



Nordstrom Double DB

Double Isolation Plug Valves

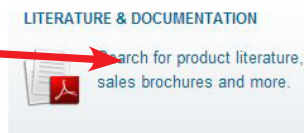


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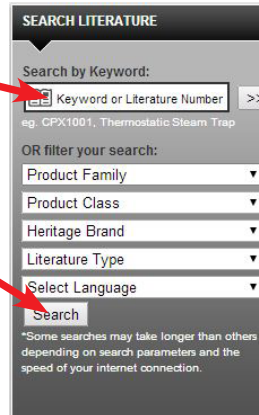
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Conformance to Standard Specifications

Wherever applicable, steel plug valves by Flowserve Nordstrom Valves conform to the latest edition of the following standard specifications as to pressure ratings, dimensions and construction. Consult your Flowserve Nordstrom Valves customer service representative for additional information.

ASME – AMERICAN SOCIETY OF MECHANICAL ENGINEERS

B16.5	Pipe Flanges and Flanged Fittings
B16.10	Face-to-Face and End-to-End Dimensions of Valves
B16.25	Butt Welding Ends
B16.34	Valves – Flanged, Threaded, and Welding End
B18.2.1	Square and Hex Bolts and Screws
B18.2.2	Square and Hex Nuts

API – AMERICAN PETROLEUM INSTITUTE

6A	Specification for Wellhead and Christmas Tree Equipment
6D/ISO 14313	Specification for Pipeline Valves
6FA	Fire Test for Valves
599	Steel and Ductile Iron Plug Valves

MSS – MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY

SP-6	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions
SP-55	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components — Visual Method for Evaluation of Surface Irregularities

MR0103 Materials Resistant to Sulfide Stress Cracking in Corrosive Petroleum Refining Environments (Valves for NACE Service)

DOT – UNITED STATES DEPARTMENT OF TRANSPORTATION

49 CFR Part 192 Pipeline Safety Regulations (U.S. Department of Transportation)

CAN/CSA Z245.15 Steel Valves

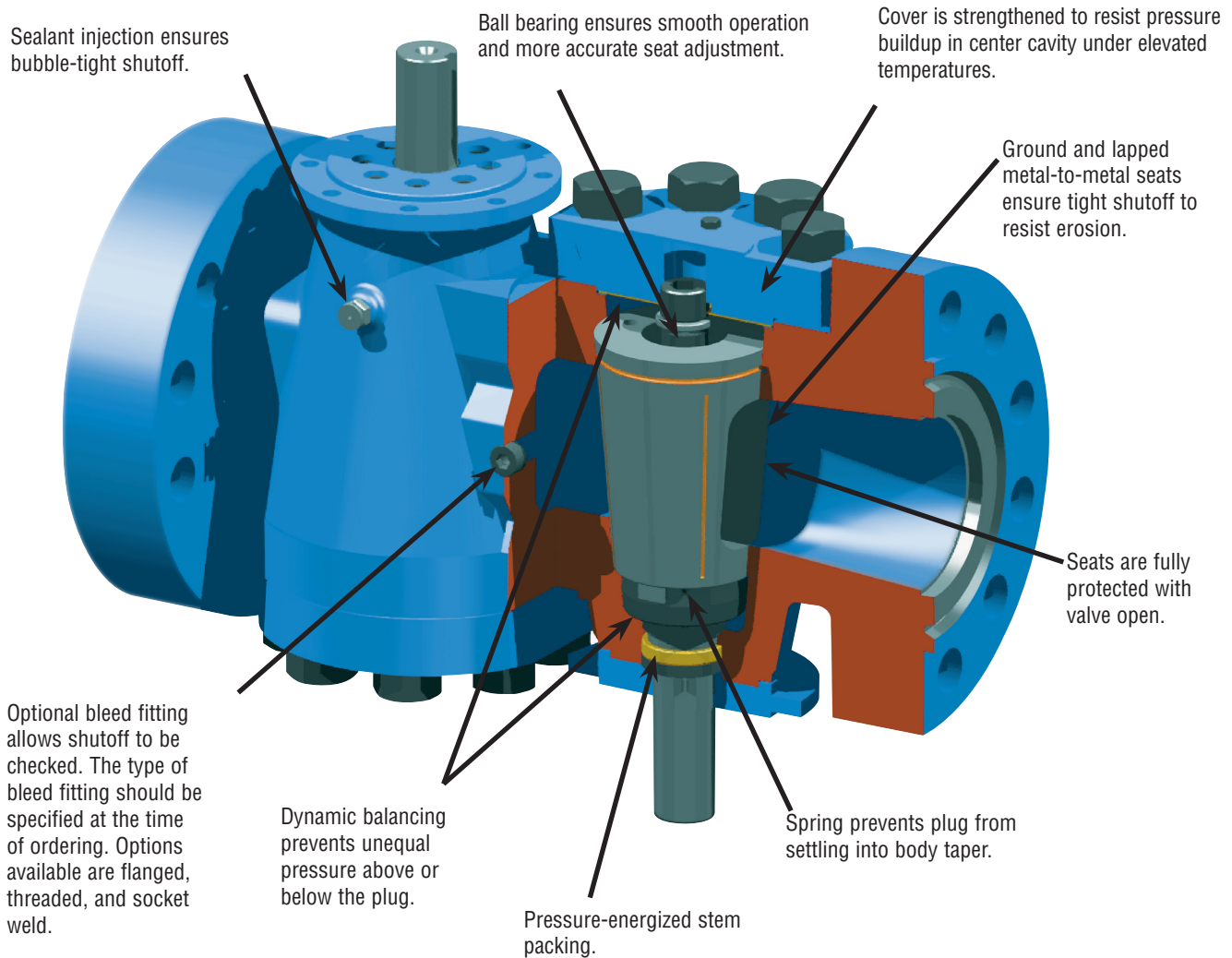
CAN/CSA Z299.3

ISO 9001 CERTIFIED



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DIPV Design Features



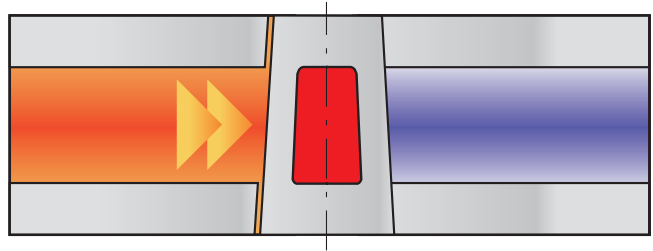
Flowserve Nordstrom Double DB™ Advantage

- Designed for critical shutoff applications where absolute shutoff is required for safety, environmental or process reasons.
 - Compressor isolation
 - Pump isolation
 - Meter isolation
 - Water or gas injection system isolation
 - Critical vents, drains and blow-downs to atmosphere
- Installation and maintenance costs are reduced dramatically.
- Uses proven Dynamic Balance® pressure balance and sealing technology.
- Two superior quality valves with the standard ASME valve dimension of a single valve.
 - Twice as many seats means twice the safety.
 - Allows for maximum port area for better flow.
- Various bleed off connections available such as, Ring Joint, Socket Weld, Threaded, Gate Valves, Needle Valves, etc. Bleed off connections are offered on one side or the other or both.
- Contact the factory for the latest available sizes.
- Flowserve's Protected Pressure Balancing ensures that the balancing holes are not exposed to the line media in the plug port, providing added security compared with normal pressure balancing.

What are the benefits?

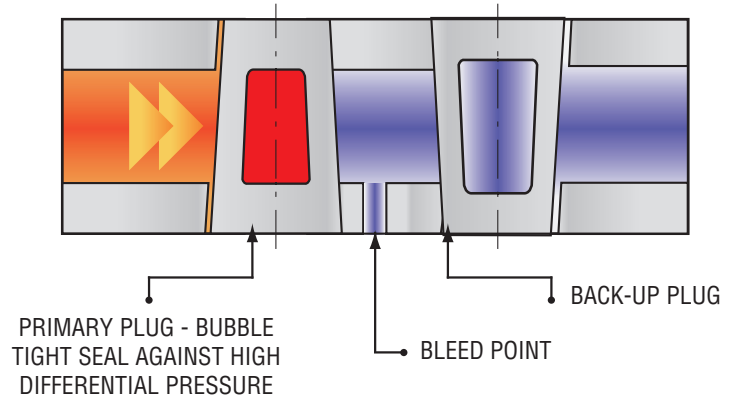
- No pipework modification - total interchangeability with existing valves.
- Choice of bleed connection options.
- Same range as single valve including hard facing.
- Meets the same industry and fire-test standards as a single valve.
- Low life cycle cost - less than two single valves.
- Assured sealing on both sides of the valve.
- Reduced leak paths - eliminates inter-valve pipework on double block and bleed configurations.
- Compact, lightweight alternative to gate valves and ball valves in series.

Single Plug - Single Isolation



Double Plug - Double Isolation

Independently operated plugs mean maximum downstream isolation safety.



Range

API 6D Dimensions	in	1/2	3/4	1	1. 1/2	2	3	4	6	8	10	12	14	16	18	20	24
	mm	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
PN20 - ANSI 150		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PN50 - ANSI 300		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PN100 - ANSI 600		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PN150 - ANSI 900		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PN250 - ANSI 1500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PN420 - ANSI 2500		•	•	•	•	•	•	•	•	•	•	•	•	•			
API 2000						•	•	•	•								
API 3000						•	•	•	•								
API 5000						•	•	•	•								
API 10000						•	•	•	•								
API 6A Dimensions	in					2. 1/16	3. 1/8	4. 1/16	7. 1/16								
	mm					52	78	103	179								

Why Select a Plug Valve?

Robust **metal-to-metal seats** cope well with the solid impurities that can run at high velocities in close proximity to the integral seating surfaces, particularly when the valve is opened against a high differential pressure.

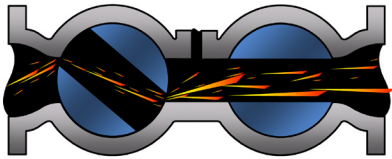


Figure 5

Robust metal-to-metal seats have also high resistance to solids objects and **lack of gap/cavity** between plug and body ensure that particles do not become trapped between plug and body thus avoiding damage to the seats while closing the valve.



Figure 6

Large seating area further enhances the DIPV resistance to erosion. The wide area maximizes the effectiveness of sealant, so that if the valve starts passing it can quickly be solved by injecting Nordstrom Sealant, restoring the valve's **bubble tight shut-off** capabilities without the need of valve overhaul. Sealant can be injected with the valve in any position and also under pressure, making the valve **in-line maintainable**.

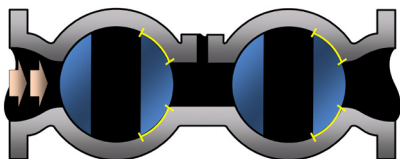


Figure 7

When the valve is open, unlike in other valve designs, the **seats are well protected** from the line media. This ensures that even if the valve is left open for long periods of time, its seating areas will not get damaged, thus ensuring good sealing and **long valve life**.

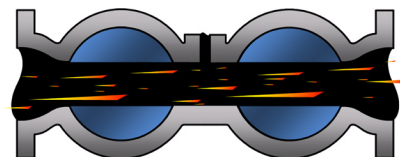


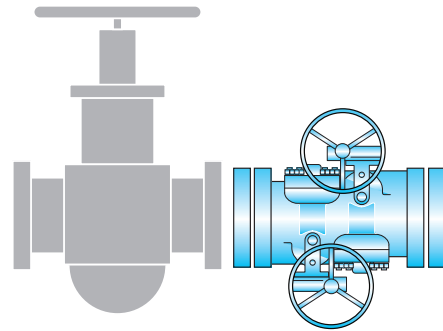
Figure 8

Proven plug valve integrity - setting new standards for double block & bleed

True double isolation within a single valve body

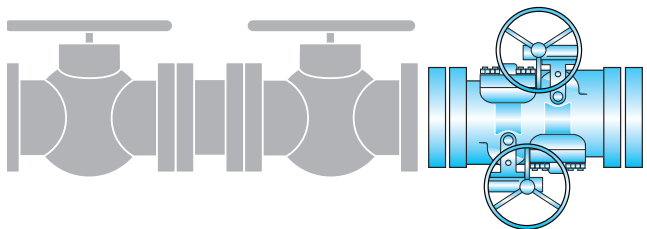
Compared with Gate Valves

- Same face-to-face but smaller overall
- Compact design means less weight



Compared with Ball Valves

- One **DIPV** replaces two ball valves
- Less interconnecting pipework means fewer leak paths
- Weight saving
- Cost saving



Main Features

Principles of Operation

Nordstrom Double Isolation Plug Valves feature two separate Protected Pressure Balanced Taper Plugs and a centrally located bleed port, integral with the body. They are designed to give bubble tight shut off on both high and low pressure applications. This is a robust, In-Line Maintainable valve with low maintenance requirements. The valve body is a rigid single piece casting. The blow out proof valve stems are fugitive emissions tested. The separate plugs are retained in the body by separate bolted covers. The design incorporates provision for external maintenance of the individual stem packing.

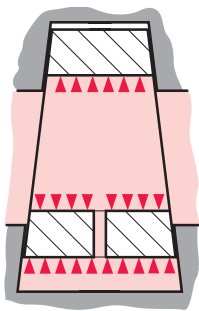


Figure 1

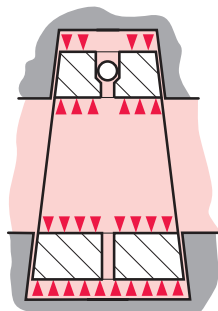


Figure 2

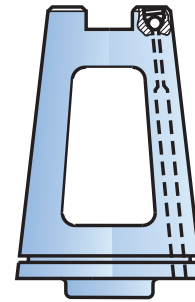


Figure 3

Plug Balancing

All DIPV valves are protected against the possibility of seizure due to taper locking. Taper locking is caused by an imbalance of forces acting on the plug due to line pressure finding its way into the large end of the plug chamber. As shown by the arrows in Figure 1, the resultant force tends to push the plug upwards, jamming it in its tapered bore. The plug can remain locked even when line pressure is subsequently reduced.

In an attempt to combat taper locking, conventional valves utilise the pressure of the plug sealant, acting on the upper face of the plug, to react against the upwards force. This reduces, but does not eliminate, the possibility of taper locking - and requires regular sealant injection to maintain valve freedom.

Pressure Balancing

Pressure balanced plug valves incorporate pressure balanced plugs, as shown in Figure 2. The drilling and check valve in the top section of the plug allow the line pressure itself to counteract the upwards force, preventing any possibility of taper locking - without the need for frequent sealant injection.

Protected Pressure Balancing (P) Flowserve Patent

For increased reliability in service and where there is a possibility of particles in the media we incorporate Protected Pressure Balance as standard on the DIPV (Figure 3). This design ensures that the balancing holes are not exposed to the line media in the plug port, providing added security compared with normal pressure balancing.

Super-LoMu Treatment

Super LoMu is our proprietary PTFE based anti-friction treatment. All DIPV plugs and stems are Super LoMu treated to ensure our valves have the lowest possible torques over the longest possible lifetime. Super LoMu is a treatment of the metal surface that reduces coefficient of friction while maintaining a true metal-to-metal contact, and we can apply it to every material combination.

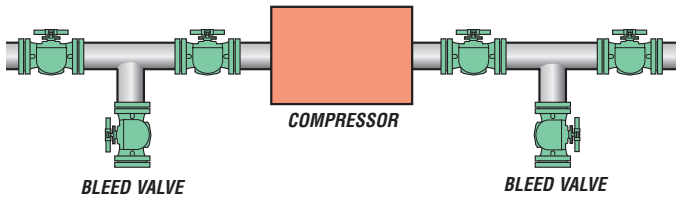
Emission Control

Industry standards are tightening the requirements on emissions levels permitted from pressurized equipment. DIPV valves are ahead of the game and are designed and tested to meet the most stringent fugitive emission requirements. Our adjustable gland design, combined with high performance graphite stem packing materials, ensures low emissions over extensive temperature and mechanical cycling, even without the use of O-rings or PTFE seals.

