



Nordstrom Steel Plug Valves



Experience In Motion

Table of Contents

List of Tables	3	Watertight Housings	45
Conformance to Standard Specifications	3	Standard Enclosed Gearing	46
Super Nordstrom Two-Bolt Cover Plug Valve	4	Minimum-Profile Enclosed Gearing	46
Dynamic Balance Plug Valve	4	Actuators	46
Super Nordstrom Plug Valve With Controlled-Balance Plug	4	Square Adapters	47
Nordstrom Bolted Gland Plug Valve	4	Wrenches	47
Pascal's Law	5	Locking Devices	49
Plug Valve Patterns	5	Drilling Templates, Flange and Ring Joint Dimensions, and Bolting Data For Steel Flanges	50
Dynamic Balance Plug Valves	6	ASME Class 150 Steel Flange Standard (ASME B16.5-1998)	50
Super Nordstrom Plug Valves with Controlled-Balance Plug	7	ASME Class 300 Steel Flange Standard (ASME B16.5-1998)	51
Super Nordstrom Two-Bolt Cover Valves for Gas Distribution Service	8	ASME Class 400 Steel Flange Standard (ASME B16.5-1998)	52
Nordstrom Bolted Gland Plug Valves	9	ASME Class 600 Steel Flange Standard (ASME B16.5-1998)	52
Super Nordstrom Two-Bolt Cover Plug Valves	10	ASME Class 900 Steel Flange Standard (ASME B16.5-1998)	53
Super Nordstrom Plug Valves	11	ASME Class 1500 Steel Flange Standard (ASME B16.5-1998)	53
Dynamic Balance Plug Valves	12	ASME Class 2500 Steel Flange Standard (ASME B16.5-1998)	53
Nordstrom Bolted Gland Plug Valves	17	API 6B Flanges for 2000 psi Rated Working Pressure	54
Super Nordstrom Plug Valves	19	API 6B Flanges for 3000 psi Rated Working Pressure	54
Dynamic Balance Plug Valves	20	API 6B Flanges for 5000 psi Rated Working Pressure	54
Super Nordstrom Plug Valves	26	Standard Preparation of Valve Butt Welding Ends	55
Dynamic Balance Plug Valves	27	Typical Materials of Construction	56
Carbon Steel Valve Pressure Temperature Ratings	41	Size 4 and Smaller Valves	56
Stainless Steel Valve Pressure Temperature Ratings	42	Size 6 and Larger – Nonpressure Seal Valves	57
Test and Working Pressures (PSIG minimum)	43	Size 6 and Larger – Pressure Seal Valves	58
Test Times (minutes)	43	Super Nordstrom Valves	59
Hard-Surfaced Valves	43	Super Nordstrom Two-Bolt Cover Valves	59
Dynamic Balance Standard Design Categories	44	Nordstrom Valves	59
NACE Construction Valves for Sour Gas Applications	44		
Dynamic Balance Plug Valve Metals	44		
Spur Gear Operating Mechanisms	45		
Worm Gearing for Side-Mounted Handwheel	45		

Upper dimensions and weights are in inches and pounds.

Lower dimensions and weights are in millimeters and kilograms.

About This Brochure

Every attempt has been made to make the data in this brochure as accurate as possible. Flowserve reserves the right to make product modifications that contradict the contents of this document without notification to its holders. Flowserve cannot be held responsible for data that is found to be inaccurate or incomplete.

Valve Figure Number Explanation

Valve figure numbers ending in a 4 or 5 indicate wrench-operated valves. (Valve figure numbers ending in a 4 indicate threaded ends. Valve figure numbers ending in a 5 indicate flanged ends.)

Valve figure numbers ending in a 7 indicate flanged ends with spur gear operator.

Valve figure numbers ending in a 9 indicate flanged ends with worm gear operator.

Valve figure numbers ending in ½ indicate welding ends.

Valve figure numbers ending in ¼ indicate one welding end and one flanged end.

Dynamic Balance, Nordstrom, and Super Nordstrom are registered trademarks.

List of Tables

200 CWP – Figure 1942½, 1943½, 1943¼	10
ASME Class 150 – Figure 1924, 1925, 1925½	11
ASME Class 150 – Figure 1945, 1945½	12
ASME Class 150 – Figure 1949, 1949½	13
ASME Class 150 – Figure 2445.	14
ASME Class 150 – Figure 2449.	15
ASME Class 150 – Figure 4149, 4149½, 4149¼	16
ASME Class 150 – Figure 4185½.	17
ASME Class 150 – Figure 4187½, 4189½	18
ASME Class 300 – Figure 2024, 2025, 2025½	19
ASME Class 300 – Figure 2045, 2045½, 2045¼	20
ASME Class 300 – Figure 2049, 2049½, 2049¼.	21
ASME Class 300 – Figure 2545.	22
ASME Class 300 – Figure 2549.	23
ASME Class 300 – Figure 4245, 4245½, 4245¼	24
ASME Class 300 – Figure 4249, 4249½, 4249¼	25
ASME Class 600 – Figure 2224.	26
ASME Class 600 – Figure 2245, 2245½, 2245¼	27
ASME Class 600 – Figure 2249, 2249½, 2249¼	28
ASME Class 600 – Figure 4749, 4749½, 4749¼	29
ASME Class 900 – Figure 2344, 2345, 2345½, 2345¼.	30
ASME Class 900 – Figure 2349, 2349½, 2349¼	31
ASME Class 900 – Figure 4949, 4949½, 4949¼	32
ASME Class 1500 – Figure 3044, 3045, 3045½, 3045¼	33
ASME Class 1500 – Figure 3049, 3049½, 3049¼	34
ASME Class 1500 – Figure 6049, 6049½, 6049¼	35
ASME Class 2500 – Figure 20545, 20545½, 20545¼	36
ASME Class 2500 – Figure 20549, 20549½, 20549¼	37
ASME Class 2500 – Figure 9349, 9349½, 9349¼	38
API 3000 – Figure 76305 and API Class 5000 – Figure 76505	39
API 5000 – Figure 76509.	40
Carbon Steel Valve Pressure Temperature Ratings	41
Stainless Steel Valve Pressure Temperature Ratings	42
Test and Working Pressures (PSIG minimum)	43
Test Times (minutes)	43
Square Adapters and Wrenches	47
Wrenches for Valves with Square or Oround Heads.	48
Locking Devices	49
Drilling Templates, Flange and Ring Joint Dimensions and Bolting Data for Steel Flanges	50-54
ASME Class 150 Steel Flange Standard	50
ASME Class 300 Steel Flange Standard	51
ASME Class 400 Steel Flange Standard	52
ASME Class 600 Steel Flange Standard	52
ASME Class 900 Steel Flange Standard	53
ASME Class 1500 Steel Flange Standard	53
ASME Class 2500 Steel Flange Standard	53
API 6B Flanges for 2000 psi Rated Working Pressure	54
API 6B Flanges for 3000 psi Rated Working Pressure	54
API 6B Flanges for 5000 psi Rated Working Pressure	54
Typical Materials of Construction.	56-59
Size 4 and Smaller Valves	56
Size 6 and Larger – Nonpressure Seal Valves	57
Size 6 and Larger – Pressure Seal Valves	58
Super Nordstrom Valves	59
Super Nordstrom Two-Bolt Cover Valves.	59
Nordstrom Valves	59

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

B1.20.1 Pipe Threads, General Purpose (Inch)

B16.5 Pipe Flanges and Flanged Fittings

B16.10 Face-to-Face and End-to-End Dimensions of Valves

B16.11 Forged Steel Fittings, Socket-Welding and Threaded

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 Specification for Pipeline Valves

6FA Fire Test for Valves

599 Steel and Ductile Iron Plug Valves

607 Fire Test for Soft-Seated Quarter-Turn 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

SP-84 Steel Valves – Socket Welding and Threaded Ends

MR0175-88 Standard Material Requirements Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment (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

Super Nordstrom Two-Bolt Cover Plug Valve

(Refer to page 9 for detailed description.)



Super Nordstrom two-bolt cover plug valve is a low-pressure valve (200 CWP) in sizes $\frac{3}{4}$ through 4 for a broad range of applications in gas distribution and general industrial services.

Dynamic Balance Plug Valve

(Refer to page 7 for detailed description.)



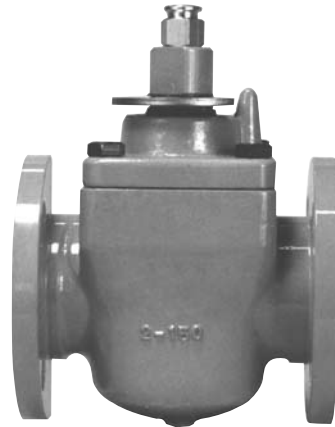
The Dynamic Balance valve is the premier Flowserve Nordstrom Valves plug valve, incorporating proven features and user benefits from over sixty years of experience in endless valve applications and design technology.

A pressure-balanced plug assures predictable torque, even under high pressure differential, vibration and thermal cycling. Pressure-energized stem seals eliminate external adjustments and the stem and the cover weatherseal provides superior corrosion resistance in hostile environments.

The Dynamic Balance plug valve is available in the broadest range of sizes, pressure classes, and materials of construction of any Flowserve Nordstrom Valves product. Dynamic Balance valves are available in sizes from 1 to 30 in ASME pressure classes from 150 to 2500, and in sizes $2\frac{1}{16}$ to $4\frac{1}{16}$ in API 3000 and 5000 psi.

Super Nordstrom Plug Valve with Controlled-Balance Plug

(Refer to page 8 for detailed description.)



The Super Nordstrom steel plug valve complements the Dynamic Balance plug valve line, offering the benefits of predictable low torque, at a competitive price, in a limited range of smaller sizes and lower pressure classes for less critical and less demanding services.

The Super Nordstrom steel plug valve is available in sizes from $\frac{1}{2}$ to 4 in ASME pressure classes 150, 300 and 600, and sizes $\frac{3}{4}$ to 4 in 200 CWP pressure rating for a broad range of applications in gas distribution and general services.

Nordstrom Bolted Gland Plug Valve

(Refer to page 10 for detailed description.)



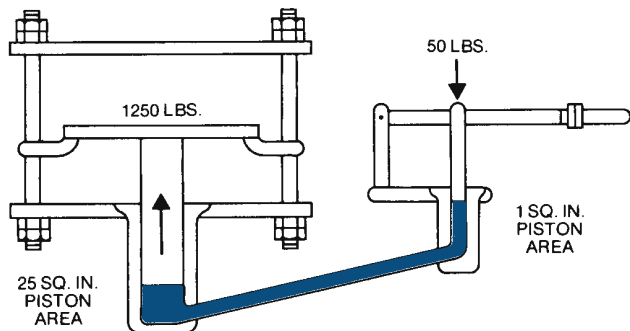
The standard Nordstrom plug valve line includes low-pressure valves (ASME Class 150) in sizes 6, 8 and 12 for a broad range of applications in gas distribution and general industrial services.

Pascal's Law

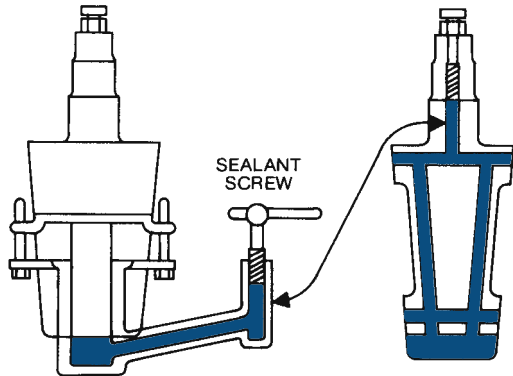
The Basic Principle of Nordstrom Valves – Pascal's Law:

Nordstrom Valves make use of the scientific principle known as Pascal's Law. This law states that "a unit pressure applied to the fluid contained in a sealed vessel is transmitted uniformly to all areas of the confining surfaces of the fluid with undiminished force, thus multiplying the force many times, depending on the area of the interior of the vessel."

1. Shown is a demonstration of Pascal's Law. A given force of 50 lbs. lifts 1,250 lbs. over an enlarged area of 25 to 1 ratio.



2. This superimposed drawing of a Nordstrom plug valve shows application of Pascal's Law. The sealant screw, when turned, exerts powerful hydraulic force that will slightly raise the plug from its seat if necessary.



3. The sealant fitting or screw, inserted in the top of the plug, performs the same operation, pressure being transmitted through the sealant grooves. The sealant grooves connect in the plug and body, forming a transmission line to the bottom chamber. The plug is always sealed against line pressure.

Sealant systems are incorporated in metal-seated plug valves as an integral part of the valve, and sealant is required to ensure proper valve performance.

Plug Valve Patterns

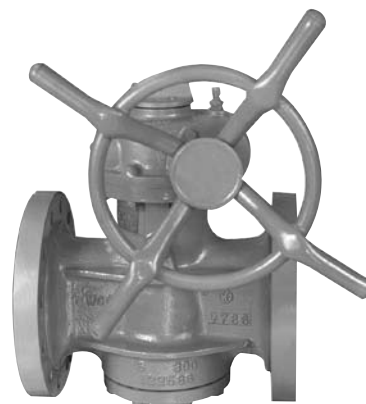
Nordstrom Valves plug valves are available with threaded, flanged or butt welding ends—or combination thereof—to meet the needs of your piping systems. Valves are wrench- or gear-operated, as listed in the detailed specification pages. Nordstrom valves come in a variety of engineered patterns to assure maximum efficiency and economy for the full range of valve services. These include:



Regular Pattern, providing the largest port opening in a trapezoidal configuration. Consult the valve dimensional data pages in this brochure for applicable valve patterns for Dynamic Balance, Super Nordstrom and Nordstrom plug valves.

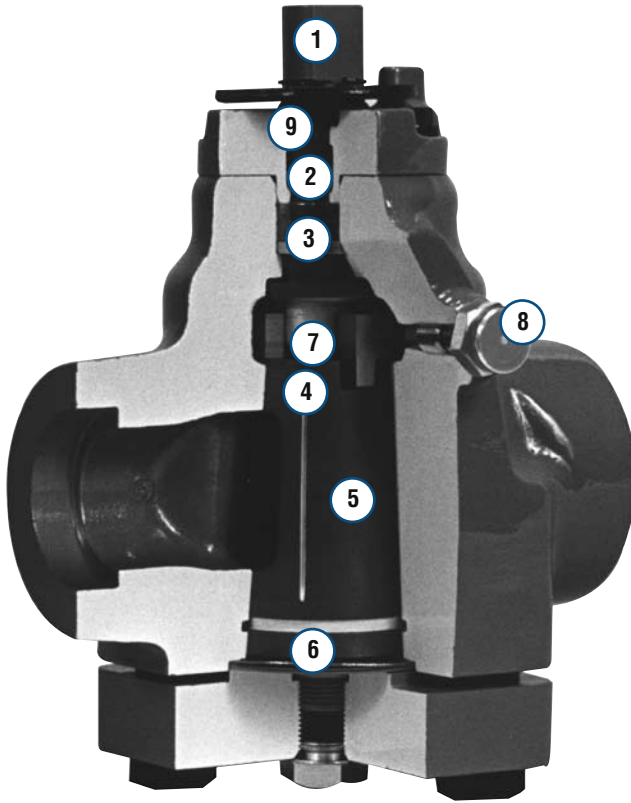


Short Pattern, incorporating the largest practical port area consistent with matching gate valve face-to-face dimensions.



Venturi Pattern, having a smaller port than either the regular or short patterns, provides optimized approach and discharge angles, plus smooth flow contours to provide minimum pressure drop.

Dynamic Balance Plug Valves



1. **Stem Head** – is obround with two wrench flats that align the wrench in the direction of the port opening, thus becoming an easily visible position indicator. Square adapters are available to allow operational flexibility where space is limited.
2. **Stem** – treated with low-friction PTFE coating to reduce overall valve torque. Wrench-operated valve stems are made of 400 series stainless steel for corrosion protection (i.e., tough offshore applications).
3. **Stem Packing** – specially designed and patented by Flowserve Nordstrom Valves, manufactured from a combination of graphite and TFE, the stem packing is pressure-energized (no external adjustments necessary) and is inert to a wide range of fluids and gases.
4. **Plug-Balancing Spring** – is designed to preload the plug to prevent vibration and thermal cycling from wedging the plug into the taper regardless of installed position.

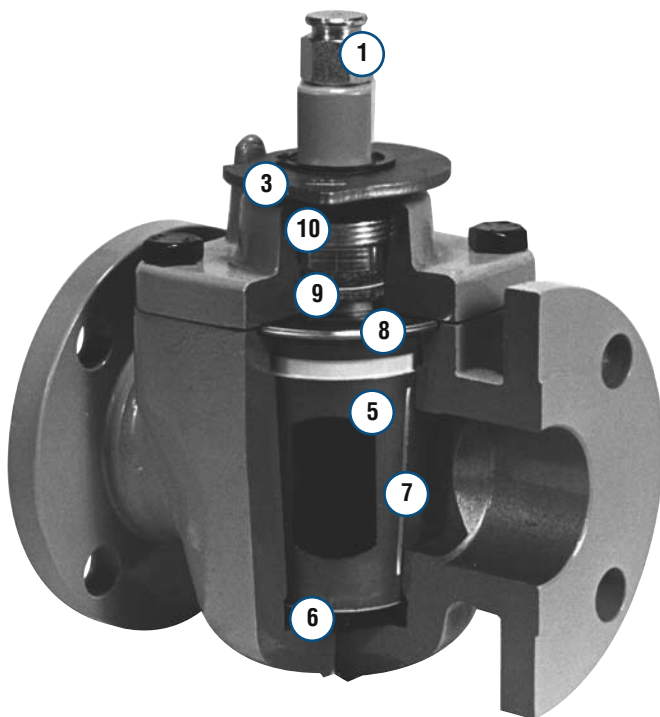
5. **Plug** – is coated with permanently bonded, low-friction coating.
6. **Bottom Balance Hole** (not shown) – is an integral part of the Dynamic Balance system which maintains pressure equalization between the plug port and the bottom of the plug.
7. **Balance Hole with Ball Check** (not shown) – ensures that pressure above the plug is the same as or greater than in the plug port.
8. **Sealant Injection Fitting** – permits restoration of damaged seats and drop-tight shutoff on hard-to-hold fluids.
9. **Weatherseal** – two different types are found in Dynamic Balance valves. The stem weatherseal is specially shaped and constructed to protect the stem and packing from hostile environments that can lead to corrosion. The cover weatherseal is an elastomeric ring compressed between the body and cover to protect cover bolts from corrosion.