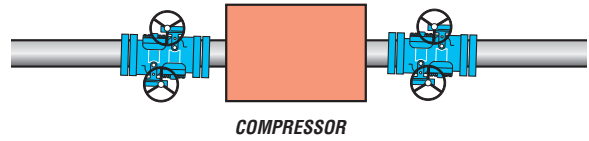
Typical Installations

Gas Transportation - Gas Compression Station

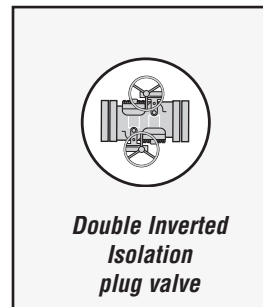
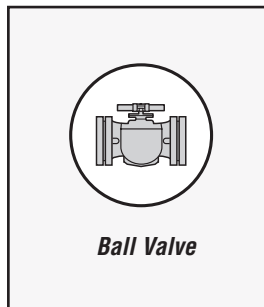
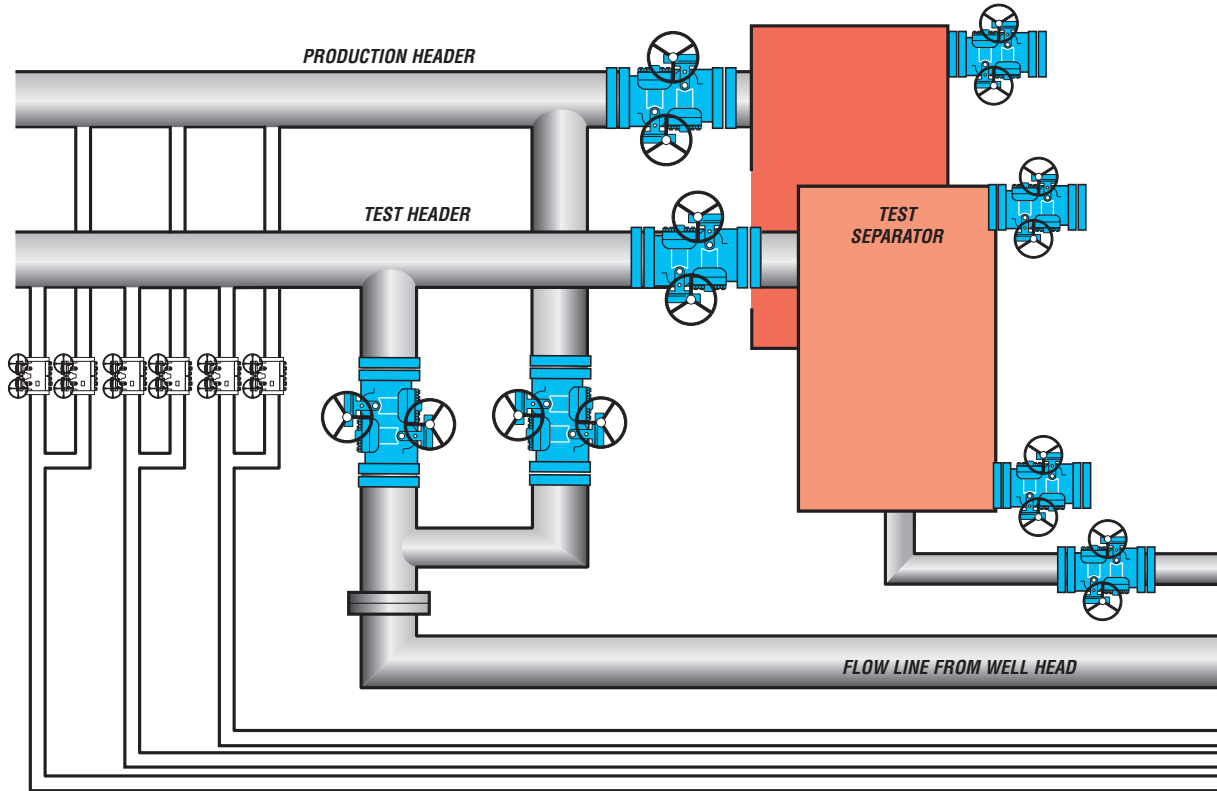
Configuration using ball valves



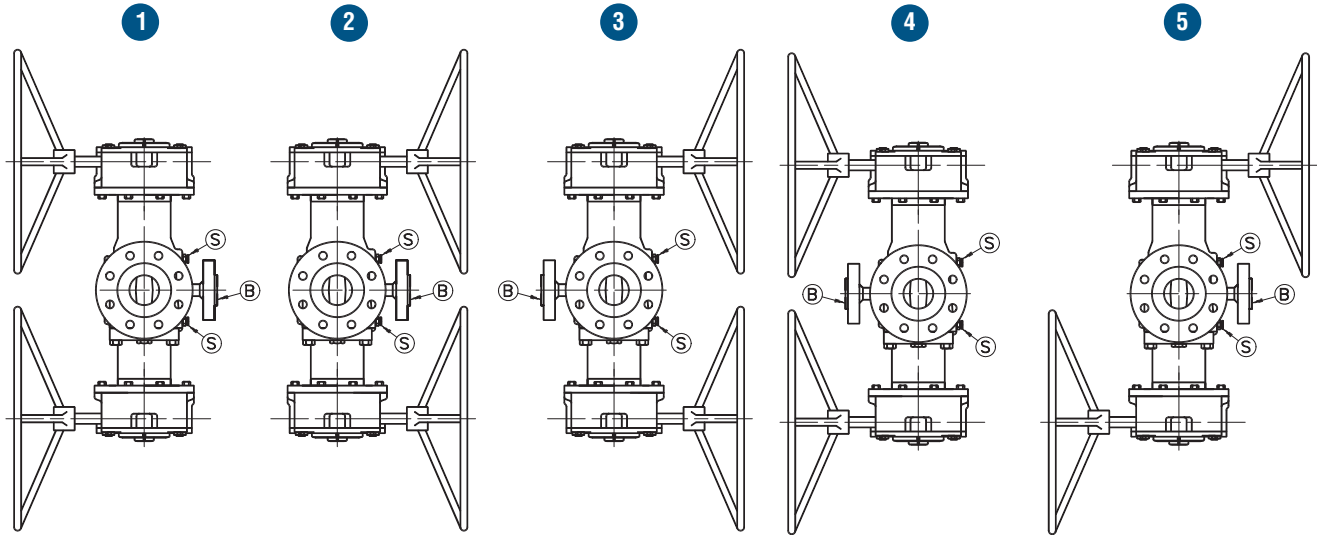
Configuration using double isolation plug valves



Oil and Gas Production - Well Heads Manifold



Double & Twin Valve Configurations



B = Bleed Connection
S = Sealant Fitting

	Double	Twin
150	5345	6345
300	5545	6545
400	n/a	n/a
600	5645	6645
900	5745	6745
1500	5845	6845
2500	5945	6945



Nordstrom Figure Number Selection Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		Figure Number	6	3	9	9	F	A	-	0	B	B	2	D					
Product Group	Double	5																	
	Twin	6																	
Pressure Class	150		3																
	300		5																
	600		6																
	900		7																
	1500		8																
	2500		9																
Operation Left Valve	Bare Stem WAct. Flange			3															
	Wrench			5															
	Gear (Horizontal Handwheel)			7															
Operation Right Valve *	Bare Stem WAct. Flange				3														
	Wrench				5														
	Gear				7														
End Connections	Flanged Ends (Raised Face)					F													
	Ring Joint Flange Ends					R													
Plug Material ***	Standard (per Design Categories)									0									
	Steel									1									
	Stainless Steel (17-4 PH)									2									
	Cast Iron									3									
	Special									4									
Bleed Size	1/2"										A								
	3/4"										B								
	1"										C								
Bleed Location	Stainless Steel (Duplex, 660 Trim)																		
	Stainless Steel (3 MIL ENC Plug)																		
Bleed Connection	Threaded End												1						
	Raised Face Flange												2						
	Ring Joint Flange												3						
	Special End												9						
Handwheel Orientation	Handwheels on same side as sealant fitting																		D
	Handwheels on opposite side of sealant fitting																		S
	Omit for Wrench operated valves																		

*** Not all plug materials available with all design categories

**** For a complete list of design categories please see page 31

Pressure Testing

All DIPV valves are hydrostatically tested on body and all 4 seats (2 seats per plug) at the following pressures before dispatch:

Valve Rating	Maximum C.W.P.		Body Test		Seat Test	
	Barg	Psig	Barg	Psig	Barg	Psig
PN20 - ANSI 150	19.5	285	29.3	427.5	21.5	313.5
PN50 - ANSI 300	51.1	740	76.7	1110	56.3	814
PN100 - ANSI 600	102.1	1480	153.2	2220	112.4	1628
ANSI 800	138	2000	207	3000	151.8	2200
PN150 - ANSI 900	153.2	2220	229.8	3330	168.6	2442
PN250 - ANSI 1500	255.3	3705	383	5558	280.9	4075.5
PN420 - ANSI 2500	425.5	6170	638.3	9255	468.1	6787
API 2000	138	2000	276	4000	138	2000
API 3000	207	3000	414	6000	207	3000
API 5000	345	5000	517	7500	345	5000
API 10000	690	10000	1035	15000	690	10000

(Class 800 pressures are taken from BS 5353, API pressures are taken from API 6A, all other pressures are taken from ANSI 16.34. The test pressures from ASME B16.34 are those relevant to Carbon Steel ASTM A216 Gr.WCB)

Even though API6D generally allows a seat leakage rate while testing metal seated valves, it should be noted that for lubricated plug valves (such as the DIPV) in accordance with API6D no seat leakage is allowed (ISO 5208 class A).

Each relevant standard defines the minimum length of time for which each test pressure is to be maintained and also the testing operations sequence. DIPV valves are tested as a minimum to API 6D, whose test durations are longer than API 598 and BS EN 12266-1.

Valve Size		API 6D	
Mm	In	Shell Test (min)	Seat Test (min)
≤ 50	≤ 2	2	2
65 – 100	2 ½ - 4	2	2
150	6	5	5
200 – 250	8 – 80	5	5
300	12	15	5
350 – 450	14 – 18	15	5
≥ 500	≥ 20	30	5

Other test durations can be accommodated to satisfy a particular order specification, optional special tests are also available such as:

- Low pressure air test
- High pressure gas test
- Fugitive emission testing
- Low and high temperature testing

Dynamic Balance Standard Design Categories

In the interests of clarity, Flowserve Nordstrom Valves has designated the following standard design categories for Dynamic Balance valves. When ordering, please indicate the letter suffix that best defines your requirements, along with complete service details.

These categories do not apply to all Dynamic Balance valves in this catalog. Contact your customer service representative for assistance.

A The standard carbon steel API-6D and B16.34 valve suitable for general service at temperatures from -20°F to +450°F (-29°C to +232°C). The standard API-6A valve, API Type 2 material, suitable for general API-6A service from 0°F to +250°F (-17°C to +121°C).

NOTE: API 6A valves are available only in NACE offshore construction.

B Low temperature valves (LCC material) suitable for general service from -50°F to +450°F (-46°C to +232°C).

C Sour gas valves conforming to NACE MR0103, API-6D and B16.34, suitable for -20°F to +450°F (-29°C to +232°C) in accordance with the appropriate standard.

D Sour gas valves conforming to NACE MR0175, API-6D and B16.34, constructed of material suitable for low-temperature service -50°F to either +250°F or +450°F (-46°C to +121°C or +232°C), in accordance with the appropriate standard.

E Valves suitable for abrasive service from -20°F to +450°F (-29°C to +232°C), essentially carbon steel material with hard-surfaced body and plug.

F Valves suitable for moderately high temperatures, +450°F to +800°F (+232°C to +427°C), essentially carbon steel material with hard-surfaced body and plug. Hot tested. Elevated gearing.

H Corrosion-resistant valves, wetted parts essentially 316 stainless steel except 17-4 PH drive train, suitable at service temperatures from -50°F to +450°F (-45°C to +232°C).

J Corrosion-resistant valves, wetted parts essentially 316 stainless steel except 17-4 PH drive train, suitable at service temperatures for +450°F to +700°F (+232°C to +371°C). Hot tested. Elevated gearing.

K Valves suitable for corrosion resistance and high temperature. Parts essentially 316 stainless steel except Nitronic 60 or 660 stainless steel stem, hard-surfaced body and plug suitable from +700°F to +1,500°F (+371°C to +816°C). Hot tested. Elevated gearing.

NACE Construction Valves for Sour Gas Applications

NACE, the National Association of Corrosion Engineers, has published a report outlining acceptable materials for valves for sour service. The current outline is Publication MR0175-2002, and is a guide to the manufacturers and users of valves based on the latest metallurgical knowledge. Most of our customers involved in this area of production also have their own specifications that may or may not be

more stringent than the NACE publication. The reason for this is, of course, that the product varies from field to field and many different types of inhibitors are used.

The basic problem is that whenever even a small amount of hydrogen sulfide (H₂S) is encountered in natural gas or under oil pressure, a corrosion phenomenon may occur, known as hydrogen sulfide embrittlement or sulfide stress cracking. Actually, the steel part is absorbing hydrogen. This causes ductility, and when other stresses are added, may result in failure of the part. Currently, we know that some steels with yield strengths above 90,000 psi (621 MPa) and/or hardness greater than Rockwell 22 (235 Brinell) are subject to sulfide stress cracking. Failure below these limits is unlikely.

Because of a long history of reliability in numerous sour gas installations, Dynamic Balance valves can be supplied in conformance to standards enumerated in the NACE governing document on sour gas application.

In some cases, a more sophisticated construction may be required because of other corrosive elements in the flow stream. All major components are heat-treated to a controlled hardness of 22 or lower on the Rockwell C scale. In this construction, the plug is coated with electrolysis nickel to prevent galling.

Complete engineering details are available upon request.

Dynamic Balance Plug Valve Metals

Carbon Steel: Cast carbon steel used in Dynamic Balance valve bodies is a medium carbon steel, conforming to ASTM Specification A216, Grade WCC.

Each heat is rigidly controlled and recorded. The castings are marked to identify the heat used in each finished valve.

Steel plugs for carbon steel valves are made of a low alloy steel, heat-treated to produce the proper balance between non-galling properties and the toughness required to resist the mechanical loads imposed in operating the valve.

Manganese-Molybdenum Alloy Steel: (API Type 60K Specification – ASTM Specification A-487 Grade 4 Class C).

This alloy steel is used for body castings for 3000 MOP and higher Dynamic Balance valves for oilfield services, that must conform to API Specification 6A, covering Steel Valves for Drilling and Production Service.

Ferritic Steel: Grade LCC Ferritic Steel, conforming to ASTM Specification A352, is basically a “killed” mild carbon steel that has good impact qualities at low temperatures.

This material is used generally for sub-zero temperatures to -50°F (-46°C) and must have a minimum average Charpy “V” notch impact strength of 15 foot pounds at that temperature.

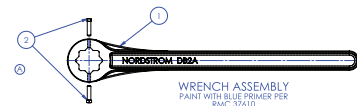
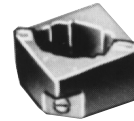
Type CF8M Stainless Steel: This is an 18-12 type of stainless steel casting material, containing molybdenum, with analysis and properties closely corresponding to AISI Type 316 wrought stainless steel, and conforming to ASTM Specification A351, Grade CF8M.

Wrenches and Adapters

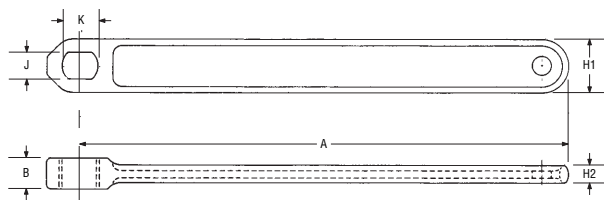
2" Square Adapters for Dynamic Balance and Super Nordstrom Valves with Obround Wrench Heads

Distance Across Flats of Obround Wrench Head on Valve (See Dimension "J")*	Adapter Part No.
.62	61291
.16	
.81	12180
.21	
.88	12181
.22	
1.00	12183
.25	
1.25	12185
.32	
1.38	12186
.35	

* For dimension "J" refer to valve dimension tables.

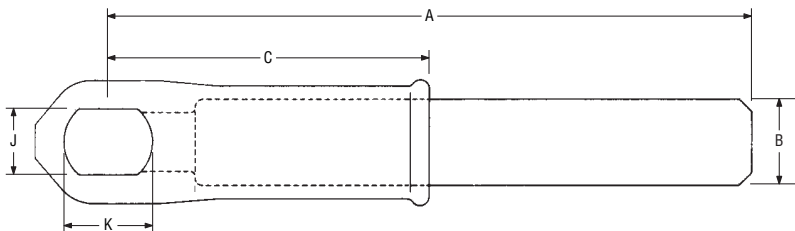


Cast Wrench For Dynamic Balance Valves



Size	Part #	Weight	A	B	H1	H2	J	K
DB-1 Obround	482014	2.0	18.0	.9	1.4	.4	.655	.875
		.9	457	23	35	11	17	22
DB-2A Standard	02769428	28	28	.68	2	131	2.75	2.75
		711	711	17	51	7.9	70	711

Cast Heads Fitted with Pipe Handle for Dynamic Balance Valves

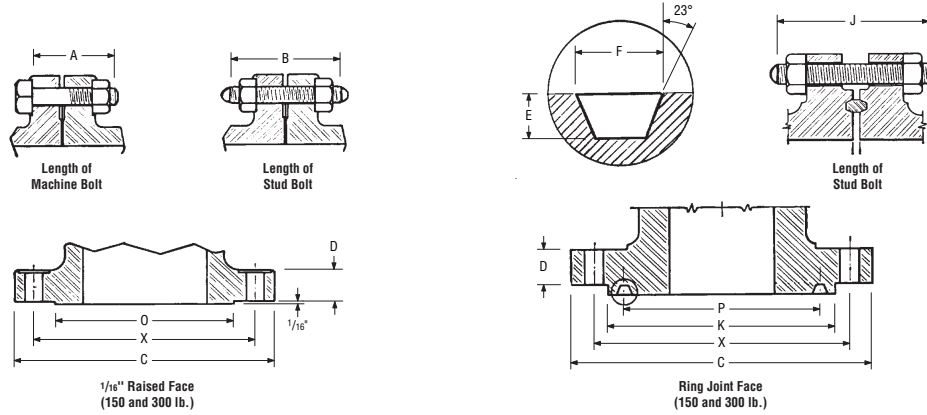


Size	Part #	Weight	A	B Dia.	C	J	K
DB-2	482006	3.7	27	1.1	4.0	.835	1.13
		2	686	27	102	21	29
DB-3	482137	6.8	36	1.3	4.7	1.03	1.44
		3	914	33	119	26	37
DB-4	482138	12.9	48	1.9	5.5	1.28	1.82
		6	1219	49	140	33	46

Locking Devices for Dynamic Balance Straightway Valves

Valve Size/Inches	1/2-3/4-1 All Classes	1 1/2-2 All Classes	2 1/2-3 All Classes (Also size 4, Class 150-600)	4 ASME Class 900-2500 API 3000 & 5000 (Also size 6 & 8, ASME Class 150-600)
Yoke	482811	482814	482817	482820
Cover	482812	482815	482818	482821
Retaining Ring	908623	908624	927389	946031
Complete Assembly	482813	482816	482819	482822

Drilling Templates, Flange and Ring Joint Dimensions, and Bolting Data for Steel Flanges



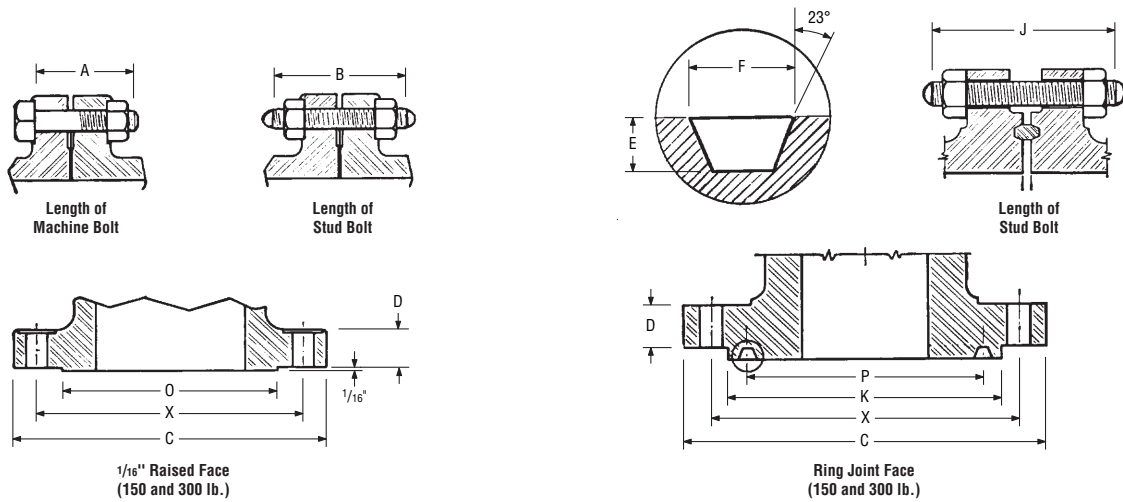
ASME Class 150 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches

Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			*Length of Bolts		
			Raised Face	Ring Joint								Stud Bolts		Mach. Bolts
	Dia. of Flange	Thickness of Flange		Dia. of 1/16" Raised Face	Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	0.06 in. Raised Face	
			C			D	O	P	E				F	K
1/2	3.50	0.38	1.38						2.38	4	1/2	2.25	-	2.00
3/4	3.88	0.44	1.69						2.75	4	1/2	2.50	-	2.00
1	4.25	0.50	2.00	R15	1.875	.250	.344	2.50	3.12	4	1/2	2.50	3.00	2.25
1 1/4	4.62	0.56	2.50	R17	2.250	.250	.344	2.88	3.50	4	1/2	2.75	3.25	2.25
1 1/2	5.00	0.62	2.88	R19	2.562	.250	.344	3.25	3.88	4	1/2	2.75	3.25	2.50
2	6.00	0.69	3.62	R22	3.250	.250	.344	4.00	4.75	4	5/8	3.25	3.75	2.75
2 1/2	7.00	0.81	4.12	R25	4.000	.250	.344	4.75	5.50	4	5/8	3.50	4.00	3.00
3	7.50	0.88	5.00	R29	4.500	.250	.344	5.25	6.00	4	5/8	3.50	4.00	3.00
3 1/2	8.50	0.88	5.50	R33	5.188	.250	.344	6.06	7.00	8	5/8	3.50	4.00	3.00
4	9.00	0.88	6.19	R36	5.875	.250	.344	6.75	7.50	8	5/8	3.50	4.00	3.00
5	10.00	0.88	7.31	R40	6.750	.250	.344	7.62	8.50	8	3/4	3.75	4.25	3.25
6	11.00	0.94	8.50	R43	7.625	.250	.344	8.62	9.50	8	3/4	4.00	4.50	3.25
8	13.50	1.06	10.62	R48	9.750	.250	.344	10.75	11.75	8	3/4	4.25	4.75	3.50
10	16.00	1.12	12.75	R52	12.000	.250	.344	13.00	14.25	12	7/8	4.50	5.00	4.00
12	19.00	1.19	15.00	R56	15.000	.250	.344	16.00	17.00	12	7/8	4.75	5.25	4.00
14	21.00	1.31	16.25	R59	15.625	.250	.344	16.75	18.75	12	1	5.25	5.75	4.50
16	23.50	1.38	18.50	R64	17.875	.250	.344	19.00	21.25	16	1	5.25	5.75	4.50
18	25.00	1.5	21.00	R68	20.375	.250	.344	21.50	22.75	16	1 1/8	5.75	6.25	5.00
20	27.50	1.62	23.00	R72	22.000	.250	.344	23.50	25.00	20	1 1/8	6.25	6.75	5.50
24	32.00	1.81	27.25	R76	26.500	.250	.344	28.00	29.50	20	1 1/4	6.75	7.25	6.00
30**	38.75	2.12	33.75						36.00	28	1 1/4	8.12		6.38
36**	46.00	2.38	40.25						42.75	32	1 1/2	8.88		7.12

NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

* Certain valves have two or more tapped holes in end flanges requiring use of studs or cap screws.

** Sizes 30 and 36 valves have the same flange and drilling dimensions as Class 125 Cast Iron Flanges ASME B16.1 – 1998 except steel flange will have .06 inch raised face.



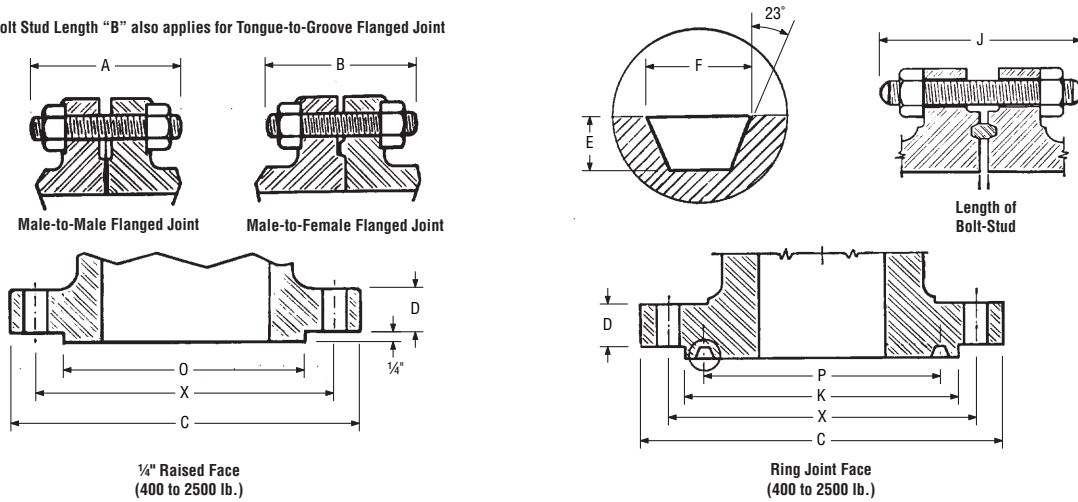
ASME Class 300 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches

Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			* Length of Bolts		
			Raised Face	Ring Joint				Stud Bolts				Mach. Bolts		
	Dia. of Flange	Thickness of Flange	Dia. of 1/16" Raised Face	Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	0.06 in. Raised Face	0.06 in. Ring Joint	0.06 in. Raised Face
C	D	O		P	E	F	K	X			B	J	A	
1/2	3.75	0.50	1.38	R11	1.344	.219	.281	2.00	2.62	4	1/2	2.50	3.00	2.25
3/4	4.62	0.56	1.69	R13	1.688	.250	.344	2.50	3.25	4	5/8	3.00	3.50	2.50
1	4.88	0.62	2.00	R16	2.000	.250	.344	2.75	3.50	4	5/8	3.00	3.50	2.50
1 1/4	5.25	0.69	2.50	R18	2.375	.250	.344	3.12	3.88	4	5/8	3.25	3.75	2.75
1 1/2	6.12	0.75	2.88	R20	2.688	.250	.344	3.56	4.50	4	3/4	3.50	4.00	3.00
2	6.50	0.81	3.62	R23	3.250	.312	.469	4.25	5.00	8	5/8	3.50	4.00	3.00
2 1/2	7.50	0.94	4.12	R26	4.000	.312	.469	5.00	5.88	8	3/4	4.00	4.50	3.25
3	8.25	1.06	5.00	R31	4.875	.312	.469	5.75	6.62	8	3/4	4.25	4.75	3.50
3 1/2	9.00	1.12	5.50	R34	5.188	.312	.469	6.25	7.25	8	3/4	4.25	5.00	3.75
4	10.00	1.19	6.19	R37	5.875	.312	.469	6.88	7.88	8	3/4	4.50	5.00	3.75
5	11.00	1.31	7.31	R41	7.125	.312	.469	8.25	9.25	8	3/4	4.75	5.25	4.25
6	12.50	1.38	8.50	R45	8.312	.312	.469	9.50	10.62	12	3/4	4.75	5.50	4.25
8	15.00	1.56	10.62	R49	10.625	.312	.469	11.88	13.00	12	7/8	5.50	6.00	4.75
10	17.50	1.81	12.75	R53	12.750	.312	.469	14.00	15.25	16	1	6.25	6.75	5.50
12	20.50	1.94	15.00	R57	15.000	.312	.469	16.25	17.75	16	1 1/8	6.75	7.25	5.75
14	23.00	2.06	16.25	R61	16.500	.312	.469	18.00	20.25	20	1 1/8	7.00	7.50	6.25
16	25.50	2.19	18.50	R65	18.500	.312	.469	20.00	22.50	20	1 1/4	7.50	8.00	6.50
18	28.00	2.31	21.00	R69	21.000	.312	.469	22.62	24.75	24	1 1/4	7.75	8.25	6.75
20	30.50	2.44	23.00	R73	23.000	.375	.531	25.00	27.00	24	1 1/4	8.00	8.75	7.25
24	36.00	2.69	27.25	R77	27.250	.438	.656	29.50	32.00	24	1 1/2	9.00	10.00	8.00

NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

* Certain valves have two or more tapped holes in end flanges requiring use of studs or cap screws.

Bolt Stud Length "B" also applies for Tongue-to-Groove Flanged Joint



1/4" Raised Face
(400 to 2500 lb.)

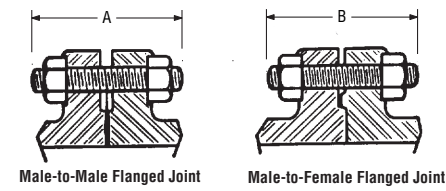
Ring Joint Face
(400 to 2500 lb.)

Nom. Pipe Size	Flange Dimensions		Facing Dimensions					Drilling			* Length of Stud-Bolts			
			Raised Face	Ring Joint							Stud Bolts		Mach. Bolts	
	Dia. of Flange	Thickness of Flange		Dia. of 1/16" Raised Face	Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	0.25 in. Raised Face	Male & Female Tongue & Groove
C	D	O		P	E	F	K	X				A	B	J
ASME Class 400 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches														
Sizes 1/2 through 3 1/2 – Use Class 600 Dimensions														
4	10.00	1.38	6.19	R37	5.875	.312	.469	6.88	7.88	8	7/8	5.50	5.25	5.50
5	11.00	1.50	7.31	R41	7.125	.312	.469	8.25	9.25	8	7/8	5.75	5.50	5.75
6	12.50	1.62	8.50	R45	8.312	.312	.469	9.50	10.62	12	7/8	6.00	5.75	6.00
8	15.00	1.88	10.62	R49	10.625	.312	.469	11.88	13.00	12	1	6.75	6.50	6.75
10	17.50	2.12	12.75	R53	12.750	.312	.469	14.00	15.25	16	1 1/8	7.50	7.25	7.50
12	20.50	2.25	15.00	R57	15.000	.312	.469	16.25	17.75	16	1 1/4	8.00	7.75	8.00
14	23.00	2.38	16.25	R61	16.500	.312	.469	18.00	20.25	20	1 1/4	8.25	8.00	8.25
16	25.50	2.50	18.50	R65	18.500	.312	.469	20.00	22.50	20	1 3/8	8.75	8.50	8.75
18	28.00	2.62	21.00	R69	21.000	.312	.469	22.62	24.75	24	1 3/8	9.00	8.75	9.00
20	30.50	2.75	23.00	R73	23.000	.375	.531	25.00	27.00	24	1 1/2	9.50	9.25	9.75
24	36.00	3.00	27.25	R77	27.250	.438	.656	29.50	32.00	24	1 3/4	10.50	10.25	11.00

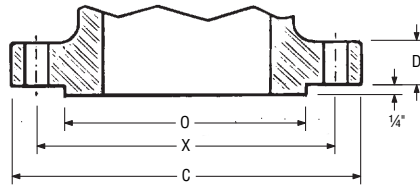
NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

* Certain valves have two or more tapped holes in end flanges requiring use of studs or cap screws.

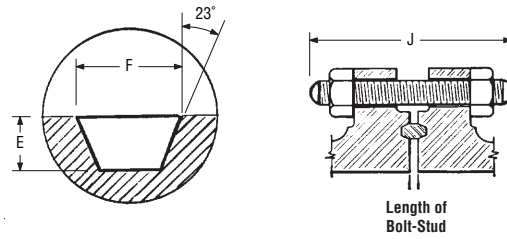
Bolt Stud Length "B" also applies for Tongue-to-Groove Flanged Joint



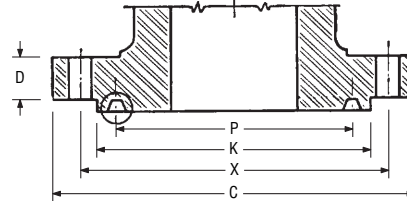
Male-to-Male Flanged Joint Male-to-Female Flanged Joint



1/4" Raised Face
(400 to 2500 lb.)



Length of Bolt-Stud



Ring Joint Face
(400 to 2500 lb.)

Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			* Length of Stud-Bolts		
			Raised Face	Ring Joint				Stud Bolts				Mach. Bolts		
	Dia. of Flange	Thickness of Flange	Dia. of 1/4" Raised Face	Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	0.25 in. Raised Face	Male & Female Tongue & Groove	Ring Joint
C	D	O		P	E	F	K	X			A	B	J	
ASME Class 600 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches														
1/2	3.75	.56	1.38	R11	1.344	.219	.281	2.00	2.62	4	1/2	3.00	2.75	3.00
3/4	4.62	.62	1.69	R13	1.688	.250	.344	2.50	3.25	4	5/8	3.50	3.25	3.50
1	4.88	.69	2.00	R16	2.000	.250	.344	2.75	3.50	4	5/8	3.50	3.25	3.50
1 1/4	5.25	.81	2.50	R18	2.375	.250	.344	3.12	3.88	4	5/8	3.75	3.50	3.75
1 1/2	6.12	.88	2.88	R20	2.688	.250	.344	3.56	4.50	4	3/4	4.25	4.00	4.25
2	6.50	1.00	3.62	R23	3.250	.312	.469	4.25	5.00	8	3/4	4.25	4.00	4.25
2 1/2	7.50	1.12	4.12	R26	4.000	.312	.469	5.00	5.88	8	3/4	4.75	4.50	4.75
3	8.25	1.25	5.00	R31	4.875	.312	.469	5.75	6.62	8	3/4	5.00	4.75	5.00
3 1/2	9.00	1.38	5.50	R34	5.188	.312	.469	6.25	7.25	8	7/8	5.50	5.25	5.50
4	10.75	1.50	6.19	R37	5.875	.312	.469	6.88	8.50	8	7/8	5.75	5.50	5.75
5	13.00	1.75	7.31	R41	7.125	.312	.469	8.25	10.50	8	1	6.50	6.25	6.50
6	14.00	1.88	8.50	R45	8.312	.312	.469	9.50	11.50	12	1	6.75	6.50	6.75
8	16.50	2.19	10.62	R49	10.625	.312	.469	11.88	13.75	12	1 1/8	7.50	7.25	7.75
10	20.00	2.50	12.75	R53	12.750	.312	.469	14.00	17.00	16	1 1/4	8.50	8.25	8.50
12	22.00	2.62	15.00	R57	15.000	.312	.469	16.25	19.25	20	1 1/4	8.75	8.50	8.75
14	23.75	2.75	16.25	R61	16.500	.312	.469	18.00	20.75	20	1 3/8	9.25	9.00	9.25
16	27.00	3.00	18.50	R65	18.500	.312	.469	20.00	23.75	20	1 1/2	10.00	9.75	10.00
18	29.25	3.25	21.00	R69	21.000	.312	.469	22.62	25.75	20	1 5/8	10.75	10.50	10.75
20	32.00	3.50	23.00	R73	23.000	.375	.531	25.00	28.50	24	1 5/8	11.25	11.00	11.50
24	37.00	4.00	27.25	R77	27.250	.438	.656	29.50	33.00	24	1 3/4	13.00	12.75	13.25

NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

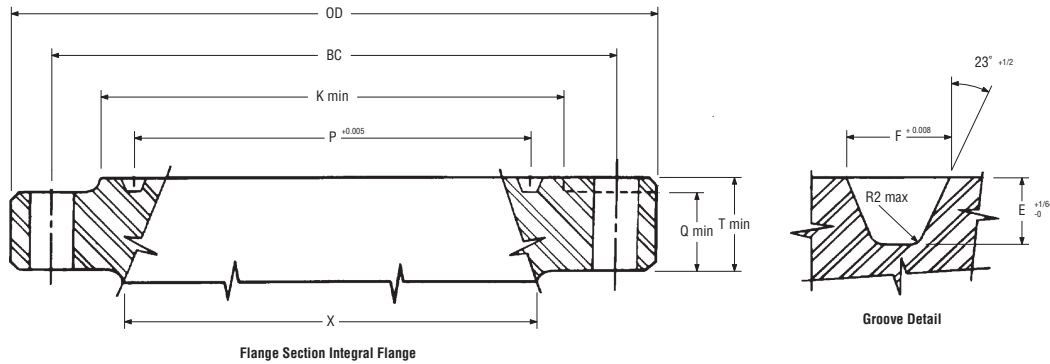
* Certain valves have two or more tapped holes in end flanges requiring use of studs or cap screws.



Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			* Length of Stud-Bolt		
	Dia. of Flange	Thickness of Flange	Raised Face	Ring Joint					Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	0.25 in. Raised Face	Male & Female Tongue & Groove	Ring Joint
				Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face						
C	D	O		P	E	F	K	X						
ASME Class 900 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches														
Sizes ½ through 2½ – Use Class 1500 Dimensions														
3	9.50	1.50	5.00	R31	4.875	.312	.469	6.12	7.50	8	¾	5.75	5.50	5.75
4	11.50	1.75	6.19	R37	5.875	.312	.469	7.12	9.25	8	1 1/8	6.75	6.50	6.75
5	13.75	2.00	7.31	R41	7.125	.312	.469	8.50	11.00	8	1 ¼	7.50	7.25	7.50
6	15.00	2.19	8.50	R45	8.312	.312	.469	9.50	12.50	12	1 1/8	7.50	7.25	7.75
8	18.50	2.50	10.62	R49	10.625	.312	.469	12.12	15.50	12	1 3/8	8.75	8.50	8.75
10	21.50	2.75	12.75	R53	12.750	.312	.469	14.25	18.50	16	1 3/8	9.25	9.00	9.25
12	24.00	3.12	15.00	R57	15.000	.312	.469	16.50	21.00	20	1 3/8	10.00	9.75	10.00
14	25.25	3.38	16.25	R62	16.500	.438	.656	18.38	22.00	20	1 ½	10.75	10.50	11.00
16	27.75	3.50	18.50	R66	18.500	.438	.656	20.62	24.25	20	1 5/8	11.25	11.00	11.50
18	31.00	4.00	21.00	R70	21.000	.500	.781	23.38	27.00	20	1 ¾	12.75	12.50	13.25
20	33.75	4.25	23.00	R74	23.000	.500	.781	25.50	29.50	20	2	13.75	13.50	14.25
24	41.00	5.50	27.25	R78	27.250	.625	1.062	30.38	35.50	20	2 ½	17.25	17.00	18.00
ASME Class 1500 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches														
½	4.75	.88	1.38	R12	1.562	.250	.344	2.38	3.25	4	¾	4.25	4.00	4.25
¾	5.12	1.00	1.69	R14	1.750	.250	.344	2.62	3.50	4	¾	4.50	4.25	4.50
1	5.88	1.12	2.00	R16	2.000	.250	.344	2.81	4.00	4	¾	5.00	4.75	5.00
1 ¼	6.25	1.12	2.50	R18	2.375	.250	.344	3.19	4.38	4	¾	5.00	4.75	5.00
1 ½	7.00	1.25	2.88	R20	2.688	.250	.344	3.62	4.88	4	1	5.50	5.25	5.50
2	8.50	1.50	3.62	R24	3.750	.312	.469	4.88	6.50	8	¾	5.75	5.50	5.75
2 ½	9.62	1.62	4.12	R27	4.250	.312	.469	5.38	7.50	8	1	6.25	6.00	6.25
3	10.50	1.88	5.00	R35	5.375	.312	.469	6.62	8.00	8	1 ¼	7.00	6.75	7.00
4	12.25	2.12	6.19	R39	6.375	.312	.469	7.62	9.50	8	1 ¼	7.75	7.50	7.75
5	14.75	2.88	7.31	R44	7.625	.312	.469	9.00	11.50	8	1 ½	9.75	9.50	9.75
6	15.50	3.25	8.50	R46	8.312	.375	.531	9.75	12.50	12	1 ½	10.25	10.00	10.50
8	19.00	3.62	10.62	R50	10.625	.438	.656	12.50	15.50	12	1 ½	11.50	11.25	12.75
10	23.00	4.25	12.75	R54	12.750	.438	.656	14.62	19.00	12	1 ¾	13.25	13.00	13.50
12	26.50	4.88	15.00	R58	15.000	.562	.906	17.25	22.50	16	2	14.75	14.50	15.25
14	29.50	5.25	16.25	R63	16.500	.625	1.062	19.25	25.00	16	2 ¼	16.00	15.75	16.75
16	32.50	5.75	18.50	R67	18.500	.688	1.188	21.50	27.75	16	2 ½	17.50	17.25	18.50
18	36.00	6.38	21.00	R71	21.000	.688	1.188	24.12	30.50	16	2 ¾	19.50	19.25	20.75
20	38.75	7.00	23.00	R75	23.000	.688	1.312	26.50	32.75	16	3	21.25	21.00	22.25
24	46.00	8.00	27.25	R79	27.250	.812	1.438	31.25	39.00	16	3 ½	24.25	24.00	25.50
ASME Class 2500 Steel Flange Standard (ASME B16.5-2003) Dimensions in Inches														
½	5.25	1.19	1.38	R13	1.688	.250	.344	2.56	3.50	4	¾	4.75	4.50	4.75
¾	5.50	1.25	1.69	R16	2.000	.250	.344	2.88	3.75	4	¾	5.00	4.75	5.00
1	6.25	1.38	2.00	R18	2.375	.250	.344	3.25	4.25	4	¾	5.50	5.25	5.50
1 ¼	7.25	1.50	2.50	R21	2.844	.312	.469	4.00	5.12	4	1	6.00	5.75	6.00
1 ½	8.00	1.75	2.88	R23	3.250	.312	.469	4.50	5.75	4	1 ¼	6.75	6.50	6.75
2	9.25	2.00	3.62	R26	4.000	.312	.469	5.25	6.75	8	1	7.00	6.75	7.00
2 ½	10.50	2.25	4.12	R28	4.375	.375	.531	5.88	7.75	8	1 ¼	7.75	7.50	8.00
3	12.00	2.62	5.00	R32	5.000	.375	.531	6.62	9.00	8	1 ¼	8.75	8.50	9.00
4	14.00	3.00	6.19	R38	6.188	.438	.656	8.00	10.75	8	1 ½	10.00	9.75	10.25
5	16.50	3.62	7.31	R42	7.500	.500	.781	9.50	12.75	8	1 ¾	11.75	11.50	12.25
6	19.00	4.25	8.50	R47	9.000	.500	.781	11.00	14.50	8	2	13.50	13.25	14.00
8	21.75	5.00	10.62	R51	11.000	.562	.906	13.38	17.25	12	2	15.00	14.75	15.50
10	26.50	6.50	12.75	R55	13.500	.688	1.188	16.75	21.25	12	2 ½	19.25	19.00	20.00
12	30.00	7.25	15.00	R60	16.000	.688	1.312	19.50	24.38	12	2 ¾	21.25	21.00	22.00

NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

* Certain valves have two or more tapped holes in end flanges requiring use of studs or cap screws.



Nom. Pipe Size	Basic Flange Dimensions			Bolting Dimensions					Ring Joint Groove and Flange Facing Dimensions				
	Outside Dia. of Flange	Total Thickness of Flange	Basic Thickness of Flange	Dia. of Hub	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	Length of Stud Bolts	Ring No.	Pitch Dia. of Type R Ring & Groove	Width of Groove	Depth of Groove	Dia. of Raised Face
	OD	T	Q	X	BC			Lssb	R or RX	P	F	E	K
API 6B Flanges for 2000 psi Rated Working Pressure Dimensions in Inches													
2 1/16	6.50	1.31	1.00	3.31	5.00	8	3/8	4.50	23	3.250	.469	.31	4.25
2 3/16	7.50	1.44	1.12	3.94	5.88	8	3/4	5.00	26	4.000	.469	.31	5.00
3 1/8	8.25	1.56	1.25	4.62	6.62	8	3/4	5.25	31	4.875	.469	.31	5.75
4 1/16	10.75	1.81	1.50	6.00	8.50	8	7/8	6.00	37	5.875	.469	.31	6.88
5 1/8	13.00	2.06	1.75	7.44	10.50	8	1	6.75	41	7.125	.469	.31	8.25
7 1/16	14.00	2.19	1.88	8.75	11.50	12	1	7.00	45	8.313	.469	.31	9.50
9	16.50	2.50	2.19	10.75	13.75	12	1 1/8	8.00	49	10.625	.469	.31	11.88
11	20.00	2.81	2.50	13.50	17.00	16	1 1/4	8.75	53	12.750	.469	.31	14.00
13 5/8	22.00	2.94	2.62	15.75	19.25	20	1 1/4	9.00	57	15.000	.469	.31	16.25
16 3/4	27.00	3.31	3.00	19.50	23.75	20	1 1/2	10.25	65	18.500	.469	.31	20.00
21 1/4	32.00	3.88	3.50	24.00	28.50	24	1 5/8	11.75	73	23.000	.531	.38	25.00
API 6B Flanges for 3000 psi Rated Working Pressure Dimensions in Inches													
2 1/16	8.50	1.81	1.50	4.12	6.50	8	7/8	6.00	24	3.750	.469	.31	4.88
2 3/16	9.62	1.94	1.62	4.88	7.50	8	1	6.50	27	4.250	.469	.31	5.38
3 1/8	9.50	1.81	1.50	5.00	7.50	8	7/8	6.00	31	4.875	.469	.31	6.12
4 1/16	11.50	2.06	1.75	6.25	9.25	8	1 1/8	7.00	37	5.875	.469	.31	7.12
5 1/8	13.75	2.31	2.00	7.50	11.00	8	1 1/4	7.75	41	7.125	.469	.31	8.50
7 1/16	15.00	2.50	2.19	9.25	12.50	12	1 1/8	8.00	45	8.313	.469	.31	9.50
9	18.50	2.81	2.50	11.75	15.50	12	1 3/8	9.00	49	10.625	.469	.31	12.12
11	21.50	3.06	2.75	14.50	18.50	16	1 3/8	9.50	53	12.750	.469	.31	14.25
13 5/8	24.00	3.44	3.12	16.50	21.00	20	1 3/8	10.25	57	15.000	.469	.31	16.50
16 3/4	27.75	3.94	3.50	20.00	24.25	20	1 5/8	11.75	66	18.500	.656	.44	20.62
20 3/4	33.75	4.75	4.25	24.50	29.50	20	2	14.50	74	23.000	.781	.50	25.50
API 6B Flanges for 5000 psi Rated Working Pressure Dimensions in Inches													
2 1/16	8.50	1.81	1.50	4.12	6.50	8	7/8	6.00	24	3.750	.469	.31	4.88
2 3/16	9.62	1.94	1.62	4.88	7.50	8	1	6.50	27	4.250	.469	.31	5.38
3 1/8	10.50	2.19	1.88	5.25	8.00	8	1 1/8	7.25	35	5.375	.469	.31	6.62
4 1/16	12.25	2.44	2.12	6.38	9.50	8	1 1/4	8.00	39	6.375	.469	.31	7.62
5 1/8	14.75	3.19	2.88	7.75	11.50	8	1 1/2	10.00	44	7.625	.469	.31	9.00
7 1/16	15.50	3.62	3.25	9.00	12.50	12	1 3/8	10.75	46	8.313	.531	.38	9.75
9	19.00	4.06	3.62	11.50	15.50	12	1 3/8	12.00	50	10.625	.656	.44	12.50
11	23.00	4.69	4.25	14.50	19.00	12	1 3/8	13.75	54	12.750	.656	.44	14.63

NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.

Typical Materials of Construction

Dynamic Balance Valves

Size 4 and Smaller Valves					
Part Name	ASME and API 6D Valves				API 6A Valves
	Category A	Category B	Category C	Category D	Category C OS ⁽⁴⁾
Adjusting Screw	Alloy Steel				
Adjusting Screw Cap	Carbon Steel				
Ball	Stainless Steel		K-500 Monel		
Body ⁽¹⁾	A216GrWCC	A352GrLCC	A216GrWCC	A352GrLCC	A487Gr4N ⁽²⁾
Bolting – Cover	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M	A193GrB7M ⁽²⁾
Bolting – Gland	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M	A193GrB7M ⁽²⁾
Bolting – Gear Flange	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M	A193GrB7M
Check Valve	Carbon Steel		Stainless Steel		
Cover ⁽¹⁾	Carbon Steel				Carbon Steel ⁽³⁾
Diaphragm – Thick	Carbon Steel				
Diaphragm – Thin	Stainless Steel				
Equalizer	Alloy Steel		Alloy Steel .003 ENP		Alloy Steel ⁽³⁾ .003 ENP
Gasket	Graphite and Stainless Steel				
Gear Flange	Wrought Carbon Steel				Carbon Steel
Gland	Ductile Iron				Ductile Iron .003 ENP
Nameplate	Stainless Steel				
Packing	Graphite and Fluoropolymer Compound				
Plug	Steel in size 6 & 8 ASME Class 1500, and size 10 & smaller Class 2500. ASTM A-48 iron in all other sizes and ASME pressure classes. Plugs have coating of low coefficient friction material.	Alloy Steel HRC 22 Max. .003 ENP			Alloy Steel ⁽³⁾ HRC 22 Max. .003 ENP
Retaining Ring	Carbon Steel				Carbon Steel .001 ENP
Sealant Fitting	Carbon Steel				
Spring	Stainless Steel		Inconel X-750		
Stem ⁽¹⁾ (Double D)	Stainless Steel		Stainless Steel		Stainless Steel ⁽³⁾ HRC 22 Max.
Stem ⁽¹⁾ (Round w/keyway)	Wrought Carbon or Low Alloy Steel		Alloy Steel HRC 22 Max.		Alloy Steel ⁽³⁾ HRC 22 Max.
Stem Ring	Carbon Steel		Wrought Carbon Steel		
Stop Collar	Wrought Carbon Steel				Wrought Carbon Steel .001 ENP
Thrust Button	Nickel Steel		Wrought Carbon Steel		
Weatherseal – Cover	Neoprene				
Weatherseal – Stem	Buna-N				Polyurethane
Zinc Washer	Zinc				
Grease Fitting	Not Applicable				Stainless Steel

(1) Category B and D valves are impact-tested to 20/15 ft-lb values.

(2) Plastic-coated.

(3) 100% hardness-tested.

(4) OS denotes offshore construction.



Size 6 and Larger – Nonpressure Seal Valves				
ASME and API 6D Valves				
Part Name	Category A	Category B	Category C	Category D
Adjusting Screw	Carbon Steel			
Adjusting Screw Cap	Carbon Steel			
Ball – Balance	Stainless Steel		K-500 Monel	
Ball – Thrust	Stainless Steel		K-500 Monel	
Ball Retaining Washer	Stainless Steel			
Ball Seat – Thrust	Alloy Steel		Stainless Steel – Stellite Hardfaced	
Bearing (Thrust Washer)	Glass/PTFE Fiber Carbon Steel Backed		Glass/PTFE Fiber Stainless Steel Backed	
Body ⁽¹⁾	A216GrWCC	A352GrLCC	A216GrWCC	A352GrLCC
Bolting – Cover	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Gland	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Gland Retainer	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Gear Flange	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Adj. Screw Cover	SAE Gr 5			
Check Valve	Carbon Steel		Stainless Steel	
Cover ⁽¹⁾	Carbon Steel			
Diaphragm – Thick	Carbon Steel			
Diaphragm – Thin	Stainless Steel			
Equalizer	Alloy Steel		Alloy Steel .003 ENP	
Gasket – Cover	Carbon Steel			
Gasket – Adj. Screw Cover	ACCOPAC N 820D			
Gear Flange	Carbon Steel			
Gland – Wrench-Operated	Ductile Iron			
Gland – Gear-Operated	Gray Iron			
Gland Retainer	Carbon Steel			
Key	Carbon Steel			
Nameplate	Stainless Steel			
Packing	Graphite and Fluoropolymer Compound			
Plug	A48Gr45B/50B or Carbon Steel		Alloy Steel HRC 22 Max. .003 ENP	
Retaining Ring	Carbon Steel			
Sealant Fitting	Carbon Steel			
Spring	Stainless Steel		Inconel X-750	
Stem ⁽¹⁾ (Double D)	Stainless Steel		Stainless Steel Double Age Hardened	
Stem ⁽¹⁾ (Round w/keyway)	Alloy Steel		Alloy Steel HRC 22 Max. .003 ENP	
Stem Ring	Carbon Steel			
Stop Collar	Wrought Carbon Steel			
Thrust Button	Wrought Carbon Steel			
Weatherseal – Cover	Neoprene			
Weatherseal – Stem	Buna-N			
Zinc Washer	Zinc			

(1) Category B and D valves are impact-tested to 20/15 ft-lb values.

Size 6 and Larger – Pressure Seal Valves				
ASME and API 6D Valves				
Part Name	Category A	Category B	Category C	Category D
Adjusting Screw	Alloy Steel			
Adjusting Screw Cap	Carbon Steel			
Ball – Balance	Stainless Steel		K-500 Monel	
Ball Retaining Washer	Stainless Steel			
Ball Seat – Thrust	Alloy Steel		Stainless Steel – Stellite Hardfaced	
Bearing (Thrust Washer, Stem)	Glass/PTFE Fiber Carbon Steel Backed		Glass/PTFE Fiber Stainless Steel Backed	
Body ⁽¹⁾	A216GrWCC	A352GrLCC	A216GrWCC	A352GrLCC
Bolting – Gland Retainer	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Gear Flange	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Packing Gland, Adjusting Screw	A193GrB7	A320GrL7	A193GrB7M	A320GrL7M
Bolting – Adj. Screw Cover	SAE Gr 5			
Check Valve	Carbon Steel		Stainless Steel	
Cover ⁽¹⁾	Carbon Steel			
Cover Retainer	Carbon Steel			
Equalizer	Alloy Steel		Alloy Steel .003 ENP	
Gasket – Pressure Seal	Carbon Steel			
Gasket – Cover	Carbon Steel			
Gland – Stem Packing	Ductile Iron			
Gland – Adjusting Screw	Gray Iron			
Gland Retainer	Carbon Steel			
Key	Carbon Steel			
Nameplate	Stainless Steel			
Packing – Stem	Graphite and Fluoropolymer Compound			
Packing – Adjusting Screw	(1) Braided Carbon Filament Yarn and (1) Graphite			
Pin – Spring Disk	Carbon Steel			
Plug	A48Gr45B/50B or Carbon Steel		Alloy Steel HRC 22 Max. .003 ENP	
Sealant Fitting	Carbon Steel			
Ring – Spacer	Carbon Steel			
Ring – Split	Alloy Steel			
Spring – Plug	Stainless Steel		Inconel X-750	
Spring Disk	Alloy Steel			
Stem ⁽¹⁾ (Gear-Operated)	Alloy Steel		Alloy Steel HRC 22 Max. .003 ENP	
Stem Ring	Carbon Steel			
Zinc Washer	Zinc			

(1) Category B and D valves are impact-tested to 20/15 ft-lb values.