Principal Features

- Turns easily every time, shuts off with the proven dependability of a plug valve and eliminates the problems generally associated with conventional plug valves.
- As shown in the photograph, balance holes at the top and bottom of the plug maintain equal pressure above and below the plug and in the plug port so that line pressure cannot jam the plug into the body taper. A stainless steel spring pre-loads the plug to prevent vibration and thermal cycling from wedging the plug in the taper. Loading the top of the plug in this way also compensates for the weight of the plug when the valve is installed upside down.
- The Dynamic Balance design provides durable, metal-to-metal seats and a sealant system for bubble-tight shutoff on hard-to-hold fluids and restoration of damaged seats.
- The Dynamic Balance design also offers the Protected Pressure Balancing feature for increased reliability in service where there is a possibility of foreign particles in the media. 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.
- Standard carbon steel API-6D and B16.34 valves are suitable for general service at temperatures from -20°F to +450°F (-29°C to +232°C).
- Sealant systems are incorporated in metal-seated plug valves as an integral part of the valve, and sealant is required to ensure proper valve performance.
- Dynamic Balance plug valves with their metal-to-metal seats have been fire-tested in conformance with API Standards 607 and 6FA.

Super Nordstrom Plug Valves with Controlled-Balance Plug



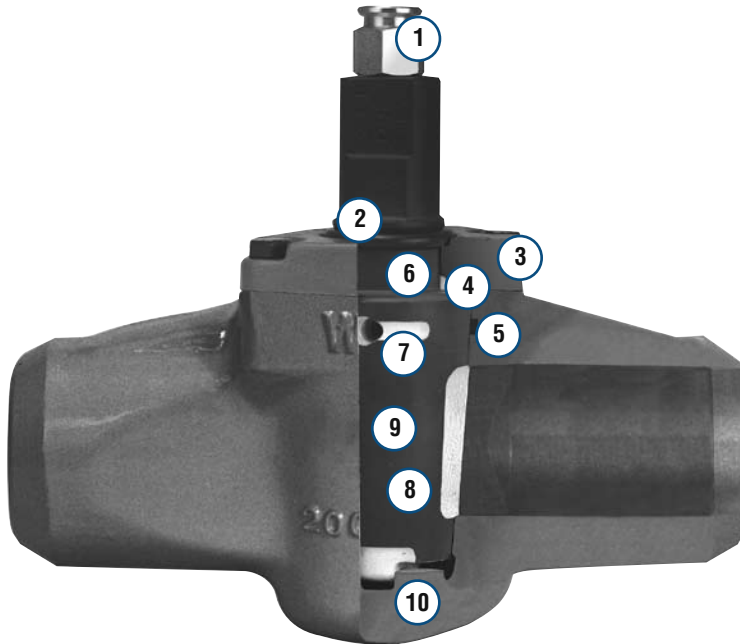
1. **Sealant Injection Fitting** – allows simple, quick injection of sealant in Super Nordstrom valves for instant seat replacement. The fitting also serves as a compression screw when sealant is used in stick form; can be removed, with caution, under pressure.
2. **Double Ball Checks (not shown)** – maintain sealant pressure in the enclosed grooving system in the plug and body and prevent back-pressure on the sealant chamber.
3. **Indicator Stop Collar** – provides consistent plug positioning in the open and closed positions.
4. **Stainless Steel Controlled-Dimension Washers** – assure proper plug positioning, “always turn” capability and predictable torque.
5. **Tapered Steel Plug** – coated with a material that has an exceptionally low coefficient of friction that is permanently bonded to metal surface and provides permanent separation of metal plug and body. The coating is inert to most liquids and gases.
6. **Stainless Steel Spring** – is designed to preload the plug to prevent vibration and thermal cycling from wedging the plug into the taper, regardless of installed position.
7. **Sealdport Sealant Grooving System** – carefully designed to give complete distribution of pressurized sealant to seating surfaces; surrounds the body port for complete sealing.
8. **Cover Seal Gasket** – independent of plug positioning mechanism, providing maximum protection against external leakage.
9. **Carbon Filament Stem Packing** – has been specially designed and patented by Nordstrom Valves and is inert to a wide range of fluids and gases.
10. **Weatherseal** – is specially shaped and constructed to protect the stem, gland and packing from hostile environments that can lead to corrosion.



Principal Features

- The Super Nordstrom plug valve carries on the Nordstrom Valves tradition of valving excellence. Complementing the broad line of Dynamic Balance plug valves, the Super Nordstrom valve offers dependable, bubble-tight shutoff and predictable torque in an economical line of valves in a smaller size range ($\frac{1}{2}$ through 4) for low to medium pressure (ASME classes 150, 300 and 600).
- The tapered plug design, metal-to-metal seating, sealant injection capability, compact rugged construction—all proven Nordstrom Valves plug valve features—have been retained in the Super Nordstrom valve. But, with its controlled-balance plug, the Super Nordstrom valve offers the added benefit of predictable torque and freedom from sticking.
- The Super Nordstrom design features a stainless steel spring that is compressed between the small end of the plug and body. This applies a constant force to the plug, tending to lift it out of the taper. This movement of the plug, however, is limited by stainless steel controlled-dimension washers located between the large end of the plug and cover. The “controlled-balance” effect is maintained by the spring pressure at the small end of the plug and the controlled dimension washers at the large end.
- Extensive testing—not to mention years of experience with Dynamic Balance plug valves—has shown that this precisely controlled vertical lifting of the plug eliminates wedging of the plug in the body taper without affecting tight shutoff. The plug is permanently adjusted at plant assembly by selection of the proper washers—thereby eliminating the need for field readjustment.

Super Nordstrom Two-Bolt Cover Valves for Gas Distribution Service

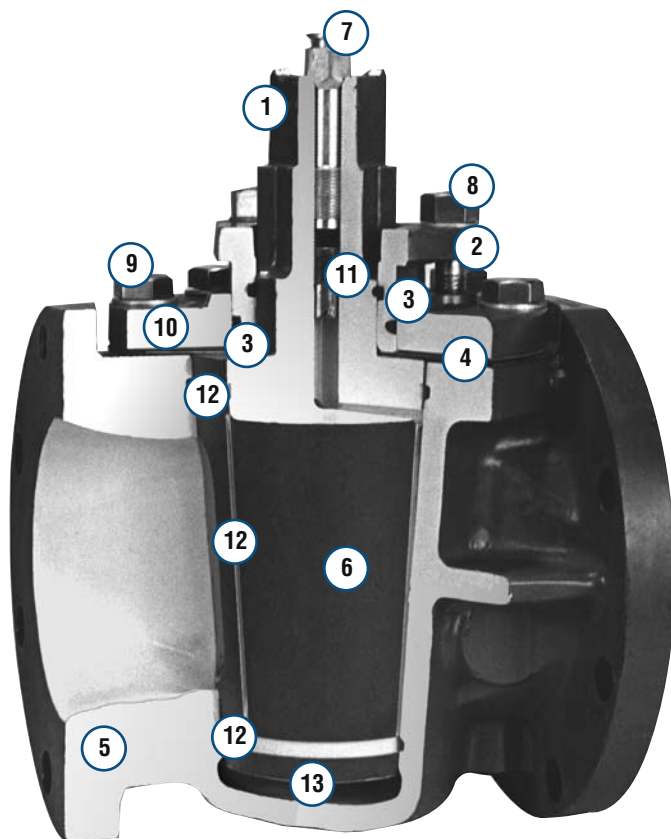


Principal Features

- All of the time-proven Nordstrom Valves quality features are available to the gas industry in the low-cost, weld-end Super Nordstrom plug valve.
- The weld-end permits fast, simple installation directly into welded gas distribution lines, eliminating time-consuming bolting of flanges and potential leaks through gasketed joints. It greatly simplifies cathodic protection by providing a connection that is smooth, simple and easily coated.
- The steel body provides greater strength and increased ductility compared to flanged iron valves. This eliminates the possibility of fracture when lines are subjected to ground movement.
- This valve is a real money saver. Use of iron plugs and ductile iron covers greatly lowers its cost over all-steel valves.
- External leakage is eliminated through proven Nordstrom Valves designs without the use of costly accessories to protect exposed, threaded stems.
- All valves—with the use of a two-inch square adapter—may be operated by a standard two-inch square wrench that clearly indicates valve open and closed positions above ground.
- These valves incorporate all of the well-known features of conventional Super Nordstrom or Nordstrom valves including quarter-turn operation, a thermally bonded, low-friction plug coating for low operating torque, and sealant jacking to insure positive operation and drop-tight closure.

1. **Sealant Injection Fitting** – allows simple, quick injection of sealant in Super Nordstrom valves for instant seat replacement. The fitting also serves as a compression screw when sealant is used in stick form, and can be removed, with caution, under pressure.
2. **Weatherseal** – eliminates the trash pocket between the cover and stem to provide optimum environmental corrosion protection.
3. **Offset Cover** – flush with body to eliminate potential leak paths; cover bolts are recessed to allow easy wrench operation. Cover and bolts provide greater resistance against external corrosion.
4. **Stem Seal** – limits plug lift and provides added protection against external leakage.
5. **Cover Seal Gasket** – independent of plug positioning mechanism, and provides maximum protection against external leakage.
6. **Double Ball Checks (not shown)** – maintain sealant pressure in the enclosed grooving system in the plug and body and prevents back-pressure on the sealant chamber.
7. **Sealport Sealant Grooving System** – carefully designed to give complete distribution of pressurized sealant to seating surfaces; surrounds the body port for complete sealing.
8. **Statically Balanced Plug** – the spring (below plug) and loaded reinforced TFE washer (above plug) assure proper plug positioning, “always turn” capability and predictable torque.
9. **Tapered Iron Plug** – coated with a material that has an exceptionally low coefficient of friction that is permanently bonded to metal surface and provides permanent separation of metal plug and body. The coating is inert to most liquids and gases.
10. **Internal Stops** – eliminate trash pockets around the cover and stem to provide maximum environmental corrosion protection.

Nordstrom Bolted Gland Plug Valves



Principal Features

- In bolted, gland-type valves, controlled plug motion is provided by flexing of the gland itself. The bolted, gland-type valves can be adjusted, if needed, but normally require little attention for leak-free, easy-turning valve performance.
- The tapered plug is lapped individually with its matching body, providing perfect seating contact. The sealant channels in the plug and body seats provide lubrication which, together with the positive rotary action of the tapered plug valve, protect the seating surfaces against corrosion, erosion, or accumulation of solid deposits. This valve is designed with a heavy-wall body, constructed beyond its requirements as a pressure vessel for its maximum rated working pressure to withstand the higher-than-line sealant pressure and expected line stresses.

1. **Wrench Square**
2. **Fixed Adjustment Gland** – allows for field adjustment, if required.
3. **O-rings** – act as a secondary seal against external leakage around the gland and the plug shank.
4. **Flexible Metal Sealing Diaphragm and Gasket** – act as primary seals for prevention of external leakage.
5. **Heavy-Wall Body** – is designed beyond its requirements as a pressure vessel for its maximum rated working pressure to withstand the higher-than-line sealant pressure and normal line stresses.
6. **Plug** – coated with a material of exceptionally low coefficient of friction that is permanently bonded to the metal surface providing permanent separation of the metal plug and body. The coating is inert to most liquids and gases.
7. **Sealant Fitting** – allows simple, quick injection of sealant in Nordstrom valves for instant seat replacement. The fitting also serves as a compression screw when sealant is used in stick form, and can be removed, with caution, under pressure.
8. **Gland Cap Screw**
9. **Cover Cap Screw**
10. **Cover**
11. **Double Ball Checks** – maintain pressure in the enclosed grooving system in the plug and body and prevent backpressure on the sealant chamber.
12. **Sealport Sealant Grooving System** – is carefully designed to give complete distribution of pressurized sealant to seating surfaces; surrounds the body port for complete sealing.
13. **Sealant Chamber** – provides plug “jacking” force.

Super Nordstrom Two-Bolt Cover Plug Valves

Short Pattern

200 CWP
(13.8 BAR)
400 PSIG
(28 BAR) TEST

Figure 1942½, Sizes ¾, 1 and 1¼ (not shown)
Figure 1943¼, Sizes 2, 3 and 4 (not shown)

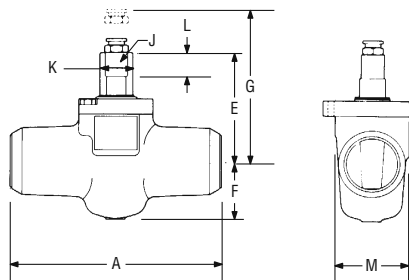


Figure 1943½, Sizes 2, 3 and 4

200 CWP – Figure 1942½, 1943½, 1943¼							
Size	NPS DN	¾ 20	1 25	1¼ 32	2 50	3 80	4 100
End-to-end, socket weld, Figure 1942½	A	4.50 114	4.50 114	5.00 127			
End-to-end, butt-welding ends,* Figure 1943½	A				9.00 229	10.00 254	11.00 279
End-to-end, flanged by weld end, Figure 1943¼	-				11.50 292	12.75 324	14.00 356
Diameter of flange	-				6.00 152	7.50 191	9.00 229
Center to top of stem	E	3.8 97	3.8 97	4.1 104	4.7 119	5.6 142	6.3 160
Center to bottom of body	F	2.0 51	2.0 51	2.2 56	2.5 64	3.5 89	4.1 104
Clearance required to remove sealant fitting	G	5.5 140	5.5 140	5.8 147	6.4 163	7.2 183	8.0 203
Width of stem flats	J	0.81 21	0.81 21	1.00 25	1.00 25	1.25 32	1.25 32
Diameter of stem	K	1.06 59	1.06 59	1.38 35	1.38 35	1.75 44	1.75 44
Height of stem flats	L	0.9 23	0.9 23	1.0 25	1.0 25	1.3 33	1.3 33
Extreme width of body	M	2.6 66	2.6 66	3.2 81	3.2 81	4.0 102	4.8 122
Wrench size	-	SN-1	SN-1	SN-2	SN-2	L-9	SN-3
2" square adapter number	-	12180	12180	12183	12183	12185	12185
Weight (approx.), Figure 1942½	-	6 3	6 3	9 4			
Weight (approx.), Figure 1943½	-				15 7	29 13	45 20
Weight (approx.), Figure 1943¼	-				22 10	41 19	63 29

* Schedule 40 steel pipe welding ends are standard – other bores on request.
All valve sizes use Sealant Stick B.

Super Nordstrom Plug Valves

Short Pattern

ASME Class 150
(PN 20)

Figure 1925½, Sizes 2, 3 and 4
(not shown)

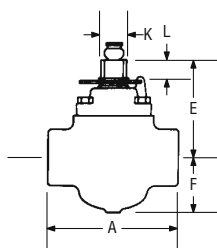


Figure 1924, Sizes 2 and 3

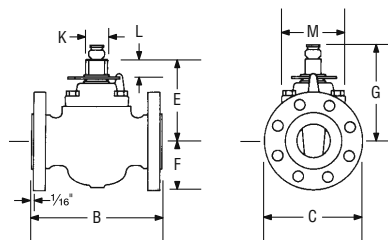
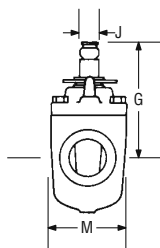


Figure 1925, Sizes 1 to 4

ASME Class 150 – Figure 1924, 1925, 1925½

Size	NPS DN	1 25	1½ 40	2 50	2½ 65	3 80	4 100
End-to-end, threaded, Figure 1924	A			7.25 184		10.00 254	
Face-to-face, flanged (raised face) (incl. ⅜" raised face), Figure 1925	B	5.50 140	6.50 165	7.00 178	7.50 191	8.00 203	9.00 229
End-to-end, welding ends, Figure 1925½	-			10.50 267		13.00 330	14.00 356
Diameter of flange	C	4.25 108	5.00 127	6.00 152	7.00 178	7.50 191	9.00 229
Center to top of stem	E	4.5 114	5.2 132	5.4 137	5.4 137	6.4 163	7.0 178
Center to bottom of body	F	2.2 56	2.6 66	3.0 76	3.0 76	4.0 102	4.4 112
Clearance required to remove sealant fitting	G	7.0 178	7.7 196	7.9 201	7.9 201	8.9 226	9.5 241
Width of stem flats	J	0.81 21	1.00 25	1.00 25	1.00 25	1.25 32	1.38 35
Diameter of stem	K	1.09 28	1.41 36	1.41 36	1.41 36	1.78 45	1.97 50
Height of stem flats	L	0.9 23	1.0 25	1.0 25	1.0 25	1.3 33	1.5 38
Extreme width of body	M	3.3 84	3.8 97	4.2 107	4.2 107	4.8 122	5.5 140
Number of tapped holes/Thread size UNC in flange*	-					2/ 625	
Wrench size	-	SN-1	SN-2	SN-2	SN-2	L-9	M-9
Weight (approx.), Figure 1924	-			25 11		50 23	
Weight (approx.), Figure 1925	-	15 7	21 10	31 14	45 20	61 28	78 35
Weight (approx.), Figure 1925½	-			26 12		50 23	65 29

All valve sizes use Sealant Stick B.

Lengths of Figure 1925 valves, sizes 2 and larger, are interchangeable with ASME Class 150 Steel Gate Valves.

* Conforms to API 6D and is marked accordingly.