Nordstrom DIPV End Flange Stud Lenth Information						
Size	Figure	Class	Config.	Qty. Per Flange	Thread Size	Stud length for tapped holes
2	5345	150	opposed	4	5/8-11UNC	2.57
	5545	300	opposed	8	5/8-11UNC	2.69
	5645	600	opposed	8	5/8-11UNC	3.26
	5845/9	1500	opposed	8	7/8-9UNC	4.31
	6845/9	1500	twin	8	7/8-9UNC	5.00
	5945/9	2500	opposed	8	1-8UNC	5.99
	6945/9	2500	twin	8	1-8UNC	5.99
3	5345	150	opposed	n/a	n/a	n/a
	5545	300	opposed	8	n/a	n/a
	5645	600	opposed	8	¾-10UNC	3.75
	5745/9	900	opposed	n/a	n/a	n/a
	5845/9	1500	opposed	8	1-1/8-8UN	5.62
	6845/9	1500	twin	8	1-1/8-8UN	5.99
	5945/9	2500	opposed	8	1-¼-8UN	7.69
	6945/9	2500	twin	8	1-¼-8UN	7.89
4	5345	150	opposed	n/a	n/a	n/a
	5545	300	opposed	n/a	n/a	n/a
	5645	600	opposed	8	7/8-9UNC	4.34
	5749	900	opposed	8	1-1/8-8UN	5.27
	5849	1500	opposed	n/a	n/a	n/a
	6849	1500	twin	8	1-¼-8UN	5.87
	5949	2500	opposed	8	1-½-8UN	8.76
	6949	2500	twin	8	1-½-8UN	8.76
6	5345	150	opposed	8	n/a	n/a
	5545	300	opposed	12	n/a	n/a
	5645	600	opposed	12	1-8UNC	4.97
	5749	900	opposed	12	1-1/8-8UN	6.68
	5849	1500	opposed	12	1-3/8-8UN	7.69
	6849	1500	twin	12	1-3/8-8UN	8.94
	5949	2500	opposed	8	n/a	n/a
	6949	2500	twin	n/a	n/a	n/a



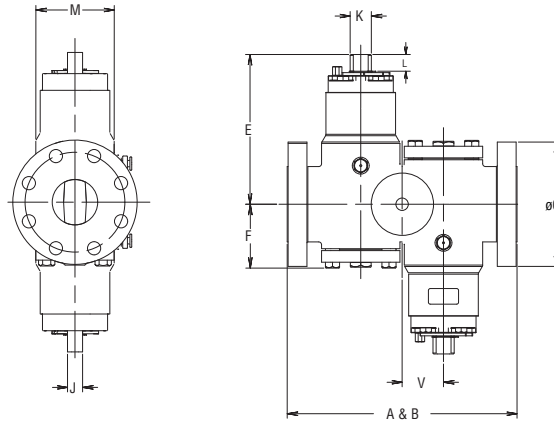
Nordstrom Double DB Double Isolation Plug Valves FCD NVENBR1016-01-AQ – 10/15

8	5345	150	opposed	n/a	n/a	n/a
	5545	300	opposed	n/a	n/a	n/a
	5649	600	opposed	12	n/a	n/a
	5749	900	opposed	12	1-3/8-8UN	6.27
	5849	1500	opposed	n/a	n/a	n/a
	6849	1500	twin	n/a	n/a	n/a
	5949	2500	opposed	12	2-8UN	13.41
	6949	2500	twin	n/a	n/a	n/a
10	5349	150	opposed	n/a	n/a	n/a
	5549	300	opposed	n/a	n/a	n/a
	5649	600	opposed	n/a	n/a	n/a
	5749	900	opposed	16	1-3/8-8UN	7.77
	5849	1500	opposed	12	1-7/8-8UN	9.77
	6849	1500	twin	n/a	n/a	n/a
	5949	2500	opposed	12	n/a	n/a
	6949	2500	twin	n/a	n/a	n/a
12	5349	150	opposed	n/a	n/a	n/a
	5549	300	opposed	n/a	n/a	n/a
	5649	600	opposed	n/a	n/a	n/a
	5749	900	opposed	n/a	n/a	n/a
	5849	1500	opposed	16	2-8UN	11.28
	6849	1500	twin	n/a	n/a	n/a
	5949	2500	opposed	*	n/a	n/a
	6949	2500	twin	n/a	n/a	n/a
*current design is Techloc ends, flange information not available						

Nordstrom DIPV Bolt Information						
Size	Class	Fig. No.	Thread Size	Bolt Length	Qty. Per Flange	
2	1500	5845	7/8-9	3.25	4	
2	1500	6845	7/8-9	4.00	8	
2	2500	5945	1-8	4.50	4	
2	2500	6945	1-8	3.75	4	
3	1500	5845	1 1/8-8	4.00	8	
3	1500	6845	1 1/8-8	4.50	8	
3	2500	5949	1 ¼-8	6.00	4	
3	2500	6945	1 ¼-8	5.00	4	
4	1500	5849	1 ¼-8	4.25	8	
4	1500	6849	1 ¼-8	4.25	4	
4	2500	5949	1 ½-8	6.75	4	
4	2500	6949	1 ½-8	6.75	4	
6	1500	5849	1 3/8-8	5.75	4	
6	1500	6849	1 3/8-8	7.00	12	
6	2500	5949	N/A	N/A	N/A	
6	2500	6949	2-8	7.75	2	

Dynamic Balance Double Isolation Plug Valve

ASME Class 150 (PN 20)



ASME Class 150 – Figure 5345

Size	NPS DN	2 50	6 150
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	11.50* 292	21.50* 546
Face-to-Face, flanged (ring joint)	B	11.62* 295	22.00* 559
Diameter of flange	C	6.00 152	11.00 279
Center to top of stem	E	8.08 205	10.57 268
Center to bottom of body	F	3.79 96	6.44 164
Width of stem flat	J	0.81 21	1.25 32
Diameter of stem	K	1.09 28	1.78 45
Height of stem flat	L	1.00 26	1.10 28
Extreme width of body	M	5.20 132	8.80 224
Centerline of valve to centerline of stem	V	2.17 55	4.00 102
Wrench size	—	DB-2	DB-4
Weight (approx.)	lb. kg	90 41	442 200

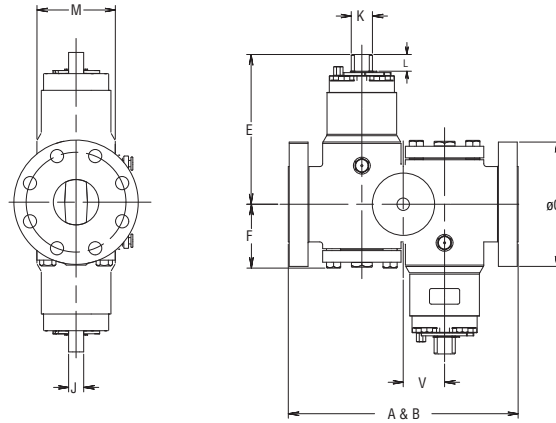
Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

*Conforms to API 6D, section 6.3, and is marked accordingly.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

ASME Class 300 (PN 50)



ASME Class 300 – Figure 5545

Size	NPS DN	2 50	3 80
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	11.12* 282	15.25* 387
Face-to-Face, flanged (ring joint)	B	11.75* 298	15.88* 403
Diameter of flange	C	6.50 165	8.25 210
Center to top of stem	E	8.00 203	9.40 239
Center to bottom of body	F	3.40 86	4.20 107
Width of stem flat	J	0.81 21	1.00 25
Diameter of stem	K	1.09 28	1.41 36
Height of stem flat	L	1.20 31	1.30 33
Extreme width of body	M	5.20 132	5.20 132
Centerline of valve to centerline of stem	V	2.17 55	2.74 70
Wrench size	—	DB-2	DB-3
Weight (approx.)	lb. kg	100 46	170 77

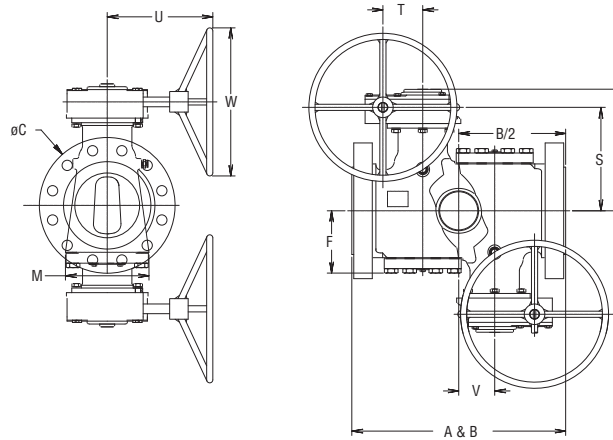
Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

*Conforms to API 6D, section 6.3, and is marked accordingly.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

ASME Class 300 (PN 50)



ASME Class 300 – Figure 5549

Size	NPS DN	6 80
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	27.75 705
Face-to-Face, flanged (ring joint)	B	28.00 711
Diameter of flange	C	12.50 318
Center to bottom of body	F	7.91 201
Extreme width of body	M	10.82 275
Centerline of valve to centerline of gearing	V	4.77 121
Category A and C Gear Dimensions		
Center to top (gearing)	E	12.70 322
Center of port to center of handwheel	S	10.40 264
Longitudinal centerline to handwheel centerline	T	4.80 122
Longitudinal centerline to face of handwheel	U	14.09 358
Handwheel diameter/Number of turns to open gearing	W	24/17 610/17
Weight (approx.)	lb. kg	1020 463
Category B and D Gear Dimensions		
Center to top (gearing)	E	12.70 322
Center of port to center of handwheel	S	10.40 264
Longitudinal centerline to handwheel centerline	T	4.80 122
Longitudinal centerline to face of handwheel	U	14.09 358
Handwheel diameter/Number of turns to open gearing	W	24/17 610/17
Weight (approx.)	lb. kg	1020 463

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

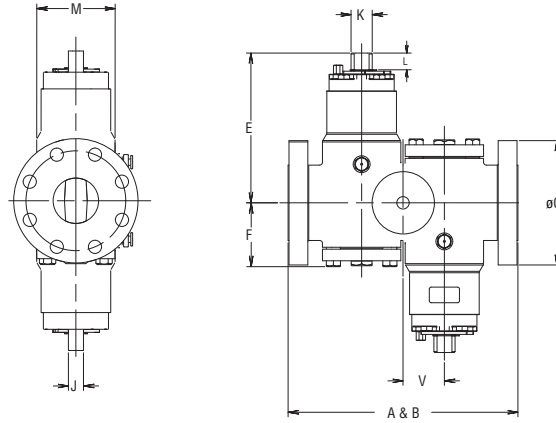
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Double Isolation Plug Valve

ASME Class 600 (PN 100)



ASME Class 600 – Figure 5645

Size	NPS DN	2 50	3 80
Face-to-Face, flanged (raised face) (incl. ¼" raised face)	A	11.50 292	14.00 356
Face-to-Face, flanged (ring joint)	B	11.62 295	14.12 359
Diameter of flange	C	6.50 165	8.25 210
Center to top of stem	E	8.00 205	9.40 239
Center to bottom of body	F	3.40 86	4.20 107
Width of stem flat	J	0.80 20	1 25
Diameter of stem	K	1.09 27	1.40 35
Height of stem flat	L	1.20 31	1.30 33
Extreme width of body	M	5.20 132	6.80 173
Centerline of valve to centerline of stem	V	2.17 55	2.53 64
Wrench size	—	DB-2	DB-3
Weight (approx.)	lb. kg	100 46	170 77.3

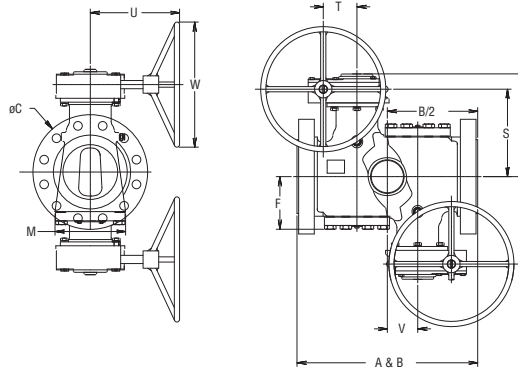
Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

Upper dimensions and weights are in inches and pounds.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

ASME Class 600 (PN 100)



ASME Class 600 – Figure 5649

Size	NPS DN	8 200
Face-to-Face, flanged (raised face) (incl. 1/4" raised face)	A	26.00 660
Face-to-Face, flanged (ring joint)	B	26.12 663
Diameter of flange	C	16.50 419
Center to bottom of body	F	7.60 193
Extreme width of body	M	10.20 259
Centerline of valve to centerline of gearing	V	4.38 111
Category A and C Gear Dimensions		
Center to top (gearing)	E	14.80 376
Center of port to center of handwheel	S	12.60 320
Longitudinal centerline to handwheel centerline	T	4.84 123
Longitudinal centerline to face of handwheel	U	12.80 325
Handwheel diameter/Number of turns to open gearing	W	18/17 457/17
Weight (approx.)	lb. kg	850 386
Category B and D Gear Dimensions		
Center to top (gearing)	E	14.80 376
Center of port to center of handwheel	S	12.60 320
Longitudinal centerline to handwheel centerline	T	4.84 123
Longitudinal centerline to face of handwheel	U	12.80 325
Handwheel diameter/Number of turns to open gearing	W	18/17 457/17
Weight (approx.)	lb. kg	850 386

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

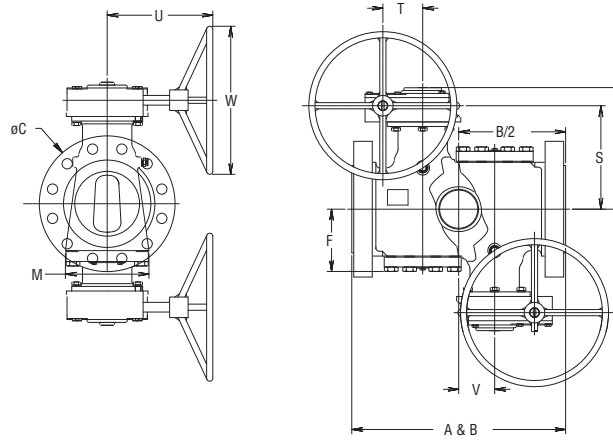
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Double Isolation Plug Valve

ASME Class 900 (PN 150)



ASME Class 900 – Figure 5749

Size	NPS DN	4 100	6 80	8 200	10 250
Face-to-Face, flanged (raised face) (incl. ¼" raised face)	A	18.00 457	24.00 610	29.00 737	33.00 838
Face-to-Face, flanged (ring joint)	B	18.12 460	24.12 613	29.12 740	33.12 841
Diameter of flange	C	11.50 292	15.00 381	18.50 470	21.50 546
Center to bottom of body	F	6.06 154	7.20 183	10.72 273	11.40 290
Extreme width of body	M	8.70 221	10.00 254	12.80 325	15.60 396
Centerline of valve to centerline of gearing	V	8.70 221	4.45 113	5.59 142	6.24 158
Category A and C Gear Dimensions					
Center to top (gearing)	E	12.12 308	15.50 392	16.30 414	19.90 504
Center of port to center of handwheel	S	10.41 264	13.20 336	13.30 338	16.90 428
Longitudinal centerline to handwheel centerline	T	3.52 89	4.84 123	6.06 154	6.06 154
Longitudinal centerline to face of handwheel	U	10.09 256	14.09 358	15.08 383	16.45 418
Handwheel diameter/Number of turns to open gearing	W	14/15 356/15	24/17 610/17	24/22 610/22	30/22 762/22
Weight (approx.)	lb. kg	460 209	800 363	1580 717	2140 971
Category B and D Gear Dimensions					
Center to top (gearing)	E	12.12 308	15.50 392	16.30 414	20.80 529
Center of port to center of handwheel	S	10.41 264	13.20 336	13.30 338	17.50 444
Longitudinal centerline to handwheel centerline	T	3.52 89	4.84 123	6.06 154	2.10 54
Longitudinal centerline to face of handwheel	U	10.09 256	14.09 358	15.08 383	21.01 534
Handwheel diameter/Number of turns to open gearing	W	14/15 356/15	24/17 610/17	24/22 610/22	30/22 762/45
Weight (approx.)	lb. kg	460 209	800 363	1580 717	2230 1012

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

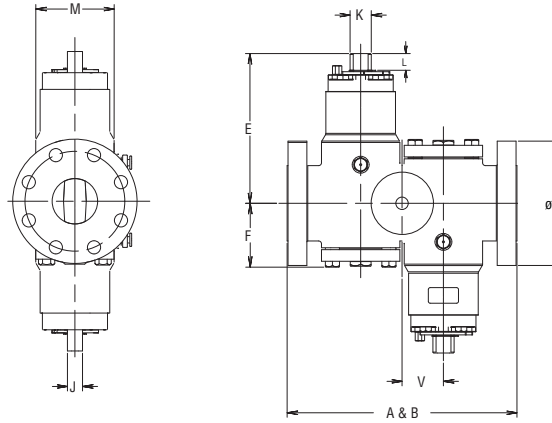
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

ASME Class 1500 (PN 250)



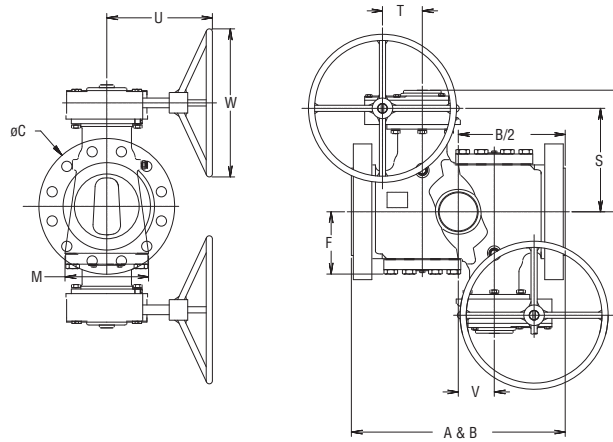
ASME Class 1500 – Figure 5845

Size	NPS DN	2 50	3 80
Face-to-Face, flanged (raised face) (incl. ¼" raised face)	A	14.50 368	18.50 470
Face-to-Face, flanged (ring joint)	B	14.62 371	18.62 473
Diameter of flange	C	8.50 216	10.50 267
Center to top of stem	E	8.10 206	10.20 260
Center to bottom of body	F	4.50 107	5.00 127
Width of stem flat	J	0.81 21	1.00 25
Diameter of stem	K	1.09 28	1.41 36
Height of stem flat	L	1.00 26	1.12 29
Extreme width of body	M	4.70 119	6.20 157
Centerline of valve to centerline of stem	V	2.35 60	3.71 94
Wrench size	—	DB-2	DB-3
Weight (approx.)	lb. kg	140 63	250 114