Dynamic Balance Plug Valves

Short Pattern

ASME Class 150
(PN 20)

Figure 1945½, Sizes 6 and 8
(not shown)

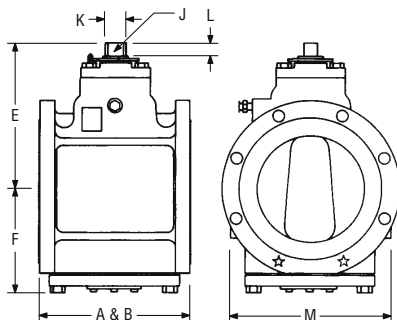


Figure 1945, Sizes 2 to 8

ASME Class 150 – Figure 1945, 1945½						
Size	NPS DN	2 50	3 80	4 100	6 150	8 200
End-to-end, welding ends, Figure 1945½	A				18.00 457	20.50 521
Face-to-face, flanged (raised face) (incl. ¼" raised face), Figure 1945	B	7.00 178	8.00 203	9.00 229	10.50 267	11.50 292
Diameter of flange	C	6.00 152	7.50 191	9.00 229	11.00 279	13.50 343
Center to top	E	6.6 168	7.6 193	8.0 203	10.4 264	11.4 290
Center to bottom of body	F	3.8 97	4.1 104	4.9 124	6.5 165	8.1 206
Width of stem flats	J	0.81 21	1.00 25	1.00 25	1.25 32	1.25 32
Diameter of stem	K	1.09 28	1.41 36	1.41 36	1.81 46	1.81 46
Height of stem flats	L	1.0 25	1.1 28	1.1 28	1.2 30	1.2 30
Extreme width of body	M	4.2 107	5.2 132	7.4 188	10.0 254	12.4 315
Number of tapped holes/Size	-		2/ 625	2/ 625	2/ 750	2/ 750
Thread size UNC in flange*	-		¾-11	¾-11	¾-10	¾-10
Wrench size	-	DB-2	DB-3	DB-3	DB-4	DB-4
Weight (approx.), Figure 1945	-	38 17	75 34	120 54	170 77	250 113
Weight (approx.), Figure 1945½	-				180 82	280 127

* Conforms to API 6D, paragraph 2.5c, and is marked accordingly.

Dynamic Balance Plug Valves

Short Pattern

ASME Class 150
(PN20)

Figure 1949½, Sizes 6 to 12
(not shown)

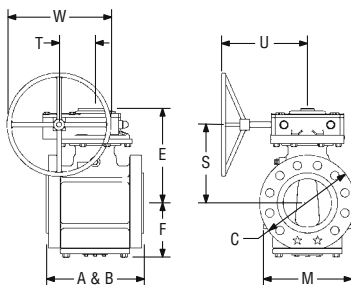


Figure 1949, Sizes 6 to 12

ASME Class 150 – Figure 1949, 1949½					
Size	NPS DN	6 150	8 200	10 250	12 300
End-to-end, welding ends Fig. 1949½	A	18.00 457	20.50 521	18.00* 457	19.75* 502
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 1949	B	10.50 267	11.50 292	13.00 330	14.00 356
Diameter of flange	C	11.00 279	13.50 343	16.00 406	19.00 483
Center to bottom of body	F	6.5 165	8.1 206	9.5 241	11.0 279
Extreme width of body	M	10.0 254	12.4 315	14.0 356	16.0 406
Number of tapped holes/Size	-	2/.750	2/.750	2/.875	2/.875
Thread size UNC in flange*	-	¾-10	¾-10	¾-9	¾-9
Category A and C Gear Dimensions					
Center to top (gearing)	E	12.6 320	13.7 348	14.6 371	17.2 437
Center of port to center of handwheel	S	10.9 277	11.9 302	12.4 315	14.2 361
Longitudinal centerline to handwheel centerline	T	3.5 89	3.5 89	4.8 122	6.1 155
Longitudinal centerline to face of handwheel	U	11.5 292	11.5 292	14.1 358	15.1 384
Handwheel diameter/ Number of turns to open with gearing	W	24/15 610	24/15 610	24/17 610	24/22 610
Weight (approx.), Fig. 1949	-	230 104	310 141	475 216	710 322
Weight (approx.), Fig. 1949½	-	240 109	340 154	435 197	620 281
Category B and D Gear Dimensions					
Center to top (gearing)	E	13.1 333	14.1 358	14.6 371	17.2 437
Center of port to center of handwheel	S	10.8 274	11.9 302	12.4 315	14.2 361
Longitudinal centerline to handwheel centerline	T	4.8 122	4.8 122	4.8 122	6.1 155
Longitudinal centerline to face of handwheel	U	14.1 358	16.5 419	14.1 358	15.1 384
Handwheel diameter/ Number of turns to open with gearing	W	24/17 610	36/17 914	24/17 610	24/22 610
Weight (approx.), Fig. 1949	-	260 118	340 154	475 216	710 322
Weight (approx.), Fig. 1949½	-	270 123	370 168	435 197	620 281

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

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

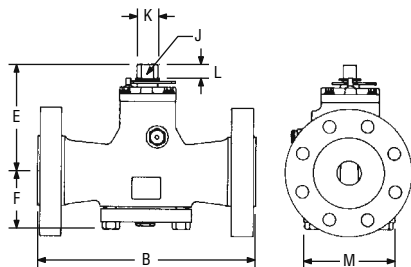
For Category E, F, H, J, and K valve gearing dimensions, contact factory.

For buried service and offshore applications, contact factory.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 150
(PN20)



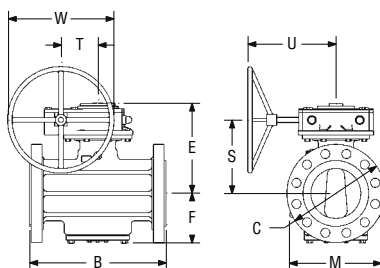
ASME Class 150 – Figure 2445

Size	NPS DN	6 150	8 200
Face-to-face, flanged (raised face) (inc. 1/16" raised face), Fig. 2445	B	15.50 394	18.00 457
Diameter of flange	C	11.00 279	13.50 343
Center to top of stem	E	10.4 264	11.4 290
Center to bottom of body	F	7.2 183	9.4 239
Width of stem flats	J	1.25 32	1.25 32
Diameter of stem	K	1.8 46	1.8 46
Height of stem flats	L	1.2 30	1.2 30
Extreme width of body	M	11.4 290	15.6 396
Number of tapped holes/Size	-		
Thread size UNC in flange*	-		
Wrench size	-	DB-4	DB-4
Weight (approx.), Fig. 2445	-	240 109	430 195

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 150
(PN20)



ASME Class 150 – Figure 2449

Size	NPS DN	6 150	8 200	10 250	12 300
Face-to-face, flanged (raised face) (inc. 1/8" raised face), Fig. 2449	B	15.50 394	18.00 457	21.00 533	24.00 610
Diameter of flange	C	11.00 279	13.50 343	16.00 406	19.00 483
Center to bottom of body	F	7.2 183	9.4 239	11.0 279	12.8 325
Extreme width of body	M	11.4 290	15.6 396	18.1 460	20.6 523
Category A and C Gear Dimensions					
Center to top (gearing)	E	13.0 330	14.6 371	17.9 455	23.0 584
Center of port to center of handwheel	S	11.3 287	12.4 315	14.9 379	18.1 460
Longitudinal centerline to handwheel centerline	T	3.5 89	4.8 122	6.1 155	10.5 267
Longitudinal centerline to face of handwheel	U	11.5 292	14.1 358	16.5 419	20.8 528
Handwheel diameter/ Number of turns to open with gearing	W	24/15 610	24/17 610	30/22 762	24/62.5 610
Weight (approx.), Fig. 2449	-	380 172	500 227	1120 508	1440 653
Category B and D Gear Dimensions					
Center to top (gearing)	E	13.4 340	14.6 371	18.9 480	23.0 584
Center of port to center of handwheel	S	11.2 285	12.4 315	15.6 396	18.1 460
Longitudinal centerline to handwheel centerline	T	4.8 122	4.8 122	2.1 53	10.5 267
Longitudinal centerline to face of handwheel	U	14.1 358	14.1 358	21.0 533	20.8 528
Handwheel diameter/ Number of turns to open with gearing	W	24/17 610	24/17 610	30/45 762	24/62.5 610
Weight (approx.), Fig. 2449	-	408 185	500 227	1160 526	1440 653

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.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 150
(PN20)

Fig. 4149½, Sizes 14 to 30
(not shown)
Fig. 4149¼, Sizes 14 & 16
(not shown)

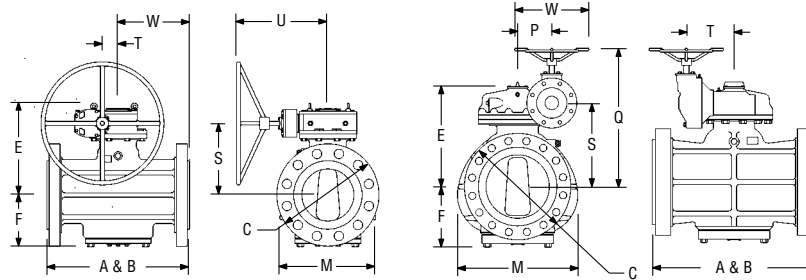


Fig. 4149, Sizes 14, 16, 18 & 20

Fig. 4149, Sizes 24 & 30

ASME Class 150 – Figure 4149, 4149½, 4149¼

Size	NPS DN	14 350	16 400	18 450	20 500	24 ** 600	30 ** 750
End-to-end, welding ends Fig. 4149½	A	27.00 686	30.00 762	34.00 864	36.00 914	42.00 1,067	51.00* 1,295
Face-to-face, flanged (raised face) (inc. ⅛" raised face), Fig. 4149	B	27.00 686	30.00 762	34.00 864	36.00 914	42.00 1,067	51.00* 1,295
End-to-end, flanged by butt-weld end, Fig. 4149¼	-	27.00 686	30.00 762				
Diameter of flanges	C	21.00 533	23.50 597	25.00 635	27.50 699	32.00 813	38.75 984
Center to bottom of body	F	11.0 279	12.8 325	14.2 361	16.2 411	18.6 472	22.8 579
Extreme width of body	M	18.0 457	20.6 523	22.3 566	23.5 597	30.0 762	38.0 965
Category A and C Gear Dimensions							
Center to top (gearing)	E	17.9 455	21.5 546	23.8 605	26.3 668	28.7 729	36.0 914
Traverse centerline to handwheel centerline	P					13.5 343	15.2 386
Center to top of handwheel	Q					38.2 970	45.1 1,146
Center of port to center of handwheel	S	14.9 379	18.2 462	18.9 480	21.4 544	22.4 569	29.3 744
Longitudinal centerline to handwheel centerline	T	6.1 155	2.1 53	10.5 267	3.8 97	10.7 272	13.9 353
Longitudinal centerline to face of handwheel	U	16.5 419	19.5 495	20.8 528	22.3 566		
Handwheel diameter/ Number of turns to open with gearing	W	30/22 762	24/45 610	24/62.5 610	30/62.5 762	32/50 813	32/119 813
Weight (approx.), Fig. 4149	-	1080 490	1660 753	2120 962	2490 1129	4137 1877	8155 3699
Weight (approx.), Fig. 4149½	-	1030 467	1580 717	1930 875	2250 1021	3787 1718	7681 3484
Weight (approx.), Fig. 4149¼	-	1055 479	1620 735				
Category B and D Gear Dimensions							
Center to top (gearing)	E	18.9 480	21.5 546	23.8 605	26.3 668	28.7 729	36.0 914
Center of port to center of handwheel	S	15.6 396	18.2 462	18.9 480	21.4 544	22.4 569	29.3 744
Longitudinal centerline to handwheel centerline	T	2.1 53	2.1 53	10.5 267	3.8 97	10.7 272	13.9 353
Longitudinal centerline to face of handwheel	U	21.0 533	19.5 495	20.8 528	22.3 566		
Handwheel diameter/ Number of turns to open with gearing	W	30/45 762	24/45 610	24/62.5 610	30/62.5 762	32/50 813	32/119 813
Weight (approx.), Fig. 4149	-	1130 513	1660 753	2020 916	2490 1129	4137 1877	8155 3699
Weight (approx.), Fig. 4149½	-	1070 485	1580 717	1930 875	2250 1021	3787 1718	7681 3484
Weight (approx.), Fig. 4149¼	-	1100 499	1620 735				

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

**These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Nordstrom Bolted Gland Plug Valves

ASME Class 150
(PN 20)

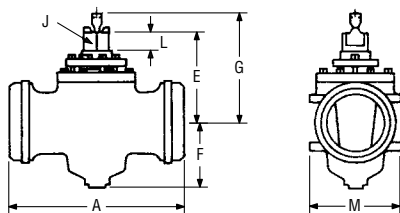


Figure 4185½, Sizes 6, 8 and 12

ASME Class 150 – Figure 4185½				
Size	NPS DN	6 150	8 200	12 300
End-to-end, welding, Figure 4185½	A	13.00 330	15.50 394	20.00 508
Center to top of stem	E	9.6 244	11.8 300	14.7 373
Center to bottom of body	F	6.0 152	7.3 185	10.3 262
Clearance required to remove sealant fitting	G	13.3 338	16.6 422	19.6 498
Width of stem flats	J	1.75 44	2.00 51	2.44 62
Height of stem flats	L	1.8 46	2.0 51	2.4 61
Extreme width of body	M	9.3 236	11.0 279	15.0 381
Wrench size	-	P-2	T-2	V-2
Weight (approx.), Figure 4185½	-	121 55	189 86	444 201

Size 6 valves use Sealant Stick D.
All other valve sizes use Sealant Stick G.

Nordstrom Bolted Gland Plug Valves

ASME Class 150
(PN 20)

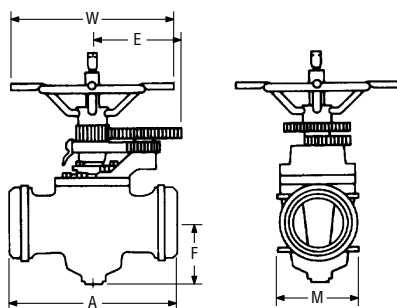


Figure 4187½, Sizes 6, 8 and 12

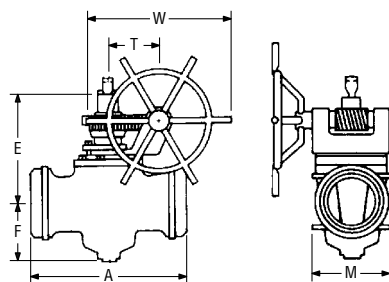


Figure 4189½, Sizes 6, 8 and 12

ASME Class 150 – Figure 4187½, 4189½

Size	NPS DN	6 150	8 200	12 300
End-to-end, welded, Figure 4187½, 4189½	A	13.00 330	15.50 394	20.00 508
Center to top	E	11.3 287	13.3 338	16.1 409
Center to bottom of body	F	6.0 152	7.3 185	10.3 262
Clearance required to remove sealant fitting, Figure 4187½	-	20.4 518	24.8 630	27.6 701
Clearance required to remove sealant fitting, Figure 4189½	-	15.0 381	18.1 460	21.0 533
Extreme width of body	M	9.3 236	11.0 279	15.0 381
Center to top of intermediate gear	-	10.9 277	12.4 315	15.8 401
Center to top of handwheel, Figure 4187½	-	15.3 389	17.1 434	20.9 531
Center of stem to outside of intermediate gear, Figure 4187½	R	10.7 272	10.7 272	14.4 366
Center of port to center of handwheel, Figure 4189½	-	8.6 218	10.0 254	12.7 323
Traverse centerline to center of worm shaft, Figure 4189½	T	5.3 135	5.3 135	7.4 188
Longitudinal centerline to face of handwheel, Figure 4189½	-	9.9 251	9.9 251	13.4 340
Diameter of handwheel, Figure 4187½	W	23.0 584	23.0 584	26.0 660
Diameter of handwheel, Figure 4189½	W	20.0 508	20.0 508	26.0 660
Number of turns to open, Figure 4187½	-	1.5	1.5	3.0
Number of turns to open, Figure 4189½	-	12.5	12.5	19.5
Weight (approx.), Figure 4187½	-	187 85	255 116	552 250
Weight (approx.), Figure 4189½	-	191 87	259 117	556 252

Size 6 valves use Sealant Stick D.

All other valve sizes use Sealant Stick G.

Super Nordstrom Plug Valves

Short Pattern

ASME Class 300
(PN 50)

Figure 2024½, Sizes 2 to 4
(not shown)

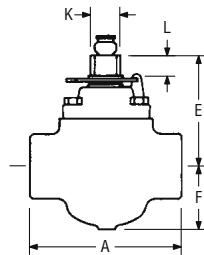


Figure 2024, Sizes ½ to 3

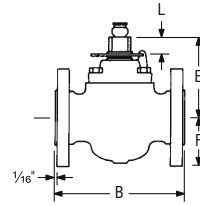
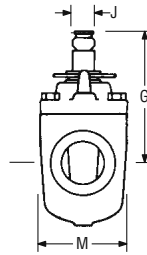
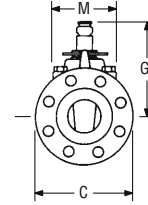


Figure 2025, Sizes 1 to 4



ASME Class 300 – Figure 2024, 2025, 2025½									
Size	NPS DN	½ & ¾ 15 & 20	1 25	1¼ 32	1½ 40	2 50	2½ 65	3 80	4 100
End-to-end, threaded, Figure 2024	A	4.25 108	4.50 114	5.50 140	5.50 140	7.25 184		10.00 254	
Face-to-face, flanged (raised face) (incl. ⅛" raised face), Figure 2025	B		6.25 159		7.50 191	8.50 216	9.50 241	11.13 283	12.00 305
End-to-end, welding ends, Figure 2025½	-					10.50 267		13.00 330	14.00 356
Diameter of flange	C		4.88 124		6.13 156	6.50 165	7.50 191	8.25 210	10.00 254
Center to top of stem	E	4.1 104	4.5 114	5.2 132	5.2 132	5.4 137	5.4 137	6.4 163	7.0 178
Center to bottom of body	F	1.9 48	2.2 56	2.6 66	2.6 66	3.0 76	3.0 76	4.0 102	4.4 112
Clearance required to remove sealant fitting	G	6.6 168	7.0 178	7.7 196	7.7 196	7.9 201	7.9 201	8.9 226	9.5 241
Width of stem flats	J	0.81 21	0.81 21	1.00 25	1.00 25	1.00 25	1.00 25	1.25 32	1.38 35
Diameter of stem	K	1.09 28	1.09 28	1.41 36	1.41 36	1.41 36	1.41 36	1.78 45	1.97 50
Height of stem flats	L	0.9 23	0.9 23	1.0 25	1.0 25	1.0 25	1.0 25	1.3 33	1.5 38
Extreme width of body	M	3.3 84	3.3 84	3.8 97	3.8 97	4.2 107	4.2 107	4.8 122	5.5 140
Wrench size	-	SN-1	SN-1	SN-2	SN-2	SN-2	SN-2	L-9	M-9
Weight (approx.), Figure 2024	-	9 4	13 6	18 8	18 8	25 11		50 23	
Weight (approx.), Figure 2025	-		18 8		28 13	39 18	57 26	77 35	105 48
Weight (approx.), Figure 2025½	-					26 12		50 23	65 29

All valve sizes use Sealant Stick B.