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.
Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Double Isolation Plug Valve

ASME Class 1500 (PN 250)



ASME Class 1500 – Figure 5849

Size	NPS DN	2 50	3 80	6 150	10 250	12 300
Face-to-Face, flanged (raised face) (incl. ¼" raised face)	A	14.50 368	18.50 470	27.75 705	39.00 991	44.50 1130
Face-to-Face, flanged (ring joint)	B	14.62 371	18.62 473	28.00 711	39.38 1000	45.12 1146
Diameter of flange	C	8.50 216	10.50 267	15.50 394	23.00 584	26.50 673
Center to bottom of body	F	4.50 114	5.00 127	7.90 201	12.90 327	14.30 363
Extreme width of body	M	4.70 119	6.20 157	10.82 275	15.88 403	22.00 559
Centerline of valve to centerline of gearing	V	2.35 60	3.71 94	4.77 121	6.40 162	7.63 194
Category A and C Gear Dimensions						
Center to top (gearing)	E	9.10 231	19.70 500	12.70 322	25.90 658	30.20 767
Center of port to center of handwheel	S	8.14 207	18.20 462	10.40 265	19.70 500	23.00 584
Longitudinal centerline to handwheel centerline	T	2.05 52	2.60 67	4.80 123	8.20 208	8.20 208
Longitudinal centerline to face of handwheel	U	6.90 176	9.40 239	14.10 358	15.30 389	14.90 376
Handwheel diameter/Number of turns to open gearing	W	10/10 254/10	12/10.5 305/10.5	24/17 610/17	24/180 610/180	30/62.5 762/62.5
Weight (approx.)	lb. kg	145 66	288 131	1346 611	3800 2041	4900 2227
Category B and D Gear Dimensions						
Center to top (gearing)	E	9.10 231	19.70 500	12.70 322	25.90 658	30.20 767
Center of port to center of handwheel	S	8.14 207	18.20 462	10.40 265	19.70 500	23.00 584
Longitudinal centerline to handwheel centerline	T	2.05 52	2.60 67	4.80 123	8.20 208	8.20 208
Longitudinal centerline to face of handwheel	U	6.90 176	9.40 239	14.10 358	15.30 389	14.90 376
Handwheel diameter/Number of turns to open gearing	W	10/10 254/10	14/10.5 356/10.5	24/17 610/17	24/180 610/180	24/180 610/180
Weight (approx.)	lb. kg	145 66	288 131	1346 611	3800 2041	4900 2227

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

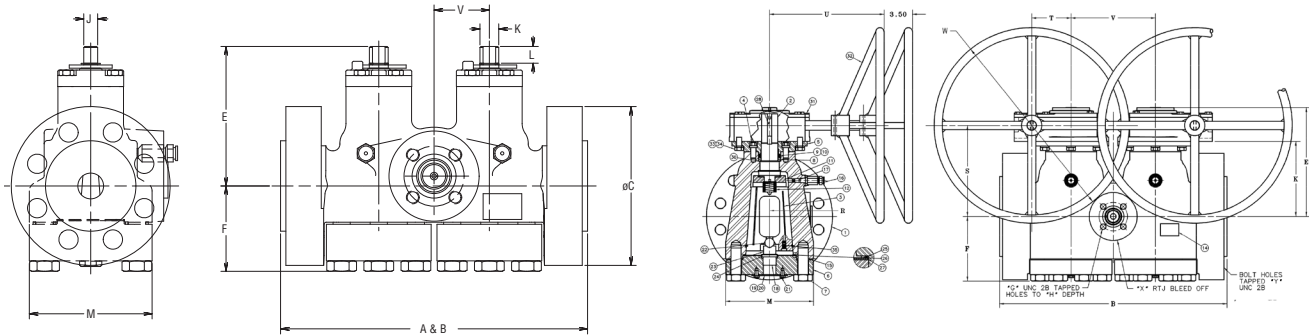
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Twin Isolation Plug Valve

ASME Class 1500 (PN 250)



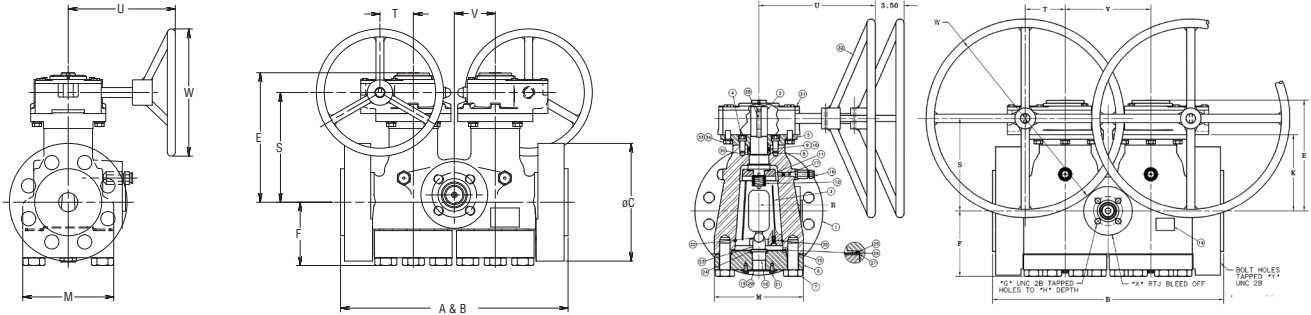
ASME Class 1500 – Figure 6845

Size	NPS DN	2 50	3 75	4 100
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	14.50 368	18.50 470	21.50 546
Face-to-Face, flanged (ring joint)	B	14.62 371	18.62 473	21.62 549
Diameter of flange	C	8.50 216	10.50 267	12.25 311
Center to top of stem	E	6.60 168	9.98 254	10.09 256
Center to bottom of body	F	4.20 107	5.19 132	5.80 147
Width of stem flat	J	0.81 21	1.00 25	1.25 32
Diameter of stem	K	1.09 28	1.41 36	1.78 45
Height of stem flat	L	1.00 26	1.10 28	1.20 29
Extreme width of body	M	6.98 177	6.20 158	9.12 232
Centerline of valve to centerline of stem	V	2.75 70	3.71 94	3.74 95
Wrench size	—	DB-2	DB-2	DB-4
Weight (approx.)	lb. kg	150 68	310 141	480 218

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.
Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Twin Isolation Plug Valve

ASME Class 1500 (PN 250)



ASME Class 1500 – Figure 6849

Size	NPS DN	2 50	4 100	6 150
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	14.50 368	21.50 546	27.75 705
Face-to-Face, flanged (ring joint)	B	14.62 371	21.62 549	28.00 712
Diameter of flange	C	8.50 216	12.25 311	15.50 394
Center to bottom of body	F	4.20 107	5.8 147	7.90 201
Extreme width of body	M	6.98 177	9.12 232	10.80 25.4
Centerline of valve to centerline of gearing	V	2.75 70	3.74 95	10.40 264
Category A and C Gear Dimensions				
Center to top (gearing)	E	7.70 196	13.40/11.90* 340/302	13.40 340
Center of port to center of handwheel	S	6.50 164	11.60/10.10* 295/256	11.20 285
Longitudinal centerline to handwheel centerline	T	2.10 52	3.40 86	4.80 122
Longitudinal centerline to face of handwheel	U	7.13 181	10.19 259	14.10 358
Handwheel diameter/Number of turns to open gearing	W	10/10 254/10	18/11.5 457/11.5	24 610
Weight (approx.)	lb. kg	175 79	590 268	1040 472
Category B and D Gear Dimensions				
Center to top (gearing)	E	7.70 196	13.40/11.90* 340/302	13.40 340
Center of port to center of handwheel	S	6.50 164	11.60/10.10* 295/256	11.20 285
Longitudinal centerline to handwheel centerline	T	2.10 52	3.40 86	4.80 122
Longitudinal centerline to face of handwheel	U	7.13 181	10.19 259	14.10 358
Handwheel diameter/Number of turns to open gearing	W	10/10 254/10	18/11.5 457/11.5	24/17 610/17
Weight (approx.)	lb. kg	175 79	590 268	1040 472

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

* Note: Gearbox height is offset between center sections.

For motorization contact factory for correct gear model and valve outline dimensions.

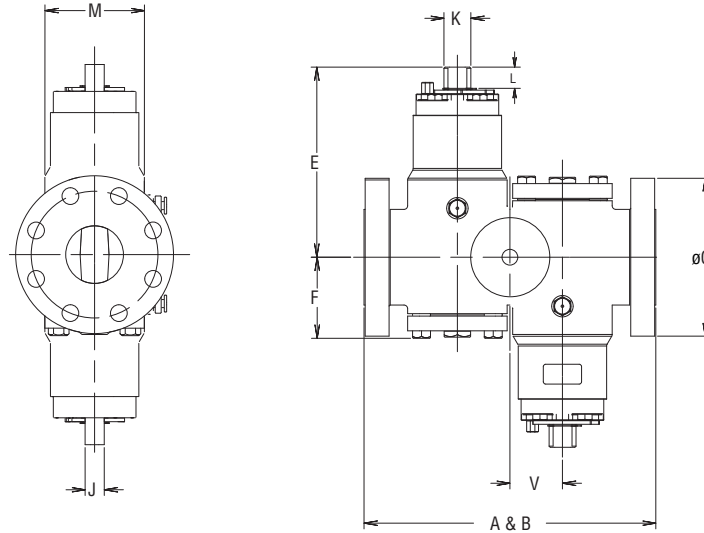
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

ASME Class 2500 (PN 420)



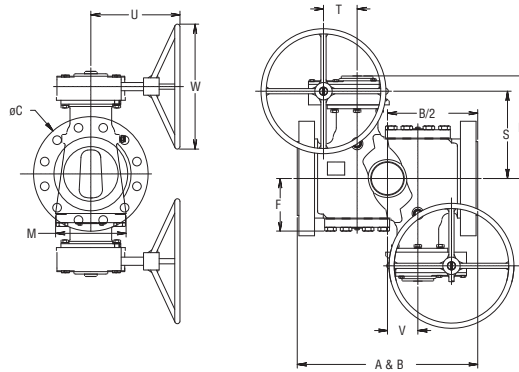
ASME Class 2500 – Figure 5945

Size	NPS DN	2 50	3 80
Face-to-Face, flanged (raised face) (incl. ¼" raised face)	A	17.75 451	22.75 578
Face-to-Face, flanged (ring joint)	B	17.88 454	23.00 584
Diameter of flange	C	9.25 235	12.00 305
Center to top of stem	E	8.12 206	8.54 217
Center to bottom of body	F	5.16 131	5.83 148
Width of stem flat	J	0.81 21	1.00 25
Diameter of stem	K	1.09 28	1.41 36
Height of stem flat	L	1.00 26	1.10 28
Extreme width of body	M	7.20 183	8.60 218
Centerline of valve to centerline of stem	V	3.22 82	4.15 105
Wrench size	—	DB-2	DB-3
Weight (approx.)	lb. kg	270 122	560 254

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.
Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Double Isolation Plug Valve

ASME Class 2500 (PN 420)



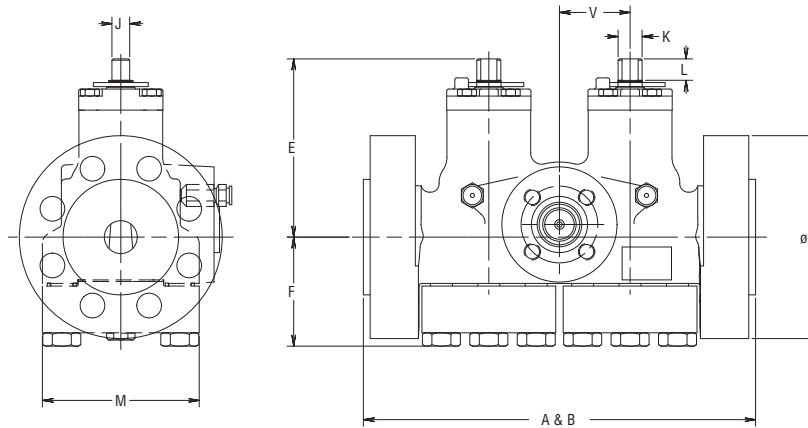
ASME Class 2500 – Figure 5949

Size	NPS DN	2 50	3 80	4 100	6 150	8 200	10 250	12 300
Face-to-Face, flanged (raised face) (incl. 1/4" raised face)	A	17.75 451	22.88 281	26.76 680	36.38 924	40.25 1022	50.76 1289	56.00 1422
Face-to-Face, flanged (ring joint)	B	17.88 454	23.00 584	26.88 683	36.50 927	40.88 1038	50.88 1292	56.88 1445
Diameter of flange	C	9.25 235	12.00 305	14.00 356	19.00 483	21.75 552	26.50 673	30.00 762
Center to bottom of body	F	5.00 127	5.70 145	6.70 170	9.60 244	11.80 300	13.50 343	17.84 453
Extreme width of body	M	7.20 183	8.60 218	10.00 254	14.00 356	17.80 452	23.10 587	28.50 724
Centerline of valve to centerline of gearing	V	3.22 82	4.15 105	4.90 124	5.00 127	7.00 178	7.38 187	7.72 196
Category A and C Gear Dimensions								
Center to top (gearing)	E	11.30 287	10.90 277	11.10 282	16.30 414	20.70 526	29.10 740	31.75 806
Traverse centerline to handwheel centerline	P							13.50 343
Center to top of handwheel	Q							50.03 1271
Center of port to center of handwheel	S	9.80 249	9.20 234	9.40 238	13.20 335	15.80 401	21.70 550	27.72 704
Longitudinal centerline to handwheel centerline	T	2.60 66	3.50 89	3.50 90	6.10 155	3.81 97	9.30 237	11.50 292
Longitudinal centerline to face of handwheel	U	9.40 239	9.47 240	11.52 293	15.10 384	20.80 528	25.60 651	27.12 689
Handwheel diameter/Number of turns to open gearing	W	10/10.5 254/10.5	12/15 305/15	24/15 610/15	24/22 610/22	24/62.5 610/62.5	30/135 762/135	30/150 762/150
Weight (approx.)	lb. kg	290 132	485 220	747 339	1910 866	3122 1416	6120 2776	10568 4794
Category B and D Gear Dimensions								
Center to top (gearing)	E	11.30 287	10.90 277	11.80 300	16.30 414	20.70 526	29.10 740	31.75 806
Traverse centerline to handwheel centerline	P							13.50 343
Center to top of handwheel	Q							50.03 1271
Center of port to center of handwheel	S	9.80 249	9.20 234	9.60 244	13.20 335	15.80 401	21.70 550	27.72 704
Longitudinal centerline to handwheel centerline	T	2.60 66	3.50 89	4.80 122	6.10 155	3.81 97	9.30 237	11.50 292
Longitudinal centerline to face of handwheel	U	9.40 239	9.47 240	14.09 358	15.10 384	20.80 528	25.60 651	21.12 689
Handwheel diameter/Number of turns to open gearing	W	10/10.5 254/10.5	12/15 305/15	24/17 610/17	24/22 610/22	24/62.5 610/62.5	30/135 762/135	30/150 762/150
Weight (approx.)	lb. kg	290 132	485 220	800 363	1910 866	3122 1416	6120 2776	10568 4794

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.
 For motorization contact factory for correct gear model and valve outline dimensions.
 For Category E, F, H, J and K valve gearing dimensions, contact factory.
 For buried service or offshore applications, contact factory.
 Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Dynamic Balance Twin Isolation Plug Valve

ASME Class 2500 (PN 420)



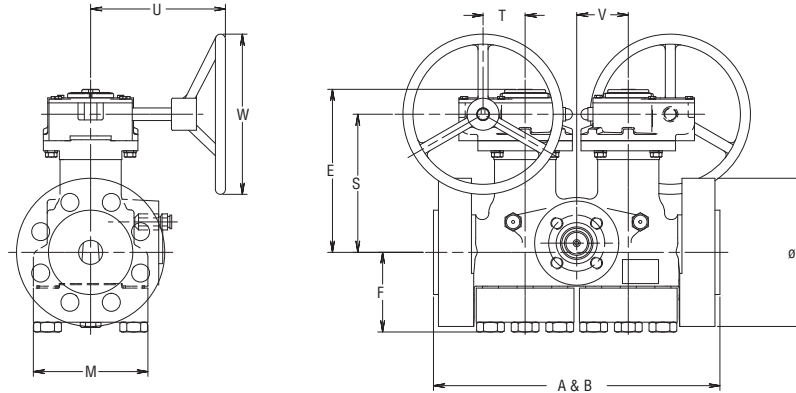
ASME Class 2500 – Figure 6945

Size	NPS DN	2 50	3 80	4 100
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	17.75 451	22.75 578	26.50 673
Face-to-Face, flanged (ring joint)	B	17.88 454	23.00 584	26.88 683
Diameter of flange	C	9.25 235	12.00 305	14.00 356
Center to top of stem	E	8.12 206	8.54 217	10.35 263
Center to bottom of body	F	5.16 131	5.83 148	6.80 173
Width of stem flat	J	0.81 21	1.00 25	1.25 32
Diameter of stem	K	1.09 28	1.41 36	1.78 45
Height of stem flat	L	1.00 26	1.10 28	1.20 29
Extreme width of body	M	7.15 182	8.60 218	10.24 260
Centerline of valve to centerline of stem	V	3.22 82	4.15 105	4.90 124
Wrench size	—	DB-2	DB-3	DB-4
Weight (approx.)	lb. kg	310 141	500 227	710 322

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.
Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Isolation Plug Valve

ASME Class 2500 (PN 420)



ASME Class 2500 – Figure 6949

Size	NPS DN	2 50	3 80	4 100
Face-to-Face, flanged (raised face) (incl. 1/16" raised face)	A	17.75 451	22.75 578	26.50 673
Face-to-Face, flanged (ring joint)	B	17.88 454	23.00 584	26.88 683
Diameter of flange	C	9.25 235	12.00 305	14.00 356
Center to bottom of body	F	5.16 131	5.83 148	6.8 173
Extreme width of body	M	7.15 182	8.60 218	10.24 260
Centerline of valve to centerline of gearing	V	3.22 82	4.15 105	4.9 124
Category A and C Gear Dimensions				
Center to top (gearing)	E	10.18 259	10.94 278	12.60 320
Center of port to center of handwheel	S	8.62 219	9.21 234	10.90 277
Longitudinal centerline to handwheel centerline	T	2.62 66	3.52 89	3.50 89
Longitudinal centerline to face of handwheel	U	8.41 214	9.47 240	11.52 293
Handwheel diameter/Number of turns to open gearing	W	10/10.5 254/10.5	12/15 305/15	24/15 610/15
Weight (approx.)	lb. kg	310 141	500 227	790 358
Category B and D Gear Dimensions				
Center to top (gearing)	E	10.18 259	10.94 278	12.60 320
Center of port to center of handwheel	S	8.62 219	9.21 234	10.90 277
Longitudinal centerline to handwheel centerline	T	2.62 66	3.52 89	3.50 89
Longitudinal centerline to face of handwheel	U	8.41 214	9.47 240	11.52 293
Handwheel diameter/Number of turns to open gearing	W	10/10.5 254/10.5	12/15 305/15	24/15 610/15
Weight (approx.)	lb. kg	310 141	500 227	790 358

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

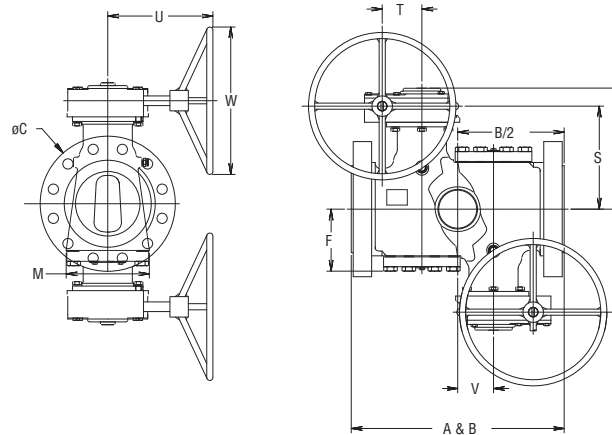
For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms.