Lengths of Figure 2025 valves, sizes 1½ and larger, are interchangeable with ASME Class 300 Steel Gate Valves.

Dynamic Balance Plug Valves

Short Pattern

ASME Class 300
(PN50)

Figure 2045½, Sizes 2 and 6
(not shown)
Figure 2045¼, Sizes 2 to 4
(not shown)

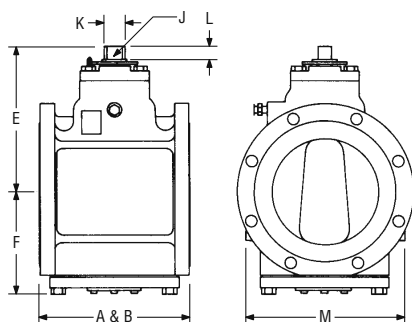


Figure 2045, Sizes 2 to 6

ASME Class 300 – Figure 2045, 2045½, 2045¼					
Size	NPS DN	2 50	3 80	4 100	6 150
End-to-end, welding ends Fig. 2045½	A	11.50* 292	14.00* 356	17.00* 432	18.00 457
Face-to-face, flanged (raised face) (inc. ½" raised face), Fig. 2045	B	8.50 216	11.13 283	12.00 305	15.88 403
End-to-end, flanged (ring joint)	-	9.12 232	11.75 298	12.62 321	
End-to-end, flanged by weld end, Fig. 2045¼	-	11.19* 284	13.68* 347	16.56* 421	15.88* 403
Diameter of flange	C	6.50 165	8.25 210	10.00 254	12.50 318
Center to top of stem	E	6.6 168	7.6 193	8.0 203	10.3 262
Center to bottom of body	F	3.8 97	4.1 104	4.9 124	6.5 165
Width of stem flats	J	0.81 21	1.00 25	1.00 25	1.25 32
Diameter of stem	K	1.09 28	1.41 36	1.41 36	1.78 45
Height of stem flats	L	1.0 25	1.1 28	1.1 28	1.2 31
Extreme width of body	M	4.2 107	5.2 132	7.4 188	11.0 279
Wrench size	-	DB-2	DB-3	DB-3	DB-4
Weight (approx.), Fig. 2045	-	46 21	82 37	134 61	244 111
Weight (approx.), Fig. 2045½	-	38 17	65 29	100 45	167 76
Weight (approx.), Fig. 2045¼	-	42 19	70 32	126 57	197 89

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

Dynamic Balance Plug Valves

Short Pattern

ASME Class 300
(PN50)

Figure 2049½, Sizes 3, 4, 6
and 8 (not shown)
Figure 2049¼, Sizes 6 and 8
(not shown)

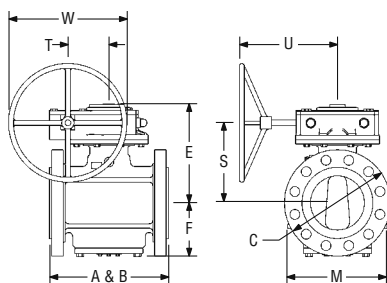


Figure 2049, Sizes 3, 4, 6 and 8

ASME Class 300 – Figure 2049, 2049½, 2049¼

Size	NPS DN	3 80	4 100	6 150	8 200
End-to-end, welding ends Fig. 2049½	A	14.00* 356	17.00* 432	18.00 457	16.50* 419
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 2049	B	11.13 283	12.00 305	15.88 403	16.50 419
End-to-end, flanged (ring joint)	-	11.75 298	12.62 321		
End-to-end, flanged by weld end, Fig. 2049¼	-	13.68* 347	16.56* 421	15.88* 403	16.50* 419
Diameter of flange	C	8.25 210	10.00 254	12.50 318	15.00 381
Center to bottom of body	F	4.1 104	4.9 124	6.5 165	8.1 206
Extreme width of body	M	5.2 132	7.4 188	11.0 279	14.0 356
Category A and C Gear Dimensions					
Center to top (gearing)	E	9.1 231	9.7 246	12.6 320	13.6 345
Center of port to center of handwheel	S	7.6 193	8.2 208	10.9 277	11.9 302
Longitudinal centerline to handwheel centerline	T	2.6 66	2.6 66	3.5 89	3.5 89
Longitudinal centerline to face of handwheel	U	9.4 239	9.4 239	11.5 292	11.5 292
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	14/10.5 356	24/15 610	24/15 610
Weight (approx.), Fig. 2049	-	130 59	165 75	310 141	420 191
Weight (approx.), Fig. 2049½	-	115 52	145 66	235 107	370 168
Weight (approx.), Fig. 2049¼	-			273 124	395 179
Category B and D Gear Dimensions					
Center to top (gearing)	E	9.1 231	9.7 246	13.1 333	14.1 358
Center of port to center of handwheel	S	7.6 193	8.2 208	10.8 274	11.9 302
Longitudinal centerline to handwheel centerline	T	2.6 66	2.6 66	4.8 122	4.8 122
Longitudinal centerline to face of handwheel	U	9.4 239	9.4 239	14.1 358	14.1 358
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	14/10.5 356	24/17 610	24/17 610
Weight (approx.), Fig. 2049	-	130 59	165 75	340 154	450 204
Weight (approx.), Fig. 2049½	-	115 52	145 66	265 120	400 181
Weight (approx.), Fig. 2049¼	-			303 137	425 193

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

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

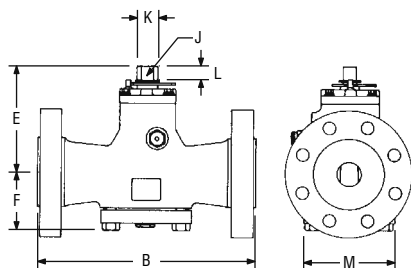
For Category E, F, H, J, and K valve gearing dimensions, contact factory.

For buried service and offshore applications, contact factory.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 300
(PN50)



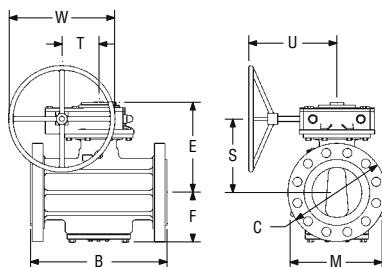
ASME Class 300 – Figure 2545

Size	NPS DN	6 150
Face-to-face, flanged (raised face) (inc. 1/16" raised face), Fig. 2545	B	15.88 403
Diameter of flange	C	12.50 318
Center to top of stem	E	10.9 277
Center to bottom of body	F	7.2 183
Width of stem flats	J	1.25 32
Diameter of stem	K	1.78 45
Height of stem flats	L	1.4 36
Extreme width of body	M	11.4 290
Wrench size	-	DB-4
Weight (approx.), Fig. 2545	-	280 127

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 300
(PN50)



ASME Class 300 – Figure 2549

Size	NPS DN	6 150	8 200	10 250	12 300
Face-to-face, flanged (raised face) (inc. 1/16" raised face), Fig. 2549	B	15.88 403	19.75 502	22.38 569	28.00 711
Diameter of flange	C	12.50 318	15.00 381	17.50 445	20.50 521
Center to bottom of body	F	7.2 183	9.4 239	11.0 279	12.8 325
Extreme width of body	M	11.4 290	15.6 396	18.1 460	22.6 574
Category A and C Gear Dimensions					
Center to top (gearing)	E	13.0 330	14.6 371	17.9 455	23.0 584
Center of port to center of handwheel	S	11.3 287	12.4 315	14.9 379	18.1 460
Longitudinal centerline to handwheel centerline	T	3.5 89	4.8 122	6.1 155	10.5 267
Longitudinal centerline to face of handwheel	U	11.5 292	14.1 358	16.5 419	20.8 528
Handwheel diameter/ Number of turns to open with gearing	W	24/15 610	24/17 610	30/22 762	24/62.5 610
Weight (approx.), Fig. 2549	-	330 150	600 272	1165 528	1800 817
Category B and D Gear Dimensions					
Center to top (gearing)	E	13.4 340	14.6 371	18.9 480	23.0 584
Center of port to center of handwheel	S	11.2 285	12.4 315	15.6 396	18.1 460
Longitudinal centerline to handwheel centerline	T	4.8 122	4.8 122	2.1 53	10.5 267
Longitudinal centerline to face of handwheel	U	16.5 419	14.1 358	21.0 533	20.8 528
Handwheel diameter/ Number of turns to open with gearing	W	36/17 914	24/17 610	30/45 762	24/62.5 610
Weight (approx.), Fig. 2549	-	360 163	600 272	1252 568	1800 817

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 300
(PN 50)

Figure 4245½, Sizes 6 and 8
(not shown)

Figure 4245¼, Sizes 6 to 8
(not shown)

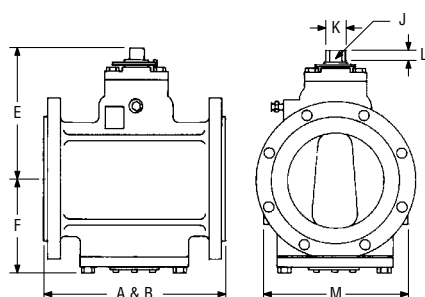


Figure 4245, Sizes 6 to 8

ASME Class 300 – Figure 4245, 4245½, 4245¼

Size	NPS DN	6 150	8 200
End-to-end, welding ends, Figure 4245½	A	18.00 457	20.50 521
Face-to-face, flanged (raised face) (incl. ½" raised face), Figure 4245	B	15.88 403	16.50 419
End-to-end, flanged (ring joint)	-	16.50 419	17.12 435
End-to-end, flanged by weld end, Figure 4245¼	-	16.94 430	18.50 470
Diameter of flange	C	12.50 318	15.00 381
Center to top of stem	E	9.6 244	10.7 272
Center to bottom of body	F	5.8 147	7.2 183
Width of stem flats	J	1.25 32	1.25 32
Diameter of stem	K	1.78 45	1.78 45
Height of stem flats	L	1.2 31	1.4 36
Extreme width of body	M	9.0 229	12.0 305
Wrench size	-	DB-4	DB-4
Weight (approx.), Figure 4245	-	201 91	318 144
Weight (approx.), Figure 4245½	-	140 64	243 110
Weight (approx.), Figure 4245¼	-	170 77	280 127

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 300
(PN50)

Fig. 4249½, Sizes 6 to 24
(not shown)
Fig. 4249¼, Sizes 6 to 24
(not shown)

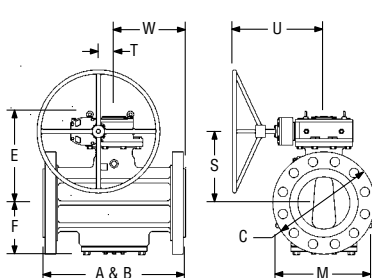


Fig. 4249, Sizes 6 to 20

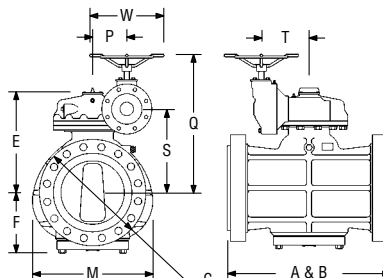


Fig. 4249, Size 24

ASME Class 300 – Figure 4249, 4249½, 4249¼

Size	NPS DN	6 150	8 200	10 250	12 300	14 350	16 400	20 ** 500	24 ** 600
End-to-end, welding ends Fig. 4249½	A	18.00 457	20.50 521	22.00 559	25.00 635	30.00 762	33.00 838	39.00 991	45.00 1143
Face-to-face, flanged (raised face) (inc. ½" raised face), Fig. 4249	B	15.88 403	16.50 419	18.00 457	19.75 502	30.00 762	33.00 838	39.00 991	45.00 1143
End-to-end, flanged (ring joint)	-	16.50 419	17.12 435	18.62 473	20.38 518	30.62 778	33.62 854	39.75 1010	45.80 1163
End-to-end, flanged by weld end, Fig. 4249¼	-	16.94 430	16.50* 419	20.00 508	22.38 568	30.00 762	33.00 838	39.00 991	45.00 1143
Diameter of flange	C	12.50 318	15.00 381	17.50 445	20.50 521	23.00 584	25.50 648	30.50 775	36.00 914
Center to bottom of body	F	5.8 147	7.2 183	9.4 239	10.4 264	11.0 279	12.8 325	17.1 434	19.9 505
Extreme width of body	M	9.0 229	12.0 305	15.6 396	15.6 396	18.1 460	22.6 574	26.8 681	34.0 864
Category A and C Gear Dimensions									
Center to top (gearing)	E	11.9 302	13.0 330	14.6 371	17.1 434	17.9 455	23.0 584	24.8 630	30.3 770
Traverse centerline to handwheel centerline	P								13.5 343
Center to top of handwheel	Q								38.4 975
Center of port to center of handwheel	S	10.1 257	11.3 287	12.4 315	14.1 358	14.9 379	18.1 460	20.4 518	22.6 574
Longitudinal centerline to handwheel centerline	T	3.5 89	3.5 89	4.8 122	6.1 155	6.1 155	10.5 267	10.4 264	10.7 272
Longitudinal centerline to face of handwheel	U	11.5 292	11.5 292	14.1 358	15.1 384	16.5 419	20.8 528	17.1 434	
Handwheel diameter/ Number of turns to open with gearing	W	24/15 610	24/15 610	24/17 610	24/22 610	30/22 762	24/62.5 610	32/24 813	32/50 813
Weight (approx.), Fig. 4249	-	255 116	380 172	630 286	840 381	1220 553	1910 866	3340 1515	5430 2463
Weight (approx.), Fig. 4249½	-	195 89	305 138	500 227	670 304	1000 454	1570 712	2950 1338	4830 2191
Weight (approx.), Fig. 4249¼	-	225 102	343 156	565 256	755 343	1110 504	1740 789	3145 1427	5130 2327
Category B and D Gear Dimensions									
Center to top (gearing)	E	12.3 312	13.4 340	14.6 371	17.1 434	18.9 480	23.0 584	24.8 630	30.3 770
Traverse centerline to handwheel centerline	P								13.5 343
Center to top of handwheel	Q								38.4 975
Center of port to center of handwheel	S	10.1 257	11.2 285	12.4 315	14.1 358	15.6 396	18.1 460	20.4 518	22.6 574
Longitudinal centerline to handwheel centerline	T	4.8 122	4.8 122	4.8 122	6.1 155	2.1 53	10.5 267	10.4 264	10.7 272
Longitudinal centerline to face of handwheel	U	14.1 358	16.5 419	14.1 358	15.1 384	21.0 533	20.8 528	17.1 434	
Handwheel diameter/Number of turns to open with gearing	W	24/17 610	36/17 914	24/17 610	24/22 610	30/45 762	24/62.5 610	32/24 813	32/50 813
Weight (approx.), Fig. 4249	-	285 129	405 184	630 286	840 381	1270 576	1910 866	3340 1515	5430 2463
Weight (approx.), Fig. 4249½	-	220 100	330 150	500 227	670 304	1050 476	1570 712	2950 1338	4830 2191
Weight (approx.), Fig. 4249¼	-	253 115	368 167	565 256	755 343	1160 526	1740 789	3145 1427	5130 2327

Size 18 & 30 valves available on special order.

*Conforms to API6D, section 6.3, and is marked accordingly.

**These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Super Nordstrom Plug Valves

Regular Pattern

ASME Class 600
(PN 100)

Figure 2224, Sizes 1½ and 2
(not shown)

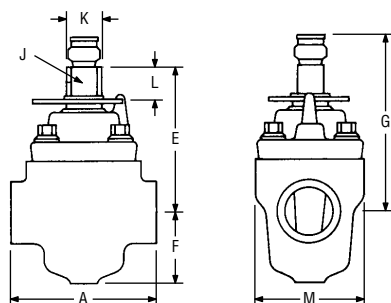


Figure 2224, Sizes ½, ¾ and 1

ASME Class 600 – Figure 2224					
Size	NPS DN	½ & ¾ 15 & 20	1 25	1½ 38	2 50
End-to-end, threaded ends, Figure 2224	A	4.25 108	4.50 114	5.75 146	7.25 184
Center to top of stem	E	4.1 104	4.5 114	5.2 132	5.4 137
Center to bottom of body	F	1.9 48	2.2 56	2.7 69	3.1 79
Clearance to remove sealant fitting	G	6.6 168	7.0 178	7.7 196	7.9 201
Width of stem flats	J	0.81 21	0.81 21	1.00 25	1.00 25
Diameter of stem	K	1.09 28	1.09 28	1.41 36	1.41 36
Height of stem flats	L	0.9 23	0.9 23	1.0 25	1.0 25
Extreme width of body	M	3.3 84	3.3 84	4.9 124	5.8 147
Wrench size	-	SN-1	SN-1	SN-2	SN-2
Weight (approx.), Figure 2224	-	9 4	13 6	20 9	31 14

Sizes 1½ and 2 valves have six bolt cover.

All valve sizes use Sealant Stick B.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 600
(PN 100)

Figure 2245½, Sizes 2 to 4
(not shown)
Figure 2245¼, Sizes 2 to 4
(not shown)

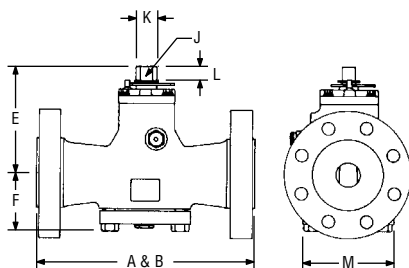


Figure 2245, Sizes 1 to 4

ASME Class 600 – Figure 2245, 2245½, 2245¼					
Size	NPS DN	1* 25	2 50	3 80	4 100
End-to-end, welding ends, Figure 2245½	A		11.50 292	14.00 356	17.00 432
Face-to-face, flanged (raised face), (incl ½" raised face), Figure 2245	B	8.50 216	11.50 292	14.00 356	17.00 432
End-to-end, flanged (ring joint)	-	8.50 216	11.62 295	14.12 359	17.12 435
End-to-end, flanged by weld end, Figure 2245¼	-		11.50 292	14.00 356	17.00 432
Diameter of flange	C	4.88 124	6.50 165	8.25 210	10.75 273
Center to top of stem	E	5.8 147	6.6 167	7.6 193	8.0 203
Center to bottom of body	F	2.8 71	3.8 97	4.1 104	4.9 124
Width of stem flats	J	0.62 16	0.81 21	1.00 25	1.00 25
Diameter of stem	K	0.85 22	1.09 28	1.41 36	1.41 36
Height of stem flats	L	0.9 23	1.0 25	1.1 28	1.1 28
Extreme width of body	M	3.7 94	4.2 107	5.2 132	7.4 188
Wrench size	-	DB-1	DB-2	DB-3	DB-3
Weight (approx.), Figure 2245	-	28 13	51 23	93 42	175 79
Weight (approx.), Figure 2245½	-		40 18	65 29	113 51
Weight (approx.), Figure 2245¼	-		46 21	79 36	144 65

*Size 1 valve is not addressed by API 6D

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 600
(PN100)

Fig. 2249½, Sizes 3 to 12 (not shown)
Fig. 2249¼, Sizes 3 to 12 (not shown)

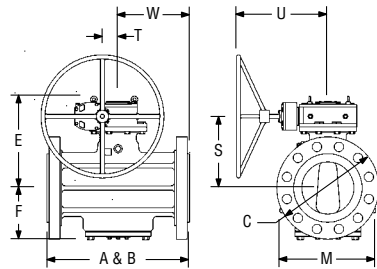


Fig. 2249, Sizes 3 to 12

ASME Class 600 – Figure 2249, 2249½, 2249¼

Size	NPS DN	3 80	4 100	6 150	8 200	10 250	12 300
End-to-end, welding ends Fig. 2249½	A	14.00 356	17.00 432	18.00* 457	20.50* 521	24.00* 610	28.00* 711
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 2249	B	14.00 356	17.00 432	22.00 559	26.00 660	31.00 787	33.00* 838
End-to-end, flanged by weld end, Fig. 2249¼	-	14.00 356	17.00 432	22.00 559	26.00 660	31.00 787	33.00* 838
End-to-end, flanged (ring joint)	-	14.12 359	17.12 435	22.12 562	26.12 663	31.12 790	33.12* 841
Diameter of flange	C	8.25 210	10.75 273	14.00 356	16.50 419	20.00 508	22.00 559
Center to bottom of body	F	4.2 107	5.0 127	6.8 173	9.4 239	10.7 272	13.2 335
Extreme width of body	M	5.2 132	7.4 188	9.5 241	13.6 345	15.6 396	20.5 521
Category A and C Gear Dimensions							
Center to top (gearing)	E	9.1 231	9.7 246	12.6 320	15.2 386	17.8 452	19.7 500
Center of port to center of handwheel	S	7.6 193	8.2 208	10.9 277	12.2 310	14.8 376	16.4 417
Longitudinal centerline to handwheel centerline	T	2.6 66	2.6 66	3.5 89	6.1 155	6.1 155	2.1 53
Longitudinal centerline to face of handwheel	U	9.4 239	9.4 239	11.5 292	15.1 384	16.5 419	18.3 465
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	14/10.5 356	24/15 610	24/22 610	30/22 762	18/45 457
Weight (approx.), Fig. 2249	-	118 54	220 100	470 213	830 377	1230 558	1900 862
Weight (approx.), Fig. 2249½	-	106 48	158 72	280 127	560 254	850 386	1500 680
Weight (approx.), Fig. 2249¼	-	112 51	189 86	375 170	695 315	1040 472	1700 771
Category B and D Gear Dimensions							
Center to top (gearing)	E	9.1 231	9.7 246	13.1 333	15.2 386	18.8 478	21.2 539
Center of port to center of handwheel	S	7.6 193	8.2 208	10.8 274	12.2 310	15.5 394	16.3 414
Longitudinal centerline to handwheel centerline	T	2.6 66	2.6 66	4.8 122	6.1 155	2.1 53	3.8 97
Longitudinal centerline to face of handwheel	U	9.4 239	9.4 239	14.1 358	15.1 384	21.0 533	19.5 495
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	14/10.5 356	24/17 610	24/22 610	30/45 762	18/62.5 457
Weight (approx.), Fig. 2249	-	118 54	220 100	500 227	830 377	1280 581	1990 903
Weight (approx.), Fig. 2249½	-	106 48	158 72	310 141	560 254	900 408	1590 721
Weight (approx.), Fig. 2249¼	-	112 51	189 86	405 184	695 315	1090 494	1790 812

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

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 600
(PN 100)

Figure 4749½, Sizes 6 to 30
(not shown)
Figure 4749¼, Sizes 6 to 30
(not shown)

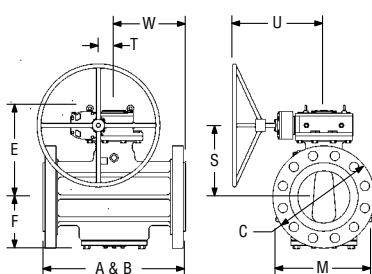


Figure 4749, Sizes 6 to 16

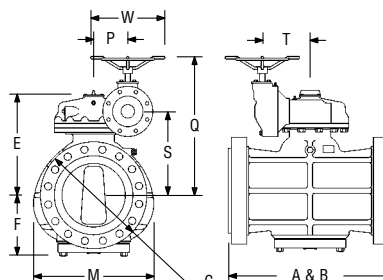


Figure 4749, Sizes 18 to 30

ASME Class 600 – Figure 4749, 4749½, 4749¼

Size	NPS DN	6 150	8 200	10 250	12 300	14 350	16 400	18 ** 450	20 500	24 ** 600
End-to-end, welding ends Fig. 4749½	A	18.00* 457	20.50* 521	24.00* 610	28.00* 711	30.00* 762	33.00* 838	43.00 1092	47.00 1194	55.00 1397
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 4749	B	22.00 559	26.00 660	31.00 787	33.00 838	35.00 889	39.00 991	43.00 1092	47.00 1194	55.00 1397
End-to-end, flanged (ring joint)	-	22.12 562	26.12 663	31.12 790	33.12 841	35.12 892	39.12 994	43.12 1095	47.25 1200	55.38 1407
End-to-end, flanged by weld end, Fig. 4749¼	-	22.00 559	26.00 660	31.00 787	30.50 775	32.50 826	36.00* 914	43.00 1092	47.00 1194	55.00 1397
Diameter of flange	C	14.00 356	16.50 419	20.00 508	22.00 559	23.75 603	27.00 686	29.25 743	32.00 813	37.00 940
Center to bottom of body	F	6.1 155	7.4 188	9.4 239	10.7 272	11.6 295	14.4 366	16.7 424	17.4 442	22.9 582
Extreme width of body	M	8.2 208	10.2 259	13.6 345	15.6 396	18.2 462	21.3 541	31.8 808	27.2 691	42.0 1067
Category A and C Gear Dimensions										
Center to top (gearing)	E	12.0 305	13.2 335	15.2 386	17.8 452	20.3 516	20.9 531	24.1 612	29.5 749	36.4 925
Traverse centerline to handwheel centerline	P									15.2 386
Center of port to top of handwheel	Q							35.4 899		43.4 1102
Center of port to center of handwheel	S	10.3 262	11.0 279	12.2 310	14.8 376	16.9 429	17.6 447	19.6 498	22.1 561	28.9 734
Longitudinal centerline to handwheel centerline	T	3.5 89	4.8 122	6.1 155	6.1 155	2.1 53	2.1 53	10.7 272	9.3 236	13.9 353
Longitudinal centerline to face of handwheel	U	11.5 292	14.1 358	15.1 384	16.5 419	19.5 495	21.0 533		26.6 676	
Handwheel diameter/ Number of turns to open with gearing	W	24/15 610	24/17 610	24/22 610	30/22 762	24/45 610	30/45 762	32/50 813	36/180 914	32/119.5 813
Weight (approx.), Fig. 4749	-	390 177	630 286	1040 472	1400 635	1840 835	3500 1588	4500 2041	5600 2540	10370 4704
Weight (approx.), Fig. 4749½	-	260 118	485 220	760 345	1000 454	1320 599	2700 1225	3780 1715	4650 2109	9280 4209
Weight (approx.), Fig. 4749¼	-	325 147	558 253	900 408	1200 544	1580 717	3100 1406	4140 1878	5125 2325	9825 4457
Category B and D Gear Dimensions										
Center to top (gearing)	E	12.5 318	13.2 335	15.2 386	18.8 478	20.3 516	25.4 645	24.1 612	30.4 772	36.4 925
Traverse centerline to handwheel centerline	P									15.2 386
Center of port to top of handwheel	Q							35.4 899		43.4 1102
Center of port to center of handwheel	S	10.3 262	11.0 279	12.2 310	15.5 394	16.9 429	17.9 455	19.6 498	22.9 582	28.9 734
Longitudinal centerline to handwheel centerline	T	4.8 122	4.8 122	6.1 155	2.1 53	2.1 53	9.3 236	10.7 272	11.5 292	13.9 353
Longitudinal centerline to face of handwheel	U	14.1 358	14.1 358	15.1 384	21.0 533	19.5 495	25.6 650		28.1 714	
Handwheel diameter/ Number of turns to open with gearing	W	24/17 610	24/17 610	24/22 610	30/45 762	24/45 610	30/180 762	32/50 813	36/150 914	32/119.5 813
Weight (approx.), Fig. 4749	-	420 191	630 286	1040 472	1450 658	1840 835	3750 1701	4500 2041	5800 2631	10370 4704
Weight (approx.), Fig. 4749½	-	290 132	485 220	760 345	1050 476	1320 599	2960 1343	3780 1715	4850 2200	9280 4209
Weight (approx.), Fig. 4749¼	-	355 161	558 253	900 408	1250 567	1580 717	3355 1522	4140 1878	5325 2415	9825 4457

*Conforms to API 6D, section 6.3, and is marked accordingly. Size 30 valve available on special order.

**These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 900
(PN 150)

Figure 2344, Sizes 2 to 4
(not shown)
Figure 2345, Sizes 3 & 4 only
Figure 2345½, Sizes 3 & 4 only
(not shown)
Figure 2345¼, Size 3 & 4 only
(not shown)

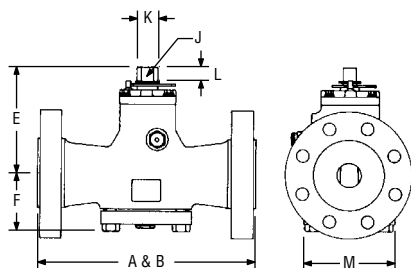


Figure 2345, Sizes 3 and 4

ASME Class 900 – Figure 2344, 2345, 2345½, 2345¼

Size	NPS DN	2 50	3 80	4 100
End-to-end, welding ends, Figure 2345½	A		18.50* 470	21.50* 546
Face-to-face, flanged (raised face) (incl. ¼" raised face), Figure 2345	B		15.00 381	18.00 457
End-to-end, flanged (ring joint)	-		15.12 384	18.12 460
End-to-end, flanged by weld end, Figure 2345¼	-		18.50* 470	21.50* 546
End-to-end, threaded ends, Figure 2344	-	7.75 197	10.04 255	11.47 291
Diameter of flange	C		9.50 241	11.50 292
Center to top of stem	E	6.6 168	7.6 193	8.9 226
Center to bottom of body	F	4.2 107	5.0 127	5.8 147
Width of stem flats	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 flats	L	1.0 25	1.1 28	1.4 36
Extreme width of body	M	4.7 119	6.2 157	8.7 221
Wrench size	-	DB-2	DB-3	DB-4
Weight (approx.), Figure 2344	-	43 20	104 47	152 69
Weight (approx.), Figure 2345	-		146 66	240 109
Weight (approx.), Figure 2345½	-		111 50	154 70
Weight (approx.), Figure 2345¼	-		128 58	197 89

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

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 900
(PN150)

Fig. 2349½, Sizes 4 to 12 (not shown)
Fig. 2349¼, Sizes 4 to 12 (not shown)

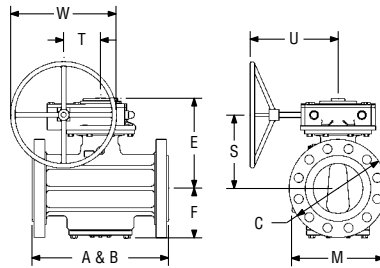


Fig. 2349, Sizes 3 to 12

ASME Class 900 – Figure 2349, 2349½, 2349¼							
Size	NPS DN	3 80	4 100	6 150	8 200	10 250	12 ** 300
End-to-end, welding ends Fig. 2349½	A	18.50* 470	21.50* 546	18.00* 457	20.50* 521	24.00* 610	38.00* 965
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 2349	B	15.00 381	18.00 457	24.00 610	29.00 737	33.00 838	38.00* 965
End-to-end, flanged (ring joint)	-	15.12 384	18.12 460	24.12 613	29.12 740	33.12 841	38.12* 968
End-to-end, flanged by weld end, Fig. 2349¼	-	18.50* 470	21.50* 546	18.00* 457	29.00 737	33.00 838	38.00* 965
Diameter of flange	C	9.50 241	11.50 292	15.00 381	18.50 470	21.50 546	24.00 610
Center to bottom of body	F	5.0 127	5.8 147	7.2 183	9.7 246	11.4 290	14.0 356
Extreme width of body	M	6.2 157	8.7 221	10.0 254	15.4 391	15.6 396	23.9 607
Category A and C Gear Dimensions							
Center to top (gearing)	E	9.1 231	10.7 272	12.9 328	15.2 386	17.8 452	24.3 617
Center of port to center of handwheel	S	7.6 193	9.0 229	10.6 269	12.2 310	14.8 376	18.0 457
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	4.8 122	6.1 155	6.1 155	10.4 264
Longitudinal centerline to face of handwheel	U	9.4 239	10.3 262	14.1 358	15.1 384	16.5 419	17.1 434
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	18/15 457	24/17 610	24/22 610	30/22 762	32/24 813
Weight (approx.), Fig. 2349	-	175 79	280 127	565 256	1080 490	1380 626	2854 1295
Weight (approx.), Fig. 2349½	-	135 61	195 89	415 188	700 318	870 395	2504 1136
Weight (approx.), Fig. 2349¼	-	155 70	238 108	490 222	890 404	1125 510	2679 1215
Category B and D Gear Dimensions							
Center to top (gearing)	E	9.1 231	10.7 272	12.9 328	15.2 386	18.8 478	24.3 617
Center of port to center of handwheel	S	7.6 193	9.0 229	10.6 269	12.2 310	15.5 394	18.0 457
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	4.8 122	6.1 155	2.1 53	10.4 264
Longitudinal centerline to face of handwheel	U	9.4 239	10.3 262	14.1 358	15.1 384	21.0 533	17.1 434
Handwheel diameter/ Number of turns to open with gearing	W	14/10.5 356	18/15 457	24/17 610	24/22 610	30/45 762	32/24 813
Weight (approx.), Fig. 2349	-	175 79	280 127	565 256	1080 490	1430 649	2854 1295
Weight (approx.), Fig. 2349½	-	135 61	195 89	415 188	700 318	920 417	2504 1136
Weight (approx.), Fig. 2349¼	-	155 70	238 108	490 222	890 404	1175 533	2679 1215

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

**This size is in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 900
(PN150)

Fig. 4949½, Sizes 16 and 20
(not shown)
Fig. 4949¼, Sizes 16 and 20
(not shown)

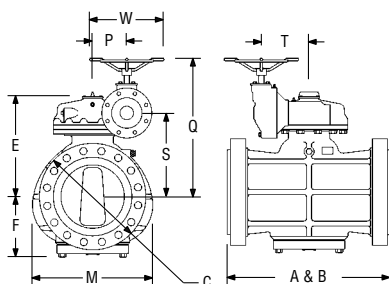


Fig. 4949, Sizes 16 and 20

ASME Class 900 – Figure 4949, 4949½, 4949¼			
Size	NPS DN	16 ** 400	20 ** 500
End-to-end, welding ends Fig. 4949½	A	44.50 1130	52.00* 1321
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 4949	B	44.50 1130	52.00* 1321
End-to-end, flanged (ring joint)	-	44.88 1140	52.50* 1334
End-to-end, flanged by weld end, Fig. 4949¼	-	44.50 1130	52.00* 1321
Diameter of flange	C	27.75 705	33.75 857
Center to bottom of body	F	17.1 434	19.0 483
Extreme width of body	M	30.3 770	31.0 787
Category A and C Gear Dimensions			
Center to top (gearing)	E	24.7 627	26.9 683
Traverse centerline to handwheel centerline	P	13.5 343	13.5 343
Center of port to top of handwheel	Q	35.3 897	37.6 955
Center of port to center of handwheel	S	19.5 495	21.8 554
Longitudinal centerline to handwheel centerline	T	10.7 272	10.7 272
Handwheel diameter/ Number of turns to open with gearing	W	32/50 813	32/50 813
Weight (approx.), Fig. 4949	-	4365 1980	9000 4082
Weight (approx.), Fig. 4949½	-	3600 1633	8000 3629
Weight (approx.), Fig. 4949¼	-	4117 1867	8500 3856
Category B and D Gear Dimensions			
Center to top (gearing)	E	24.7 627	26.9 683
Traverse centerline to handwheel centerline	P	13.5 343	13.5 343
Center of port to top of handwheel	Q	35.3 897	37.6 955
Center of port to center of handwheel	S	19.5 495	21.8 554
Longitudinal centerline to handwheel centerline	T	10.7 272	10.7 272
Handwheel diameter/ Number of turns to open with gearing	W	32/50 813	32/50 813
Weight (approx.), Fig. 4949	-	4365 1980	9000 4082
Weight (approx.), Fig. 4949½	-	3600 1633	8000 3629
Weight (approx.), Fig. 4949¼	-	4117 1867	8500 3856

*Conforms to API 6D, section 6.3, and is marked accordingly. Size 18 and 24 valves available on special order.