Dynamic Balance Double Isolation Plug Valve

API 5000



API 5000 – Figure 32049		
Size	NPS	4 1/16
Face-to-Face, flanged (including flat faced ring joint)	B	21.62 549
Diameter of flange	C	12.25 311
Center to bottom of body	F	5.70 145
Extreme width of body	M	8.72 221
Centerline of valve to centerline of gearing	V	3.74 95
Category A and C Gear Dimensions		
Center to top (gearing)	E	12.60 319
Center of port to center of handwheel	S	10.90 276
Longitudinal centerline to handwheel centerline	T	3.50 89
Longitudinal centerline to face of handwheel	U	11.53 293
Handwheel diameter/Number of turns to open gearing	W	24/15 610/15
Weight (approx.)	lb. kg	580 263
Category B and D Gear Dimensions		
Center to top (gearing)	E	13.10 332
Center of port to center of handwheel	S	10.90 276
Longitudinal centerline to handwheel centerline	T	4.80 122
Longitudinal centerline to face of handwheel	U	14.10 358
Handwheel diameter/Number of turns to open gearing	W	24/17 610/17
Weight (approx.)	lb. kg	580 263

Chart current at time of printing. Additional sizes may now be available. Contact Factory for latest available sizes.

For motorization contact factory for correct gear model and valve outline dimensions.

For Category E, F, H, J and K valve gearing dimensions, contact factory.

For buried service or offshore applications, contact factory.

Upper dimensions and weights are in inches and pounds. Lower dimensions and weights are in millimeters and kilograms..

Carbon Steel Valve Pressure Temperature Ratings

Pressure Temperature Ratings (Carbon Steel - ASTM A352 Grade LCC and ASTM A216 Grade WCC)

Working Pressure by Classes (psig)						
Service Temp °F	150	300	600	900	1500	2500
-20 to 100	290	750	1500	2250	3750	6250
200	260	750	1500	2250	3750	6250
250	245	740	1478	2218	3695	6160
300	230	730	1455	2185	3640	6070
400	200	705	1410	2115	3530	5880
450	185	685	1370	2055	3428	5710
500	170	665	1330	1995	3325	5540
600	140	605	1210	1815	3025	5040
700	110	570	1135	1705	2840	4730
750	95	505	1010	1510	2520	4200
800	80	410	825	1235	2060	3430

Working Pressure by Rating Number (bar)						
Service Temp °C	PN20	PN50	PN100	PN150	PN250	PN420
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9
50	19.0	51.7	103.4	155.1	258.6	430.9
100	17.9	51.7	103.4	155.1	258.6	430.9
120	16.9	51.0	101.9	152.9	254.8	424.7
150	15.9	50.3	100.3	150.7	251.0	418.5
200	13.8	48.6	97.2	145.8	243.4	405.4
232	12.8	47.2	94.5	141.7	236.4	393.7
250	11.7	45.9	91.7	137.6	229.3	382.0
300	9.7	41.7	83.4	125.1	208.6	347.5
350	8.7	40.5	80.9	121.4	202.2	336.8
375	7.6	39.3	78.3	117.6	195.8	326.1
400	6.6	34.8	69.6	104.1	173.7	289.6
425	5.5	28.3	56.9	85.2	142.0	236.5
450	4.7	20.5	41.4	60.1	100.2	166.9

CAN / CSA Z245-15 Ratings

Service Temperature °C	Working Pressure by Rating Number (kPa)					
	PN20	PN50	PN100	PN150	PN250	PN420
-29 to 120	19.00	49.60	99.30	148.90	248.20	413.70

Maximum Operating Temperatures

Standard construction Dynamic Balance valves (Category A) are suitable for operation at the pressures and temperatures listed in the above table up to a maximum temperature of +450°F (+232°C). Special constructions are available for higher temperatures. Please refer to the design categories section of this brochure. Specific recommendations are available from your customer service representative.

Stainless Steel Valve Pressure Temperature Ratings

Pressure Temperature Ratings (Stainless Steel - ASTM A351 Grade CF8M)

Working Pressure by Classes (psig)						
Service Temp °F	150	300	600	900	1500	2500
-50 to 100	275	720	1440	2160	3600	6000
200	230	600	1200	1800	3000	5000
250	218	570	1140	1710	2850	4750
300	205	540	1080	1620	2700	4500
400	190	495	995	1490	2485	4140
450	180	480	963	1443	2408	4010
500	170	465	930	1395	2330	3880
600	140	435	875	1310	2185	3640
650	125	430	860	1290	2150	3580
700	110	425	850	1275	2125	3540
750	95	415	830	1245	2075	3460
800	80	405	805	1210	2015	3360
850	65	395	790	1190	1980	3000
900	50	390	780	1165	1945	3240
950	35	380	765	1145	1910	3180
1000	20	320	640	965	1605	2675
1050	20 ⁽¹⁾	310	615	925	1545	2570
1100	20 ⁽¹⁾	255	515	770	1285	2145
1150	20 ⁽¹⁾	200	400	595	995	1655
1200	20 ⁽¹⁾	155	310	465	770	1285
1250	20 ⁽¹⁾	115	225	340	565	945
1300	20 ⁽¹⁾	85	170	255	430	715
1350	20 ⁽¹⁾	60	125	185	310	515
1400	20 ⁽¹⁾	50	95	142	240	400
1450	15 ⁽¹⁾	35	70	105	170	285
1500	10 ⁽¹⁾	25	55	80	135	230

Working Pressure Rating by Number (bar)						
Service Temp °C	PN20	PN50	PN100	PN150	PN250	PN420
-45 to 38	19.0	49.6	99.3	148.9	248.2	413.7
50	17.5	45.5	91.0	136.5	227.5	379.2
100	15.9	41.4	82.7	124.1	206.8	344.7
120	15.0	39.3	78.6	117.9	196.5	327.5
150	14.1	37.2	74.5	111.7	186.2	310.3
200	13.1	34.1	68.6	102.7	171.3	285.4
232	12.4	33.1	66.4	99.5	166.0	276.5
250	11.7	32.1	64.1	96.2	160.6	267.5
300	9.7	30.0	60.3	90.3	150.7	251.0
350	8.6	29.6	59.3	88.9	148.2	246.8
375	7.6	29.3	58.6	87.9	146.5	244.1
400	6.6	28.6	57.2	85.8	143.1	238.6
425	5.5	27.9	55.5	83.4	138.9	231.7
450	4.5	27.2	54.5	82.1	136.5	206.8
475	3.4	26.9	53.8	80.3	134.1	223.4
500	2.4	26.2	52.7	78.9	131.7	219.3
525	1.4	22.1	44.1	66.5	110.7	184.4
550	1.3 ⁽¹⁾	21.4	42.4	63.8	106.5	177.2
575	1.3 ⁽¹⁾	19.5	39.0	58.5	97.6	162.6
600	1.3 ⁽¹⁾	17.6	35.5	53.1	88.6	147.9
625	1.3 ⁽¹⁾	13.8	27.6	41.0	68.6	114.1
650	1.3 ⁽¹⁾	10.7	21.4	32.1	53.1	88.6
675	1.3 ⁽¹⁾	7.9	15.5	23.4	39.0	65.2
700	1.3 ⁽¹⁾	5.9	11.7	17.6	29.6	49.3
725	1.3 ⁽¹⁾	4.1	8.6	12.8	21.4	35.5
750	1.3 ⁽¹⁾	3.4	6.6	9.8	16.5	27.6
775	1.0 ⁽¹⁾	2.4	4.8	7.2	11.7	19.7
800	0.7 ⁽¹⁾	1.7	3.8	5.5	9.3	15.9

(1) For welding end valves only. Flanged end ratings terminate at +1,000°F (+540°C).

Test and Working Pressures (PSIG minimum)

(Carbon Steel - ASTM A352 Grade LCC and ASTM A216 Grade WCC)

	ASME Class Valves						API Valves
	150	300	600	900	1500	2500	5000
Maximum Cold Working Pressure	290	750	1500	2250	3750	6250	5000
Hydrostatic Body (Shell) Test	450	1125	2250	3375	5625	9375	10000
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	5000

Hydrostatic body and seat tests performed on API 6A valves are for 3 minutes each with the hydrostatic body test being performed twice.
Hydrostatic body and seat tests for hard-surfaced valves will be performed at the valve maximum operating pressure for the time periods specified above

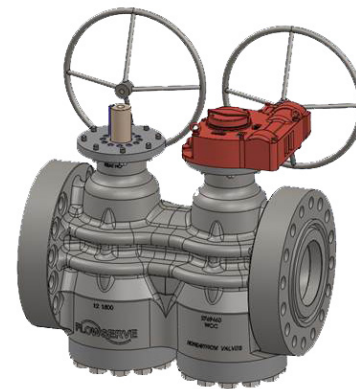
Test Times

Valve Size	Shell Hydrostatic Time, Minutes	Seat Hydrostatic Time, Minutes
4" & Smaller	2	2
6-10	5	5
12-18	15	5
20 and larger	30	5

Hard-Surfaced Valves

For high temperature and abrasive services, Dynamic Balance valves can be supplied with plug taper and body seat hard-surfaced with nickel or cobalt base alloys (Standard Design Categories E, F and K). These materials provide a protective coating having a low coefficient of friction for easier operation at elevated temperatures. With additional hard-surfacing in high erosion areas, hard-surfaced Dynamic Balance valves provide excellent resistance to abrasion in coal, limestone, iron ore, copper ore and other water-carried slurries. For severe services, hard-surfacing extends valve life and improves valve performance significantly.

Flowserve Nordstrom Valves has extensive experience in applying hard-surfacing materials. Special vacuum furnaces keep the base metal of the plug in a controlled, heated atmosphere where the coating alloy can be fused to base metal with optimum adherence.



Fully trained technicians take the hard-surfaced plugs and lap these into the matching bodies. Valve assembly at room temperature is made with dimension allowances to assure proper operation at elevated temperatures in actual services. A valve shell test is performed to prove pressure containment, and a seat test is performed with normal adjustment to prove the integrity of the seat. To prevent stress cracking of the hard-surfacing material, these tests are performed at the valve maximum operating pressure.

Sealant System

Nordstrom Valve Sealant functions as an integral part of the lubricated plug valve. Sealant is the basic improvement over the dry plug cock. In order for sealant to be effective, the valve requires a system of internal channels - the Nordstrom Sealdport Grooving System.

The Nordstrom Sealdport Grooving System provides complete shut-off of line media regardless of the flow direction of material through the valve. Nordstrom valves can be lubricated with the plug in any position while the valve is subjected to line pressure. With the plug in the closed position, the downstream port is completely surrounded by a film of Sealant between the body and plug seating surfaces. When rotating the plug between the open and closed positions, the grooves exposed to the valve flow passages are disconnected from the sealant system.

By maintaining a periodic sealant injection schedule, the Sealdport grooving system will sustain a pressurized sealant system regardless of whether the valve is in the open, closed, or throttled position. This is why a periodic schedule of sealant injection maintenance, based on the service, is recommended.



Why Use Nordstrom Valves Sealants?

- Manufactured by the world's largest manufacturer of plug valves
- Time-tested and proven by actual use in millions of valves
- Nordstrom Valves Sealants have been tested to ensure maximum valve performance:
 - Valve operating torque
 - Solvent resistance
 - Water resistance
 - Shear force reaction
 - High and low temperature resistance
 - Degradation test
 - Sealability
- Laboratory tested to be environmentally safe and non-hazardous
- Controlled manufacturing processes
- Each batch of product traceable for a minimum period of five years
- A wide variety of advanced valve sealant formulations available for different services
- In-house technical expertise to ensure sealant quality and provide technical assistance when needed

Basic Sealant Injection

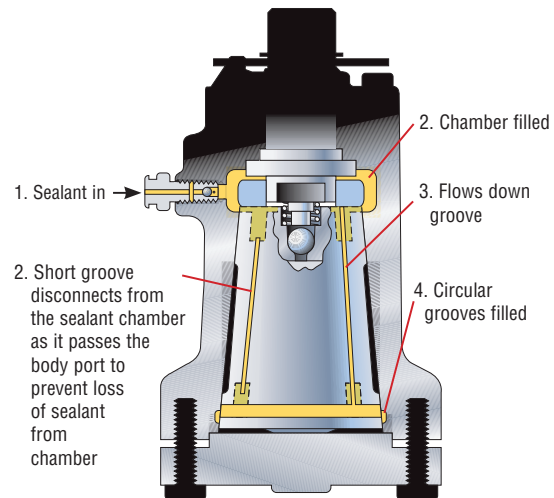
High pressures are generated during sealant injection. It is recommended that safety glasses and thick leather gloves be worn during sealant injection.

1. Before injecting sealant into the valve, determine if the valve is fully open or closed. While the Dynamic Balance plug valve can be lubricated with the plug in any position, either the full open or full close position allows the Sealdport groove system to completely distribute the pressurized sealant to the valve seating surfaces.
2. Locate the Sealant Injection Fitting on the side of the valve. Remove any debris from the face of the sealant fitting and attach your sealant injection device to the fitting. Be careful not to damage the fitting in any way. A smooth contact surface is necessary to ensure an adequate seal is formed between the button head coupler and the Sealant Fitting.
3. Inject sealant following the operating instructions for the injection equipment that you are using. The valve is properly lubricated when the pressure gauge on the gun reads higher than the actual line pressure and then drops off. That means the sealant pressure has overcome the line pressure, forced the sealant into the Sealdport groove system, and has been relieved into the line.

VXX Valve Purge Cleaner

VXX Valve Purge, a non-hazardous formulation, was developed for cleaning valves in-line, returning them to service without disassembly, and eliminating down time. Periodic injection of sealant into a valve flushes debris from the sealant system and allows sealant to flow more freely.

For detailed lubrication and maintenance instructions, please refer to the Dynamic Balance Plug Valve & Double DB Double Isolation Plug Valve Installation, Operation & Maintenance Manual.



When the valve lifts from the seat, sealant spreads along the plug/body contact surfaces. This sealant spreads when the plug operates.