**These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 1500
(PN 250)

Figure 3044, Sizes 1 to 4
(not shown)
Figure 3045½, Size 4
(not shown)
Figure 3045¼, Size 4
(not shown)

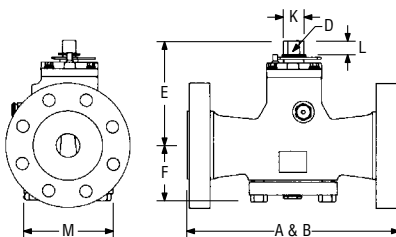


Figure 3045, Sizes 1 to 4

ASME Class 1500 – Figure 3044, 3045, 3045½, 3045¼					
Size	NPS DN	1* 25	2 50	3 80	4 100
End-to-end, welding ends, Figure 3045½	A			18.50 470	21.50 546
Face-to-face, flanged (raised face) (incl. ¼" raised face), Figure 3045	B	10.00 254	14.50 368	18.50 470	21.50 546
End-to-end, flanged (ring joint)	-	10.00 254	14.62 371	18.62 473	21.62 549
End-to-end, flanged by weld end, Figure 3045¼	-			18.50 470	21.50 546
End-to-end, threaded ends, Figure 3044 **	-	5.00 127	7.75 197	10.00 254	11.50 292
Diameter of flange	C	5.88 149	8.50 216	10.50 267	12.25 311
Center to top of stem	E	5.8 147	6.6 168	7.6 193	8.9 226
Center to bottom of body	F	2.8 71	4.2 107	5.0 127	5.8 147
Width of stem flats	J	0.62 16	0.81 21	1.00 25	1.25 32
Diameter of stem	K	0.85 22	1.09 28	1.41 36	1.78 45
Height of stem flats	L	0.9 23	1.0 25	1.1 28	1.4 36
Extreme width of body	M	3.7 94	4.7 119	6.2 157	8.7 221
Wrench size	-	DB-1	DB-2	DB-3	DB-4
Weight (approx.), Figure 3044	-	22 10	43 20	104 47	119 54
Weight (approx.), Figure 3045	-	40 18	98 44	181 82	300 136
Weight (approx.), Figure 3045½	-				152 69
Weight (approx.), Figure 3045¼	-				226 103

* Size 1 valve conforms to ASME B16.34.

** Threaded end valves conform to MSS-SP-84.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 1500
(PN250)

Fig. 3049½, Sizes 3 to 10 (not shown)
Fig. 3049¼, Sizes 3 to 10 (not shown)

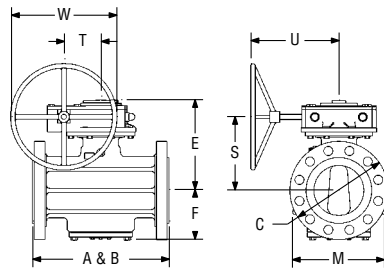


Fig. 3049, Sizes 2 to 10

ASME Class 1500 – Figure 3049, 3049½, 3049¼

Size	NPS DN	2 50	3 80	4 100	6 150	8 200	10 250
End-to-end, welding ends Fig. 3049½	A		18.50 470	21.50 546	27.75 705	32.75 832	39.00 991
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 3049	B	14.50 368	18.50 470	21.50 546	27.75 705	32.75 832	39.00 991
End-to-end, flanged (ring joint)	-	14.62 371	18.62 473	21.62 549	28.00 711	33.12 841	39.38 1000
End-to-end, flanged by weld end, Fig. 3049¼	-		18.50 470	21.50 546	27.75 705	32.75 832	39.00 991
Diameter of flange	C	8.50 216	10.50 267	12.25 311	15.50 394	19.00 483	23.00 584
Center to bottom of body	F	4.2 107	5.0 127	5.8 147	9.0 229	11.5 292	14.3 363
Extreme width of body	M	4.7 119	6.2 157	8.7 221	15.5 394	20.0 508	23.8 605
Category A and C Gear Dimensions							
Center to top (gearing)	E	7.7 196	9.1 231	10.7 272	15.4 391	18.1 460	27.6 701
Center of port to center of handwheel	S	6.5 165	7.6 193	9.0 229	12.4 315	15.1 384	22.7 577
Longitudinal centerline to handwheel centerline	T	2.1 53	2.6 66	3.5 89	6.1 155	6.1 155	10.5 267
Longitudinal centerline to face of handwheel	U	7.1 180	9.4 239	10.3 262	15.1 384	16.5 419	22.3 566
Handwheel diameter/Number of turns to open with gearing	W	10/10 254	14/10.5 356	18/15 457	24/22 610	30/22 762	30/62.5 762
Weight (approx.), Fig. 3049	-	115 52	210 95	340 154	1130 513	1670 758	2550 1157
Weight (approx.), Fig. 3049½	-		110 50	195 89	800 363	1400 635	2100 953
Weight (approx.), Fig. 3049¼	-		160 73	268 122	965 438	1535 696	2325 1055
Category B and D Gear Dimensions							
Center to top (gearing)	E	7.7 196	9.1 231	10.7 272	15.4 391	19.0 483	30.6 777
Center of port to center of handwheel	S	6.5 165	7.6 193	9.0 229	12.4 315	15.7 399	23.1 587
Longitudinal centerline to handwheel centerline	T	2.1 53	2.6 66	3.5 89	6.1 155	2.1 53	9.3 236
Longitudinal centerline to face of handwheel	U	7.1 180	9.4 239	10.3 262	15.1 384	21.0 533	24.1 612
Handwheel diameter/Number of turns to open with gearing	W	10/10 254	14/10.5 356	18/15 457	24/22 610	30/45 762	24/180 610
Weight (approx.), Fig. 3049	-	115 52	210 95	340 154	1130 513	1710 776	2720 1234
Weight (approx.), Fig. 3049½	-		110 50	195 89	800 363	1440 653	2270 1030
Weight (approx.), Fig. 3049¼	-		160 73	268 122	965 438	1575 714	2495 1132

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 1500
(PN250)

Fig. 6049½, Size 6 to 16
(not shown)
Fig. 6049¼, Size 6 to 16
(not shown)

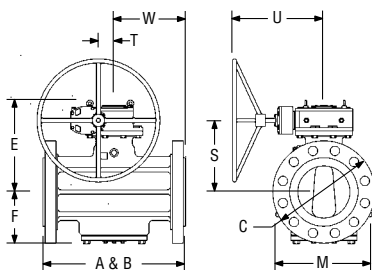


Fig. 6049, Size 6 and 12

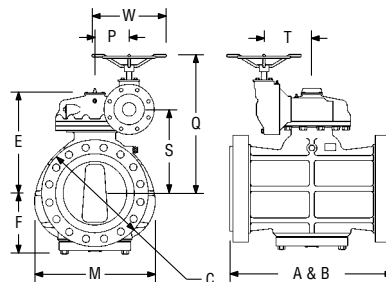


Fig. 6049, Size 16 (worm or bevel gearing)

ASME Class 1500 – Figure 6049, 6049½, 6049¼

Size	NPS DN	6 ** 150	12 300	16 ** 400
End-to-end, welding ends Fig. 6049½	A	27.75 705	44.50 1130	54.50* 1384
Face-to-face, flanged (raised face) (inc. ¼" raised face), Fig. 6049	B	27.75 705	44.50 1130	54.50* 1384
End-to-end, flanged (ring joint)	-	28.00 711	45.12 1146	55.38* 1407
End-to-end, flanged by weld end, Fig. 6049¼	-	27.75 705	44.50 1130	54.50* 1384
Diameter of flange	C	15.5 394	26.5 673	32.5 826
Center to bottom of body	F	7.6 193	14.3 363	17.9 455
Extreme width of body	M	11.2 284	23.8 605	31.8 808
Category A and C Gear Dimensions				
Center to top (gearing)	E	13.9 353	27.6 701	26.9 683
Traverse centerline to handwheel centerline	P			13.5 343
Center of port to top of handwheel	Q			36.3 922
Center of port to center of handwheel	S	10.1 257	22.7 577	20.4 518
Longitudinal centerline to handwheel centerline	T	3.8 97	10.5 267	10.7 272
Longitudinal centerline to face of handwheel	U	11.9 302	22.3 566	
Handwheel diameter/ Number of turns to open with gearing	W	20/9 508	30/62.5 762	32/50 813
Weight (approx.), Fig. 6049	-	825 374	3590 1628	7900 3583
Weight (approx.), Fig. 6049½	-	639 290	2640 1198	6500 2948
Weight (approx.), Fig. 6049¼	-	732 332	3115 1413	7200 3266
Category B and D Gear Dimensions				
Center to top (gearing)	E	13.9 353	30.6 777	26.9 683
Center of port to center of handwheel	S	10.1 257	23.1 587	20.4 518
Longitudinal centerline to handwheel centerline	T	3.8 97	9.3 236	10.7 272
Longitudinal centerline to face of handwheel	U	11.9 302	24.1 612	
Handwheel diameter/ Number of turns to open with gearing	W	20/9 508	24/180 610	32/50 813
Weight (approx.), Fig. 6049	-	825 374	3760 1706	7900 3583
Weight (approx.), Fig. 6049½	-	639 290	2810 1275	6500 2948
Weight (approx.), Fig. 6049¼	-	732 332	3285 1490	7200 3266

*Conforms to API 6D, section 6.3, and is marked accordingly. Size 20 and 24 valves available on special order.

**These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 2500
(PN420)

Fig. 20545½, Sizes 2 and 4
(not shown)
Fig. 20545¼, Size 4
(not shown)

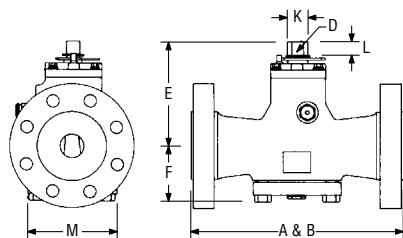


Fig. 20545, Sizes 2 to 4

ASME Class 2500 – Figure 20545, 20545½, 20545¼

Size	NPS DN	2 50	3 80	4 100
End-to-end, welding ends Fig. 20545½	A	17.75* 451		26.50* 673
End-to-end, flanged (ring joint), Fig. 20545	B	17.88 454	23.00 584	26.88 683
End-to-end, flanged (ring joint) by weld end, Fig. 20545¼	-			26.50* 673
Diameter of flange	C	9.25 235	12.00 305	14.00 356
Center to top of stem	E	6.6 168	8.0 203	9.1 231
Center to bottom of body	F	4.8 122	5.7 145	6.7 170
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 flats	L	1.0 25	1.1 28	1.4 36
Extreme width of body	M	7.2 183	8.6 218	10.0 254
Wrench size	-	DB-2	DB-3	DB-4
Weight (approx.), Fig. 20545	-	152 69	302 137	500 227
Weight (approx.), Fig. 20545½	-	85 39		290 132
Weight (approx.), Fig. 20545¼	-			326 148

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

Dynamic Balance Plug Valves

Regular Pattern

ASME Class 2500
(PN420)

Fig. 20549½, Sizes 4, 6*, 8*
and 10* (not shown)
Fig. 20549¼, Sizes 4, 6*, 8*
and 10* (not shown)

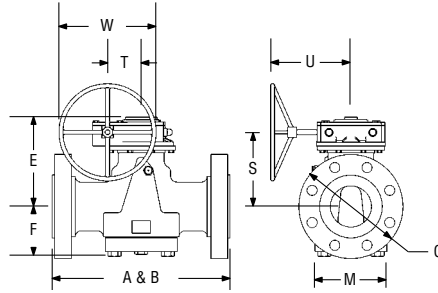


Fig. 20549, Sizes 2, 3, 4, 6*, 8*

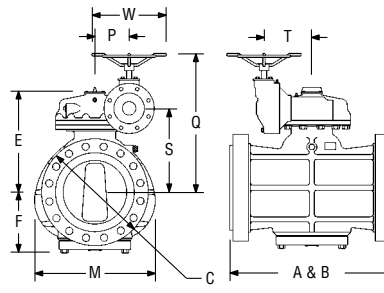


Fig. 20549, Size 10*

ASME Class 2500 – Figure 20549, 20549½, 20549¼

Size	NPS DN	2 50	3 80	4 100	6 150	8 200	10 *** 250
End-to-end, welding ends, Fig. 20549½	A	17.75** 451		26.50** 673	36.00** 914	40.25** 1022	50.00** 1270
End-to-end, flanged (ring joint), Fig. 20549	B	17.88 454	23.00 584	26.88 683	36.50 927	40.88 1038	50.88 1292
End-to-end, flanged (ring joint) by weld end, Fig. 20549¼	-			26.50* 673	36.25 921	40.25 1022	50.25 1276
Diameter of flange	C	9.25 235	12.00 305	14.00 356	19.00 483	21.75 552	26.50 673
Center to bottom of body	F	4.8 122	5.7 145	6.7 170	9.6 244	11.8 300	13.5 343
Extreme width of body	M	7.2 183	8.6 218	10.0 254	13.5 343	17.8 452	22.3 566
Category A and C Gear Dimensions							
Center to top (gearing)	E	8.4 213	10.1 257	11.3 287	16.3 414	21.2 539	20.3 516
Traverse centerline to handwheel centerline	P						13.5 343
Center to top of handwheel	Q						40.8 1036
Center of port to center of handwheel	S	6.9 175	8.4 213	9.6 244	13.2 335	16.3 414	15.1 384
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	3.5 89	6.1 155	3.8 97	10.7 272
Longitudinal centerline to face of handwheel	U	8.4 213	9.5 241	11.5 292	15.1 384	20.8 528	
Handwheel diameter/Number of turns to open with gearing	W	10/10.5 254	12/15 305	24/15 610	24/22 610	24/62.5 610	32/50 813
Weight (approx.), Fig. 20549	-		345 157	540 245	1440 653	2370 1075	4050 1837
Weight (approx.), Fig. 20549½	-			285 129	950 431	1810 821	3100 1406
Weight (approx.), Fig. 20549¼	-			413 187	1195 542	2090 948	3575 1622
Category B and D Gear Dimensions							
Center to top (gearing)	E	8.4 213	10.1 257	11.8 300	16.3 414	21.2 539	20.3 516
Traverse centerline to handwheel centerline	P						13.5 343
Center to top of handwheel	Q						40.8 1036
Center of port to center of handwheel	S	6.9 175	8.4 213	9.6 244	13.2 335	16.3 414	15.1 384
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	4.8 122	6.1 155	3.8 97	10.7 272
Longitudinal centerline to face of handwheel	U	8.4 213	9.5 241	14.1 358	15.1 384	20.8 528	
Handwheel diameter/Number of turns to open with gearing	W	10/10.5 254	12/15 305	24/17 610	24/22 610	24/62.5 610	32/50 813
Weight (approx.), Fig. 20549	-		345 157	570 259	1440 653	2370 1075	4050 1837
Weight (approx.), Fig. 20549½	-			315 143	950 431	1810 821	3100 1406
Weight (approx.), Fig. 20549¼	-			443 201	1195 542	2090 948	3575 1622

*Sizes 6, 8 and 10 Fig. 20549, 20549½ and 20549¼ have pressure seal bottom cover.

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

*** These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

Venturi Pattern

ASME Class 2500
(PN420)

Fig. 9349½, Sizes 12 and 16
(not shown)
Fig. 9349¼, Sizes 12 and 16
(not shown)

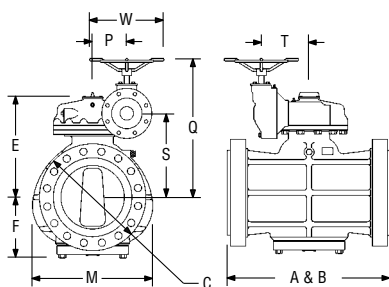


Fig. 9349, Sizes 12 and 16

ASME Class 2500 – Figure 9349, 9349½, 9349¼

Size	NPS DN	12 *** 300	16 *** 400
End-to-end, welding ends, Fig. 9349½	A	56.00* 1422	65.00* 1651
End-to-end, flanged (ring joint), Fig. 9349	B	56.88 1445	65.00** 1651
End-to-end, flanged (ring joint) by weld end, Fig. 9349¼	-	56.00 1422	65.88** 1673
Diameter of flange	C	30.00 762	35.50** 902
Center to bottom of body	F	16.4 417	22.1 561
Extreme width of body	M	27.0 686	35.0 889
Category A and C Gear Dimensions			
Center to top (gearing)	E	30.1 765	34.3 871
Traverse centerline to handwheel centerline	P	13.5 343	15.2 386
Center to top of handwheel	Q	40.8 1036	46.3 1176
Center of port to center of handwheel	S	24.9 632	30.5 775
Longitudinal centerline to handwheel centerline	T	10.7 272	13.9 353
Handwheel diameter/ Number of turns to open with gearing	W	32/50 813	32/119.5 813
Weight (approx.), Fig. 9349	-	5730 2599	11850 5375
Weight (approx.), Fig. 9349½	-	4000 1814	9550 4332
Weight (approx.), Fig. 9349¼	-	4870 2209	10700 4853
Category B and D Gear Dimensions			
Center to top (gearing)	E	30.1 765	34.3 871
Center of port to center of handwheel	S	24.9 632	30.5 775
Longitudinal centerline to handwheel centerline	T	10.7 272	13.9 353
Handwheel diameter/ Number of turns to open with gearing	W	32/50 813	32/119.5 813
Weight (approx.), Fig. 9349	-	5730 2599	11850 5375
Weight (approx.), Fig. 9349½	-	4000 1814	9550 4332
Weight (approx.), Fig. 9349¼	-	4870 2209	10700 4853

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

** Special flange design not addressed by API 6D

*** These sizes are in process of a gearing design change. Please contact factory for latest gearing information.

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 and offshore applications, contact factory.

Dynamic Balance Plug Valves

API 3000 and 5000
MOP

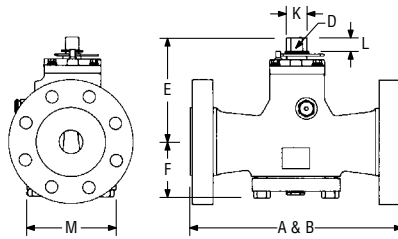


Fig. 76305, Sizes 2½ to 4½
Fig. 76505, Sizes 2½ to 4½

API 3000 – Figure 76305 and API 5000 – Figure 76505									
Size		Fig. No. 76305				Fig. No. 76505			
		2½	2¾	3½	4½	2½	2¾	3½	4½
Face-to-face, flanged (including flat faced ring joint), Fig. 76305, 76505	B	14.62	16.62	15.12	18.12	14.62	16.62	18.62	21.62
		371	422	384	460	371	422	473	549
Diameter of flange	C	8.50	9.12	9.50	11.50	8.50	9.62	10.50	12.25
		216	232	241	292	216	244	267	311
Center to top of stem	E	6.6	7.6	7.6	8.9	6.6	8.0	8.0	9.1
		168	193	193	226	168	203	203	231
Center to bottom of body	F	4.4	5.0	5.0	5.8	4.4	4.6	4.6	5.7
		112	127	127	147	112	117	117	145
Width of stem flats	J	0.81	1.00	1.00	1.25	0.81	1.00	1.00	1.25
		21	25	25	32	21	25	25	32
Diameter of stem	K	1.09	1.41	1.41	1.78	1.09	1.41	1.41	1.78
		28	36	36	45	28	36	36	45
Height of stem flats	L	1.0	1.1	1.1	1.4	1.0	1.1	1.1	1.4
		25	28	28	36	25	28	28	36
Extreme width of body	M	4.7	6.2	6.2	8.7	5.5	7.9	7.9	8.7
		119	157	157	221	140	201	201	221
Wrench size	-	DB-2	DB-3	DB-3	DB-4	DB-2	DB-3	DB-3	DB-4
Weight (approx.)	-	100	125	153	263	115	140	203	310
		45	57	69	119	52	64	92	141

Dynamic Balance Plug Valves

API 5000 MOP

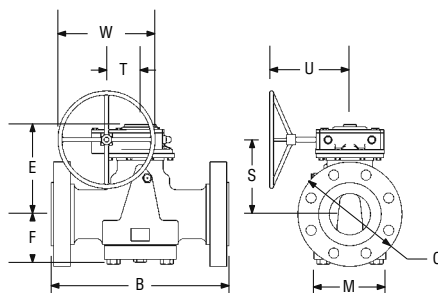


Fig. 76509, Size 4 $\frac{1}{16}$

API 5000 – Figure 76509

Size		2 $\frac{1}{16}$	2 $\frac{1}{8}$	3 $\frac{1}{8}$	4 $\frac{1}{8}$
Face-to-face, flanged (including flat faced ring joint), Fig. 76509	B	14.62 371	16.62 422	18.62 473	21.62 549
Diameter of flange	C	8.50 216	9.62 244	10.50 267	12.25 311
Center to bottom of body	F	4.4 112	4.6 117	4.6 117	5.7 145
Extreme width of body	M	5.5 140	7.9 201	7.9 201	8.7 221
Category A and C Gear Dimensions					
Center to top of gearing	E	8.4 213	9.0 229	9.0 229	11.3 287
Center of port to center of handwheel	S	6.9 175	7.3 185	7.3 185	9.6 244
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	3.5 89	3.5 89
Longitudinal centerline to face of handwheel	U	8.4 214	9.5 241	9.5 241	11.5 292
Handwheel diameter/Number of turns to open with gearing	W	10/10.5 254	12/15 305	12/15 305	24/15 610
Weight (approx.), Fig. 76509	-				350 159
Category B and D Gear Dimensions					
Center to top of gearing	E	8.4 213	9.0 229	9.0 229	11.8 300
Center of port to center of handwheel	S	6.9 175	7.3 185	7.3 185	9.6 244
Longitudinal centerline to handwheel centerline	T	2.6 66	3.5 89	3.5 89	4.8 122
Longitudinal centerline to face of handwheel	U	8.4 214	9.5 241	9.5 241	14.1 358
Handwheel diameter/Number of turns to open with gearing	W	10/10.5 254	12/15 305	12/15 305	24/17 610
Weight (approx.), Fig. 76509	-				380 172

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 and offshore applications, contact factory.

Carbon Steel Valve Pressure Temperature Ratings

Pressure Temperature Ratings (Carbon Steel - ASTM A105, ASTM A216 Grade WCB and ASTM A216 Grade WCC)

Working Pressure by Classes (psig)												
Service Temp	150		300		600		900		1500		2500	
°F	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC
-20 to 100	285	290	740	750	1480	1500	2220	2250	3705	3750	6170	6250
200	260	260	675	750	1350	1500	2025	2250	3375	3750	5625	6250
250	245	245	665	740	1333	1478	1998	2218	3328	3695	5548	6160
300	230	230	655	730	1315	1455	1970	2185	3280	3640	5470	6070
400	200	200	635	705	1270	1410	1900	2115	3170	3530	5280	5880
450	185	185	618	685	1235	1370	1848	2055	3083	3428	5135	5710
500	170	170	600	665	1200	1330	1795	1995	2995	3325	4990	5540
600	140	140	550	605	1095	1210	1640	1815	2735	3025	4560	5040
700	110	110	535	570	1065	1135	1600	1705	2665	2840	4440	4730
750	95	95	505	505	1010	1010	1510	1510	2520	2520	4200	4200
800	80	80	410	410	825	825	1235	1235	2060	2060	3430	3430

Working Pressure by Rating Number (bar)												
Service Temp	PN20		PN50		PN100		PN150		PN250		PN420	
°C	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC	WCB	WCC
-29 to 38	19.7	20.0	51.0	51.7	102.0	103.4	153.1	155.1	255.5	258.6	425.4	430.9
50	19.2	19.0	50.1	51.7	100.2	103.4	150.2	155.1	250.4	258.6	417.3	430.9
100	17.9	17.9	46.5	51.7	93.1	103.4	139.6	155.1	232.7	258.6	387.8	430.9
120	16.9	16.9	45.9	51.0	91.9	101.9	137.8	152.9	229.5	254.8	382.5	424.7
150	15.9	15.9	45.2	50.3	90.7	100.3	135.8	150.7	226.1	251.0	377.1	418.5
200	13.8	13.8	43.8	48.6	87.6	97.2	131.0	145.8	218.6	243.4	364.0	405.4
232	12.8	12.8	42.6	47.2	85.2	94.5	127.4	141.7	212.6	236.4	354.1	393.7
250	11.7	11.7	41.4	45.9	82.7	91.7	123.8	137.6	206.5	229.3	344.1	382.0
300	9.7	9.7	37.9	41.7	75.5	83.4	113.1	125.1	188.6	208.6	314.4	347.5
350	8.4	8.7	36.1	40.5	73.9	80.9	110.9	121.4	184.8	202.2	308.0	336.8
375	7.6	7.6	36.9	39.3	73.4	78.3	110.3	117.6	183.7	195.8	306.1	326.1
400	6.6	6.6	34.8	34.8	69.6	69.6	104.1	104.1	173.7	173.7	289.6	289.6
425	5.5	5.5	28.3	28.3	56.9	56.9	85.2	85.2	142.0	142.0	236.5	236.5
450	4.7	4.7	20.5	20.5	41.4	41.4	60.1	60.1	100.2	100.2	166.9	166.9

CAN / CSA Z245-15 Ratings

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

Maximum Operating Temperatures

Dynamic Balance Plug Valves

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.

Super Nordstrom and Nordstrom Plug Valves

Super Nordstrom and Nordstrom ASME rated valves are suitable for operation at the pressures and temperatures in the above table up to a maximum of +350°F (177°C).

Super Nordstrom Two-Bolt Cover Plug Valves

Super Nordstrom 200 CWP valves are suitable for operation from -20°F (-29°C) to +200°F (+93°C).

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)

	200 CWP Valves	ASME Class Valves						API Valves	
		150	300	600	900	1500	2500	3000	5000
Maximum Cold Working Pressure	200	285	740	1480	2220	3705	6170	3000	5000
Hydrostatic Body (Shell) Test	300	450	1125	2225	3350	5575	9275	6000	10000
Hydrostatic Seat Test	300	325	825	1650	2450	4100	6800	3000	5000

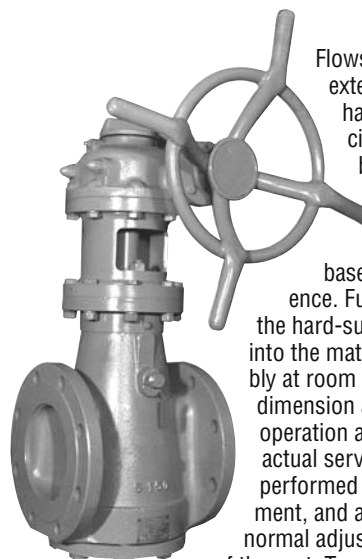
Test Times (minutes)

Valve Sizes	200 CWP Valves		ASME Class Valves	
	Hydrostatic Body Test Time	Hydrostatic Seat Test Time	Hydrostatic Body Test Time	Hydrostatic Seat Test Time
1 through 4	½	1	2	2
6 through 10	-	-	5	5
12 through 18	-	-	15	5
20 and larger	-	-	30	5

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.

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.

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 MR0175, 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 MR0175-88, 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.

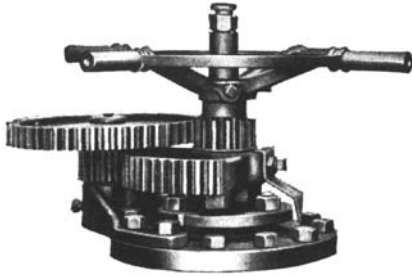
Ferritic Steel: Grade LCC Ferritic Steel, conforming to ASTM Specification A352, is basically a “killed” mild carbon steel that has good impact qualities at low temperatures.

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.

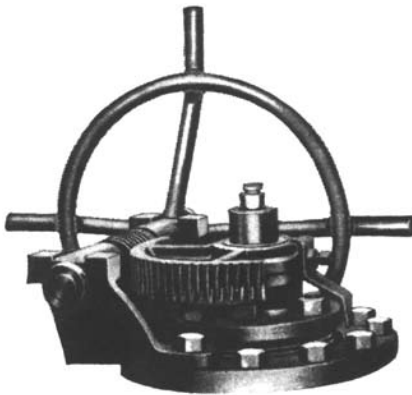
Type CF8M Stainless Steel: This is an 18-12 type of stainless steel casting material, containing molybdenum, with analysis and properties closely corresponding to AISI Type 316 wrought stainless steel, and conforming to ASTM Specification A351, Grade CF8M.

Spur Gear Operating Mechanism for Nordstrom Valves

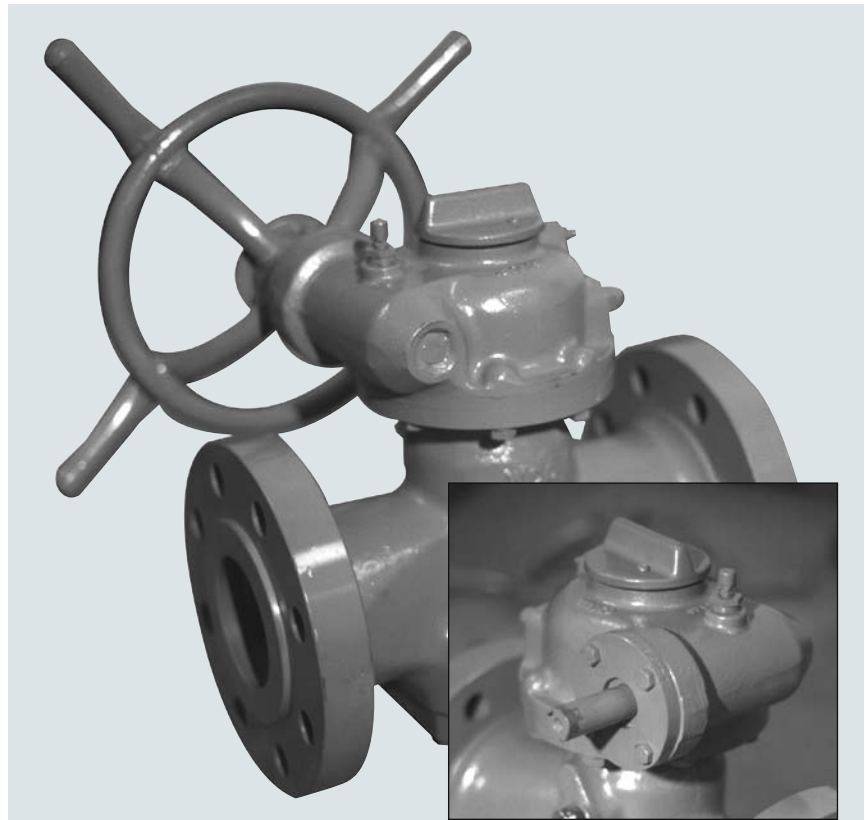
Spur gear-operated valves are normally designed for buried service and, as such, are normally supplied with a 2" square adapter. If a handwheel is required with a spur gear-operated valve, it must be so stated on the purchase order.



Spur gearing for standard valves. Handwheel pinion rotates upon upper end of plug shank.



Worm gearing for standard valves. Handwheel at side.



Simple or Single-Reduction Worm Gearing for Dynamic Balance Valves With Side-Mounted Handwheel

Simple or reduction worm gearing and bevel worm gearing are used on Dynamic Balance valves. These gear mechanisms are enclosed in an oil-retaining and weatherproof housing. An indicator on top readily shows the valve operating position. This gearing is adaptable for mounting electric actuators. Worm gear operating mechanisms are built to withstand abuse under all types of conditions. Wear tests have proven them reliable for five hundred cycles at full rated output of the unit.

Super Nordstrom Watertight Housings For Wrench-Operated Valves

A watertight housing for wrench-operated valves eliminates the problem of water entering the valve box, freezing and thus preventing operation of a critical valve. The housing keeps ground water away from the plug shank so there is no danger of freeze-up.

Housings are available as factory-installed units only and are not sold separately. Customers can install a cover and open pipe extension to the housing at nominal cost.

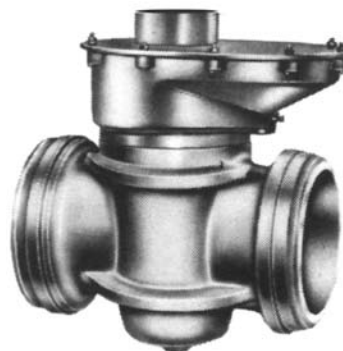


Nordstrom Standard Enclosed Gearing with Road Boxes for Spur Gear-Operated Valves (Figure 4187½ only)

Watertight gear housings can be supplied to install spur gear-operated valves underground without building a vault. With this type of housing, a minimum size hole is dug and there is no concrete to pour.

The housing cover is gasketed and an extension pipe stub is welded to the gear housing cover so an extension pipe can then easily be welded to the stub to keep

out ground water, dirt, rocks, and silt from the space around the gearing. The gear housing may be filled with heavier-than-water oil to ensure that there is no danger of surface water entering the gearing mechanism and subsequently freezing. The point of operation and sealant application may be enclosed in a valve box located at the top of the extension a few inches below the ground or pavement surface.



Nordstrom Minimum-Profile Enclosed Gearing for Spur Gear-Operated Valves (Figure 4187½ only)

Watertight minimum-profile gearing can be provided for underground valve installation at street level. The enclosure is similar to that of the standard enclosed gearing

except the gear housing cover is designed with no extension pipe. The unit is provided with a 2" square operating nut in lieu of a handwheel.



Actuators for Dynamic Balance Valves

Flowserve Nordstrom Valves can supply hydraulic, pneumatic or electric power actuators for mechanical operation of Dynamic Balance valves. To obtain equipment in close conformance with customer requirements, the following information should be provided at the time of the inquiry:

1. Valve size and pressure class:
If the power actuator is being ordered for field conversion, describe the actuator currently installed on the valve.
2. Minimum and maximum temperature valve will experience.
3. Fluid passing through valve.
4. Sealant currently being used.
5. Type of actuator desired:
 - A. Hydraulic
 - B. Pneumatic
 - C. Electric
6. Maximum differential pressure across valve during operation.
7. Speed of operation required in minutes or seconds:
 - A. To open
 - B. To close
8. Frequency of operation.
9. For an electric operator, specify:
 - A. AC or DC voltage
 - B. Single- or three-phase
 - C. Type of motor:
 1. Explosion-proof
 2. Weatherproof
 3. Other
 - D. Frequency
10. If pneumatic or hydraulic actuator is desired, specify:
 - A. Minimum and maximum pressure available.
 - B. Operating medium:
 1. Gas
 2. Air
 3. Fluid (specify type)
- C. Accessory equipment desired:
 1. Filter
 2. Pump
 3. Control valving:
 - a. Electrically operated
 - b. Manually operated
 - c. Pilot-operated
11. Position indicator (visual indicator on valves is standard):
 - A. Remote reading:
 1. Selsyn
 2. Potentiometer
12. Full instrumentation to be furnished by:
 - A. Flowserve Nordstrom Valves
 - B. Others

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.