Characteristics of Nordstrom Sealants

Sealant Number	Grades Available	Temperature Range °F (°C)		Color	Principle Services	Unsuitable for	Composition		
		From	To				Base Oil	Thickener	Additive
167	Stick	50 (10)	650 (343)	Tan	Air and gas dryer service, high temperature water, hot oil, steam and hot/oil steam combinations on burner front applications. Limit oxidizing services for 500°F.	Liquid light hydrocarbons, aromatic solvents, nitrating acids	Hydrocarbon	Silica, Inorganic Thickeners	Antioxidants
	Bulk	20 (-6.7)	650 (343)						
	SS Bulk	20 (-6.7)	650 (343)						
	Gun Pack	20 (-6.7)	650 (343)						
234	Tube	-40 (-40)	400 (204)	White	A silicone sealant for hot air, hot water, steam, high vacuum, acetic acid, acetic anhydride, ethyl alcohol below 250°F, natural gas compressor discharge, food and pharmaceutical applications as determined by the user. NSF 61 approved for use in potable water systems and U.S.D.A. H-1 approved for food applications	Gasoline and light liquid hydrocarbons, strong mineral acids, aromatic and chlorinated solvents.	Silicone	Silica	None
	Gun Pack	-40 (-40)	400 (204)						
	Bulk	-40 (-40)	400 (204)						
386	Stick	-20 (-29)	250 (121)	Cream	Dry or wet gas service, water works and sewage services as determined suitable by the user.	Services with organic solvents	Hydrocarbon	Metallic Soap Thickeners	None
	Bulk	-40 (-40)	250 (121)						
421	Stick	10 (-12)	350 (177)	Brown	Acids, alkalis, alcohols, amines, asphalt, aqueous solutions, fats, glycerine, glycols, soap, water and steam. Food and pharmaceutical applications as determined by the user. NSF 61 approved for use in potable water systems and U.S.D.A. H-1 approved for food applications	Liquid aliphatic or aromatic hydrocarbon solvents.	Hydrocarbon	Soap Thickener, Inorganic Non-soap Thickeners	None
	Bulk	0 (-173)	300 (149)						
	Gun Pack	0 (-173)	300 (149)						
555	Stick	-10 (23)	500 (260)	Brown	General purpose sealant for aliphatic hydrocarbon liquids and gases including gasoline, kerosene, fuel and lubricating oils, crude distillates, sweet or sour natural and manufactured gas with water or organic condensates, LPG systems, dilute acids and alkalis, glycols, textile plants, aqueous solutions, and water.	Aromatic solvents, strong chemicals, hot air.	Vegetable Oil	Inorganic Non-Soap Thickeners, Organic Thickeners	Antioxidants, Friction Modifier
	Bulk	-20 (-29)	500 (260)						
	SS Bulk	-20 (-29)	500 (260)						
	Gun Pack	-20 (-29)	500 (260)						
Sealant Number	Grades Available	Temperature Range °F (°C)		Color	Principle Services	Unsuitable for	Composition		
		From	To				Base Oil	Thickener	Additive
654	Stick	50 (10)	500 (260)	Brown	Solvent treating of lubricating oils, hot hydrocarbon vapors and gases, general hot oil service, asphalt.	Liquid light hydrocarbons, aromatic solvents, strong acids and chemicals.	Hydrocarbon	Soap, Organic Thickeners	None
	Bulk	0 (-18)	500 (260)						
	Gun Pack	0 (-18)	500 (260)						
755	Stick	30 (-1.1)	300 (149)	Pink	Benzene, butane, solvent naphthas, toluene, gasoline containing benzene or large amounts of aromatic hydrocarbons, carbon bisulfide, carbon tetrachloride, animal and vegetable oils.	Strong acids, nitrating acids, alcohols, water, aqueous solutions.	Polyglycols	Gel Thickeners	Corrosion Inhibitor
	Bulk	20 (-6.7)	300 (149)						
	Gun Pack	20 (-6.7)	300 (149)						
862	Stick	-85 (-65)	250 (121)	Tan	Natural gas transmission lines under variable extreme climatic temperatures and for air and inert gases at sub-zero temperatures.	Liquid hydrocarbon solvents or strong chemicals	Synthetic	Metallic Soap Thickeners	Antioxidants
	Bulk	-85 (-65)	251 (121)						
950	Stick	-20 (-29)	350 (177)	Cream	Excellent dual resistance to petroleum products and water. Particularly recommended for regular, premium and high octane gasoline, kerosene, aviation and jet fuels, fuel blending ingredients, such as alkylate and platformate, fuel and lubricating oils, mixtures of these products and water in all proportions, Usable to 400°F in non-oxidizing atmospheres. Approved under specification MIL-G-6032D "Grease Plug Valve, Gasoline and Oil Resistant".	Strong acids and alkalis.	Synthetic	Inorganic Non-Soap Thickeners,	Antioxidants, Copper Corrosion Inhibitor
	Bulk	-25 (-32)	350 (177)						
	SS Bulk	-10 (-32)	350 (177)						
	Gun Pack	-25 (-32)	350 (177)						
960	Bulk	-50 (-46)	300 (149)	Cream	Aliphatic liquids and gasses including gasolines, kerosene, fuel, and lubricating oils, hydrocarbon solvents and natural gas, neutral brines and salt solutions.	Strong acids and alkalis, aromatic and chlorinated solvents.	Synthetic	Inorganic Non-Soa Thickeners	Antioxidants, Friction Modifier
	Gun Pack	-50 (-46)	300 (149)						
1033	Stick (J and K)	-10 (23)	500 (260)	Green	General purpose sealant for liquid and gaseous aliphatic hydrocarbon service suitable for gasoline, kerosene, fuel oils, crude distillates, aviation and jet fuel, natural gas. Oxidation resistant formula minimizes problems associated with sealant hardening and solids buildup.	Aromatic solvents, strong acids and alkalis, steam.	Synthetic	Silica	Antioxidants, Corrosion Inhibitor
	Bulk	-20 (-29)	500 (260)						
	Gun Pack	-20 (-29)	500 (260)						
1045	Bulk	-30 (-34)	700 (371)	Black	Elevated temperature services involving hot hydrocarbon gases and vapors, water, steam, and aqueous solutions.	Liquid light hydrocarbons, aromatic solvents, and nitrating acids.	Synthetic	Organic Thickeners	Antioxidants
1200	Bulk	-33 (-36)	400 (204)	White	Highly resistant to extremely aggressive chemicals at low carbon dioxide concentrations.	Supercritical Fluids, Fluorinated Fluids	Synthetic	PTFE	None
	HT	-22 (-30)	550 (288)						
	LT	-94 (-70)	150 (66)						
1200 SS	HT	20 (-6.7)	650 (343)	Tan	Hot water, steam, hot oil, hot air, and coke oven gases.	Liquid light hydrocarbons, aromatic solvents, or nitrating acids.	Hydrocarbon	Silica, Organic Thickeners	Antioxidants
970 SS	5 QT	-27	350	Caramel	Recommended for liquid and gaseous aliphatic hydrocarbon service, gasoline, kerosene, fuel oils, crude distillates, aviation and jet fuel, natural gas, and miscible injectant.	Strong acids and alkalis, aromatic solvents	Synthetic	Inorganic, Non-Soap Thickeners	Antioxidants
	Gun Pack	-27	350						

Nordstrom VXX valve cleaner is a combination cleaner and lubricant designed to soften and remoisturize dried sealant residues and deposits in clogged hard to operate valves. VXX valve cleaner is a microsilica-thickened vegetable oil product which is compatible with other valve lubricants / sealants and is not harmful to rubber parts. This product contains an organic molybdenum compound that will provide extra lubricity and help prevent galling and scoring. VXX valve cleaner is available in 1-quart bottles, 5-quart cans, or in Gun Pak form.

How is Sealant Injected into Valves?

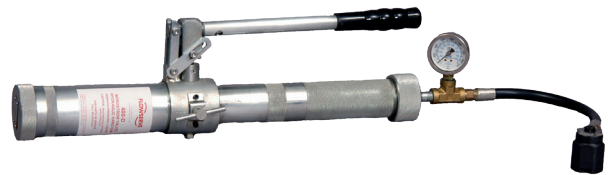
Manually	A, B, C, D, and G Sticks
Hypregun-Plus 5Q	five-quart can
Hypregun-Plus 5G	five-gallon pale
400-D Hydraulic Hand Gun	J-Stick or Gun Pack
400-A Hand Gun	J-Stick or K-Stick
400-B Bucket Pum	30-pound bulk capacity

For more detailed information on sealant injection equipment, refer to specific product brochures.

400-D Hydraulic Hand Gun

The Flowserve Nordstrom 400-D High-Pressure Hand Gun is rated at 10,000-11,000 psi (690-759 bar) and includes many features for meeting the exact demands of replacing sealant in lubricated valves.

- Operates effectively in all positions.
- Air entrapment eliminated by adding fluid when recharging, automatically purging the system of air.
- The large fluid capacity permits long periods of operation between recharging.
- Solid floating piston without the use of a capscrew eliminates fluid leakage and eventual operation failure.
- Specially formulated hydraulic fluid in the pumping mechanism allows the gun to pump smoothly and with minimum effort.
- The powerful hydraulic floating piston principle forces sealant out of the gun with ease, regardless of the sealant viscosity.
- Equipped with a Giant Button Head Coupler for connection to the button head sealant fitting of the valve.
- “Built-in” safety features provide maximum safety both to the user and the gun itself. The internal relief valve protects the operator if pumping continues after the gun depleted of sealant.
- Dependable performance under all conditions.
- Includes 15,000 psi gauge.
- Perfect for tight quarters and for use on 6” and smaller valves.



In designing the 400-D Hand Gun, engineers concentrated on greatly simplifying maintenance and repair procedures. In most cases, the gun can be easily maintained and repaired by valve service personnel, without requiring factor service.

Refer to NVENIM2002 for further Assembly Operation and Maintenance Instructions.



Hypregun-Plus 5Q and 5G

The Flowserve Nordstrom Hypregun-Plus 5Q and the Flowserve Nordstrom Hypregun-Plug 5G were developed using the original Nordstrom Hypregun design and modifications as suggested by many Hypregun owners. This design continues to meet field and plant maintenance needs of valve users.

- Ideal for large scale valve servicing in refineries, compressor stations, gasoline plants, cycling plants, pipelines, and manifold installations. Versatile design for servicing small or large valves.
- Compact, highly efficient, air operated sealant injection devices with a 100:1 pressure ratio and double acting piston.
- Continued positive pressure applied to the side cylinders assures intimate contact between the follower plate and sealant makes it possible to pump sealant at much lower temperatures.
- The follower plate is engineered to promote flow of sealant to the foot valve at all workable air pressures but air pressure between 100 and 125 psi (6.9 to 8.6 bar) provide the most efficient operation. The air motor is rated to 125 psi (8.6 bar) and the Hypreguns should not be operated with pressures exceeding this rating.
- The air motor uses a maximum of 11.4 cubic feet of air per minute when operated at 125 psi (8.6 bar) with zero load. Reduced air pressure and increased load reduce air consumption although not linearly.
- Moisture traps (not supplied with the guns) can be used to prevent moisture from reaching the air motor which can condense and freeze causing the air motor to stall.
- Sealant cans have been materially strengthened with welded seams and are standard for all Nordstrom bulk sealants.
- The can shield supplied with each gun gives added strength to the can.
- The sealant cans and can shields have been developed specifically for use with Nordstrom Hypregun-Plus devices and it is not recommended using containers of sealants developed by other manufacturers.
- The Hypregun-Plus 5Q uses 5 quart (4.7 liter) sealant cans. The Hypregun-Plus 5G uses 5 gallon (18.9 liter) sealant cans. Both guns work well for all size valves.
- A 5 quart conversion kit is also available for the Hypregun 5G and provides the option of using a 5 quart can in the 5 gallon gun.
- Refer to NVENIM2003 for Hypregun 5Q and NVENIM2004 for Hypregun Plus 5G for further Assembly, Operation and Maintenance Instructions.

Injection Equipment

Giant Button-head Coupler



- Comes standard on all Nordstrom Valves sealant injection equipment.
- Allows easy connection to a valve's button-head sealant fitting.
- Automatically locks to the sealant fitting when the gun is pressurized.
- Coupler cannot be attached or removed from the fitting with the gun under pressure.
- Sealant will not pass through coupler unless connected to the valve sealant fitting.

400-B Bucket Pump



- Powerful, lightweight and portable.
- Hand-operated 15,000 psi sealant injection.
- Includes 15,000 psi gauge.
- 30-pound bulk capacity.
- Designed for heavy bulk lubricants.
- Easy to use.

400-A Hand Gun



- Polished hardened steel piston in high-pressure barrel.
- Powerful spring-loaded primer piston allows 30 or more strokes without repriming.
- Check valve and bleeder relief valve.
- Positive action makes the 400-A easy to handle and use.
- Includes shoulder strap.
- Uses convenient J-Stick and K-Stick sealants.
- Includes 15,000 psi gauge.

How To Order

Inquiries and orders for Flowserve Nordstrom sealants and sealant injection equipment should always include complete descriptions so that the proper sealant is supplied. The following information is required at the time of order placement. If you are uncertain which sealant formula is required for your application, please contact the factory for further assistance.

Ordering Information Requirements

Stick Grade Sealant

- Quantity
- Container Type (Box)
- Formula Number
- Product Size
- Sticks Per Box

Example: qty. 3, Boxes, 1033, Size J, 6 sticks per box

Stick Grade Sealant Sizes and Packaging

Flowserve Nordstrom stick-grade sealants are high-viscosity sealants for manual injection with a Combination Button-Head Fitting or for use with the 400-A or 400-D Hand Guns. The sealant is a consistency that maintains its extruded shape. The following chart lists available stick sizes and the method of injection.

Product Size	Sticks per Box	Boxes per Case*	Diameter		Length		Injection Method
			mm	in.	mm	in.	
A	24	n/a	6.4	0.25	22.4	0.88	Manually
B	24	150	9.7	0.38	35.1	1.38	Manually
C	24	120	14.0	0.55	50.8	2.00	Manually
D	24	50	16.8	0.66	62.0	2.44	Manually
G	24	24	21.8	0.86	85.9	3.38	Manually
J	6	10	37.3	1.47	222.3	8.75	400-D or 400-A Hand Gun
K	12	n/a	38.9	1.53	254.0	10.00	400-A Hand Gun

* Stick grade sealants are sold by the box; however, for storage convenience, stick sealant boxes can be packaged and shipped in cases.

Bulk Grade Sealant

- Required quantity
- Formula number
- Container size

Example: qty. 2, 1033, 5 quart can

Bulk Grade Sealant Packaging

Flowserve Nordstrom bulk grade sealants are injected into valves using all models of Flowserve Nordstrom sealant injection equipment and are available in various packaging forms, depending upon the method chosen for valve injection. Super Soft bulk grade sealant (SS) is available in 950, 555, and 167. SS sealant has improved “pumpability” characteristics and must be ordered as “SS”.

Container Size	Units per Container	Containers per Case	Injection Method
5.3 oz. Tube ¹	2 tubes per box	n/a	Manually
Cartridge ²	4 cartridges per box	n/a	Standard Grease Gun ⁽³⁾
Gun Pack	6 Gun Packs per box	10	400-D Hand Gun
5 Quart Can	5 Quarts	1, 2 or 4	Hypregun Plus 5Q
5 Gallon Pale	5 Gallons	1	Hypregun Plus 5Q
16 Gallon Drum	16 Gallons	n/a	Pump
55 Gallon Drum	55 Gallons	n/a	Pump

¹ Plastic tubes are standard packaging only for 234 sealant
² Cartridge dimensions are 2.07" (53.0 mm) by 9.25" (236.8 mm)(15 ounce)
³ Not sold by Flowserve

Sealant Injection Equipment

Provide equipment description. Refer to pages 8, 9 and 10 for information on sealant injection equipment.

Valve Cleaner

VXX Valve Cleaner is packaged the same as bulk grade sealant. Example: qty. 4, VXX Valve Cleaner, 5 quart Can.

Flowserve-Dynamic Balance Valve Service and Seal Kits*

Flowserve Nordstrom Valves is now offering service and seal kits. These kits have been specifically developed to provide you the proper parts to ensure a quick and proper service and to maximize the life of the valve. Standard kits are in stock so they can be shipped the same or next day to minimize downtime installations. Proper identification of the valve is essential to providing the correct parts for your repair application. The serial number from your valve is the best way to determine any special parts or materials that may be required for repairing the valve.

Seal Kits

- O-Rings Weather Seal
- Packing Kit
- Thick Diaphragm
- Thin Diaphragm
- Stem Ring
- Gasket
- Retainer Ring

Service Kits

- Check Valve
- Sealant Fitting
- Spring
- Ball
- Thrust Button
- For valves >4", kit also includes: Gland Retainer, Thrust Ball, Ball Retainer, and Thrust Washer

Please use the following information as a guide as some installed base designs will be different. The information contained on valve tags or existing paperwork will be very beneficial to identifying the correct replacement parts. Flowserve Nordstrom has a skilled staff of Customer Service and Sales Representatives who can assist you with this identification process.

For additional information on repairing or servicing your Nordstrom Dynamic Balance plug valves, please request or download (IOM-NVENIM2005) from the Flowserve website (www.flowserve.com).

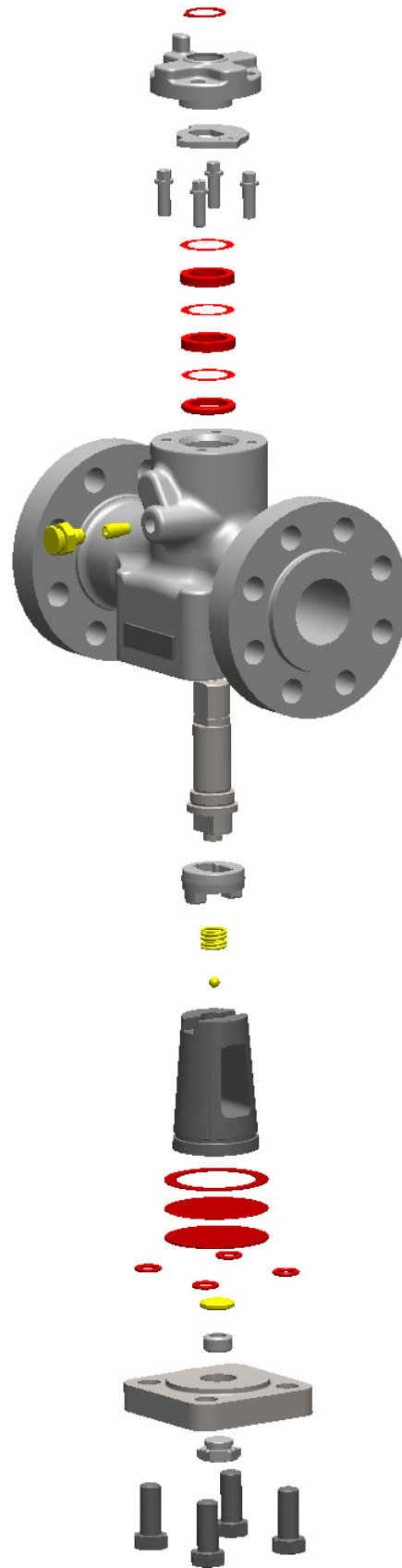
The utilization of OEM replacement parts and Nordstrom Valve sealants will ensure that your valves will continue to provide you with excellent performance.

* Kits are available for both wrench and gear operated valves.

Seal kits include the items shown in red.

Service Kits include both the red and yellow items.

Available in sizes 2" to 12" ASME Class 600, 900 & 1500.





Notes

Notes



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For more information about Flowserve Corporation, visit
www.flowserve.com or call USA 1 800 225 6989

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