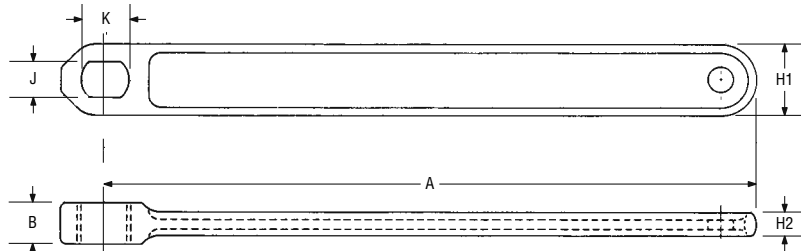


2" Square Adapters for Nordstrom Steel Valves with Square Stems

Distance Across Flats of Square Stem Head on Valve (See Dimension "J")*	Adapter Part No.
1.75	1277
44	
2.00	None Required
51	

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

Cast Wrench For Dynamic Balance Valves

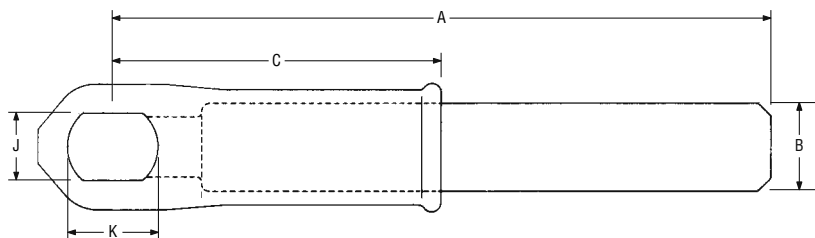


Black numerals are in inches and pounds.

Blue numerals are in millimeters and kilograms.

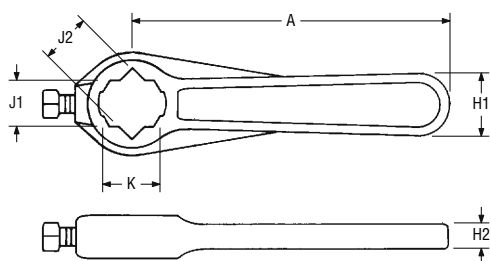
Size	Part #	Weight	A	B	H1	H2	J	K
DB-1	482014	2.0	18.0	.9	1.4	.4	.655	.875
		.9	457	23	35	11	17	22

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

Wrenches for Valves with Square or Obround Stems

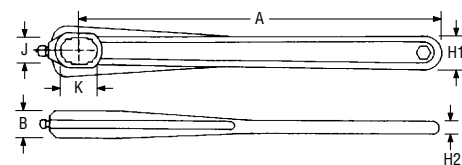


Black numerals are in inches and pounds.

Blue numerals are in millimeters and kilograms.

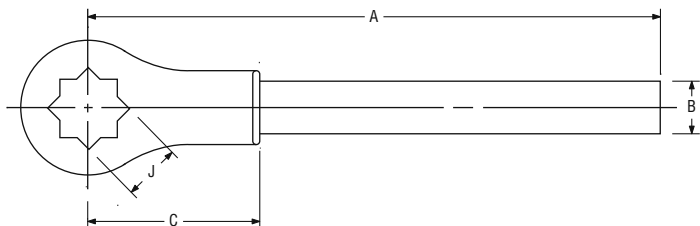
Size	Part #	Weight	A	H1	H2	J1	J2	K
SN-1	3001198	.9	7.0	1.1	.4	.81	.88	1.10
		.4	178	28	10	21	22	28
SN-2	3001197	1.7	10.5	1.5	.5	1.00	1.10	1.41
		.8	267	38	13	25	28	36
SN-3	3001196	5.6	25.0	1.8	.6	1.25	1.50	1.79
		2.5	635	46	15	32	38	45

Wrenches for Valves with Obround Stems



Size	Part #	Weight	A	B	H1	H2	J	K
L-9	15109	3.8	17.5	1.2	1.8	.6	1.25	1.79
		1.7	445	30	46	15	32	45
M-9	15110	5.5	21.0	1.3	1.9	.6	1.38	1.98
		2.5	533	33	48	15	35	50

Wrenches for Valves with Square Heads



Size	Part #	Weight	A	B (Dia.)	C	J
P-2	8889	6	27.0	1.7	5.5	1.84
		3	686	43	140	47
T-2	8148	11	36.0	1.9	6.7	2.09
		5	914	48	170	53
V-2	8890	17	48.0	1.9	7.0	2.56
		8	1219	48	178	65

Locking Devices for Dynamic Balance Straightway Valves

Valve Size/Inches	½-¾-1 All Classes	1½-2 All Classes	2½-3 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

Locking Devices for Super Nordstrom Valves

ASME Classes 150 (PN 20) and 300 (PN 50)

Size	NPS	½, ¾, 1	1½ & 1½	2 & 2½	3	4
	DN	15, 20, 25	32 & 40	50 & 65	80	100
Part Description	Part Number					
Hood		497998	497999	498000	498001	498002
Yoke		497994	497995	497995	497996	497997
Retaining Ring		908624	927389	927389	952111	952112
Complete Assembly		498005	498006	498007	498008	498009

ASME Class 600 (PN 100)

Size	NPS	½, ¾, 1	1½	2
	DN	15, 20, 25	40	50
Part Description	Part Number			
Hood		497998	498003	498004
Yoke		497994	497995	497995
Retaining Ring		908624	927389	927389
Complete Assembly		498005	498010	498011

Locking Devices for Nordstrom Bolted Gland Valves

Size Number	NPS	6 & 8	12
	DN	150 & 200	300
Part Description	Part Number		
Hood		57630	57629
Locking Clip		45926	57613
Dart and Chain		57734	57734
Complete Assembly		58093	58092

Locking Device for Super Nordstrom Two-Bolt Cover Valves

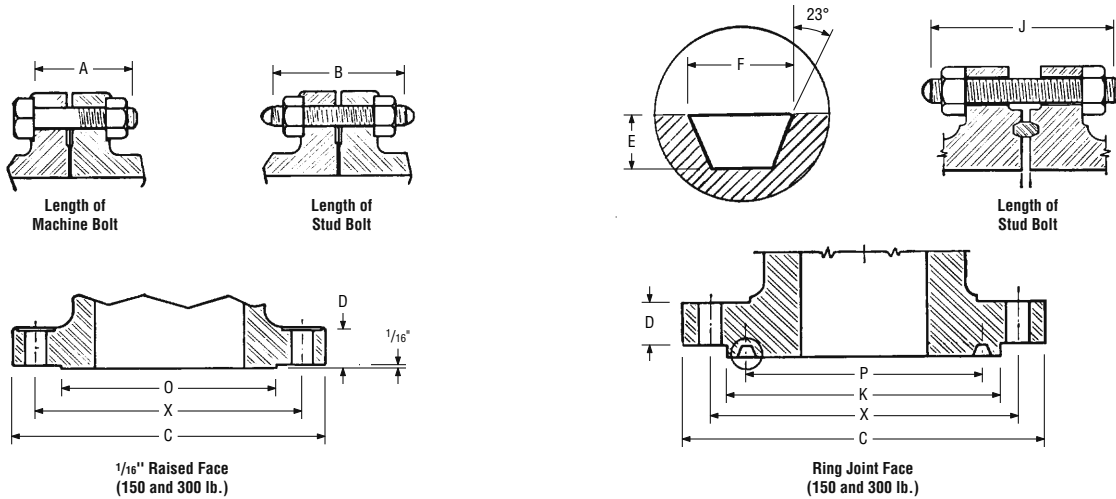
A – Plain Locking Device

Size	NPS	¾ & 1	1½, & 2	3	4
	DN	20 & 25	32 & 50	80	100
Part Description	Part Number				
Hood		3001225	3001115	3001153	3001155
Chain Assembly		2753423	2753423	2753424	2753425
Complete Assembly		2752670	2752671	2752672	2753673

B – Combination Reversible Locking Device and Wrench

Size	NPS	¾ & 1	1½, & 2	3	4
	DN	20 & 25	32 & 50	80	100
Part Description	Part Number				
Locking Wrench		2752770	3001165	2752771	2752772
Chain Assembly		2753426	2753427	2753428	2753429
Complete Assembly		2752861	2752862	2752863	2752864

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



ASME Class 150 Steel Flange Standard (ASME B16.5-1998) 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 ¼" 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	Ring Joint	0.06 in. Raised Face
	C	D	O		P	E	F	K	X	B	J	A		
½	3.50	.44	1.38						2.38	4	½	2.25	-	2.00
¾	3.88	.50	1.69						2.75	4	½	2.50	-	2.00
1	4.25	.56	2.00	R15	1.875	.250	.344	2.50	3.12	4	½	2.50	3.00	2.25
1¼	4.62	.62	2.50	R17	2.250	.250	.344	2.88	3.50	4	½	2.75	3.25	2.25
1½	5.00	.69	2.88	R19	2.562	.250	.344	3.25	3.88	4	½	2.75	3.25	2.50
2	6.00	.75	3.62	R22	3.250	.250	.344	4.00	4.75	4	¾	3.25	3.75	2.75
2½	7.00	.88	4.12	R25	4.000	.250	.344	4.75	5.50	4	¾	3.50	4.00	3.00
3	7.50	.94	5.00	R29	4.500	.250	.344	5.25	6.00	4	¾	3.50	4.00	3.00
3½	8.50	.94	5.50	R33	5.188	.250	.344	6.06	7.00	8	¾	3.50	4.00	3.00
4	9.00	.94	6.19	R36	5.875	.250	.344	6.75	7.50	8	¾	3.50	4.00	3.00
5	10.00	.94	7.31	R40	6.750	.250	.344	7.62	8.50	8	¾	3.75	4.25	3.25
6	11.00	1.00	8.50	R43	7.625	.250	.344	8.62	9.50	8	¾	4.00	4.50	3.25
8	13.50	1.12	10.62	R48	9.750	.250	.344	10.75	11.75	8	¾	4.25	4.75	3.50
10	16.00	1.19	12.75	R52	12.000	.250	.344	13.00	14.25	12	¾	4.50	5.00	4.00
12	19.00	1.25	15.00	R56	15.000	.250	.344	16.00	17.00	12	¾	4.75	5.25	4.00
14	21.00	1.38	16.25	R59	15.625	.250	.344	16.75	18.75	12	1	5.25	5.75	4.50
16	23.50	1.44	18.50	R64	17.875	.250	.344	19.00	21.25	16	1	5.25	5.75	4.50
18	25.00	1.56	21.00	R68	20.375	.250	.344	21.50	22.75	16	1⅝	5.75	6.25	5.00
20	27.50	1.69	23.00	R72	22.000	.250	.344	23.50	25.00	20	1⅝	6.25	6.75	5.50
24	32.00	1.88	27.25	R76	26.500	.250	.344	28.00	29.50	20	1¼	6.75	7.25	6.00
30**	38.75	2.12	33.75						36.00	28	1¼	8.12		6.38
36**	46.00	2.38	40.25						42.75	32	1½	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. For quantity, diameter, and length, see page 52.

** Sizes 30 and 36 valves have the same flange and drilling dimensions as Class 125 Cast Iron Flanges ASME B16.1 – 1975 except steel flange will have .06 inch raised face.

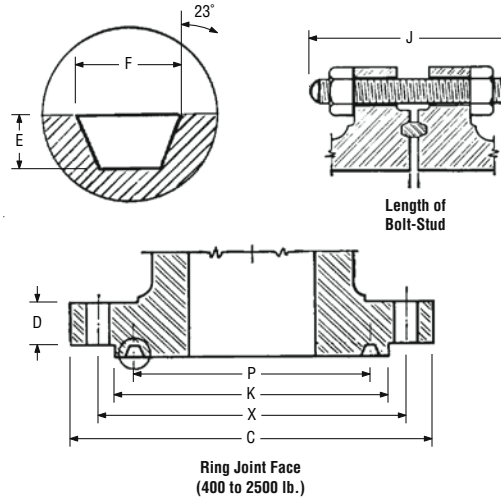
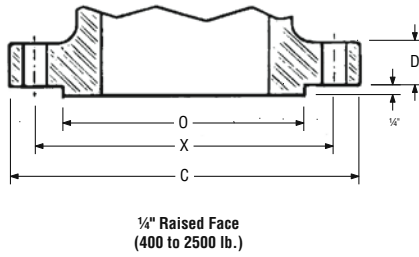
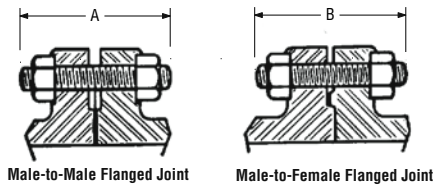
ASME Class 300 Steel Flange Standard (ASME B16.5-1998) Dimensions in Inches																
Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			Length of Bolts				
			Raised Face	Ring Joint								Stud Bolts		Mach. Bolts		
	Dia. of Flange	Thickness of Flange		Dia. of ⅛" Raised Face	Ring 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
½	3.75	.56	1.38	R11	1.344	.219	.281	2.00	2.62	4	½	2.50	3.00	2.25		
¾	4.62	.62	1.69	R13	1.688	.250	.344	2.50	3.25	4	⅝	3.00	3.50	2.50		
1	4.88	.69	2.00	R16	2.000	.250	.344	2.75	3.50	4	⅝	3.00	3.50	2.50		
1¼	5.25	.75	2.50	R18	2.375	.250	.344	3.12	3.88	4	⅝	3.25	3.75	2.75		
1½	6.12	.81	2.88	R20	2.688	.250	.344	3.56	4.50	4	¾	3.50	4.00	3.00		
2	6.50	.88	3.62	R23	3.250	.312	.469	4.25	5.00	8	⅝	3.50	4.00	3.00		
2½	7.50	1.00	4.12	R26	4.000	.312	.469	5.00	5.88	8	¾	4.00	4.50	3.25		
3	8.25	1.12	5.00	R31	4.875	.312	.469	5.75	6.62	8	¾	4.25	4.75	3.50		
3½	9.00	1.19	5.50	R34	5.188	.312	.469	6.25	7.25	8	¾	4.25	5.00	3.75		
4	10.00	1.25	6.19	R37	5.875	.312	.469	6.88	7.88	8	¾	4.50	5.00	3.75		
5	11.00	1.38	7.31	R41	7.125	.312	.469	8.25	9.25	8	¾	4.75	5.25	4.25		
6	12.50	1.44	8.50	R45	8.312	.312	.469	9.50	10.62	12	¾	4.75	5.50	4.25		
8	15.00	1.62	10.62	R49	10.625	.312	.469	11.88	13.00	12	⅞	5.50	6.00	4.75		
10	17.50	1.88	12.75	R53	12.750	.312	.469	14.00	15.25	16	1	6.25	6.75	5.50		
12	20.50	2.00	15.00	R57	15.000	.312	.469	16.25	17.75	16	1⅛	6.75	7.25	5.75		
14	23.00	2.12	16.25	R61	16.500	.312	.469	18.00	20.25	20	1⅛	7.00	7.50	6.25		
16	25.50	2.25	18.50	R65	18.500	.312	.469	20.00	22.50	20	1¼	7.50	8.00	6.50		
18	28.00	2.38	21.00	R69	21.000	.312	.469	22.62	24.75	24	1¼	7.75	8.25	6.75		
20	30.50	2.50	23.00	R73	23.000	.375	.531	25.00	27.00	24	1¼	8.00	8.75	7.25		
24	36.00	2.75	27.25	R77	27.250	.438	.656	29.50	32.00	24	1½	9.00	10.00	8.00		

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

Cap Screws and Studs – Valves with Tapped Holes in End Flange For Steel Valves

Figure Number		Size of Valve, Inches						
Wrench-Operated	Worm Gear-Operated	Type of Facing	3	4	6	8	10	12
Quantity, Diameter, and Length of Cap Screws for One End Flange								
1925	—	1/16" R.F. to 1/16" R.F.	(2) 5/8 x 1 1/4	—	—	—	—	—
1945	1949	1/16" R.F. to 1/16" R.F.	(2) 5/8 x 1 1/4	(2) 5/8 x 1 1/4	(2) 3/4 x 2	(2) 3/4 x 2 1/4	(2) 5/8 x 2 1/2	(2) 5/8 x 2 1/2
Quantity, Diameter, and Length of Studs for One End Flange								
1925	—	1/16" R.F. to 1/16" R.F.	(2) 5/8 x 2 1/2	—	—	—	—	—
1945	1949	1/16" R.F. to 1/16" R.F.	(2) 5/8 x 2 1/2	(2) 5/8 x 2 3/4	(2) 3/4 x 3	(2) 3/4 x 3 1/4	(2) 5/8 x 3 1/2	(2) 5/8 x 3 1/2
1945	1949	Ring Joint to Ring Joint	(2) 5/8 x 3 1/4	(2) 5/8 x 3 1/2	(2) 3/4 x 3 3/4	(2) 3/4 x 4	(2) 5/8 x 4 1/4	(2) 5/8 x 4 1/4

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



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 ¼" 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 400 Steel Flange Standard (ASME B16.5-1998) 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	3/8	5.50	5.25	5.50
5	11.00	1.50	7.31	R41	7.125	.312	.469	8.25	9.25	8	3/8	5.75	5.50	5.75
6	12.50	1.62	8.50	R45	8.312	.312	.469	9.50	10.62	12	3/8	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 1/8	8.75	8.50	8.75
18	28.00	2.62	21.00	R69	21.000	.312	.469	22.62	24.75	24	1 1/8	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

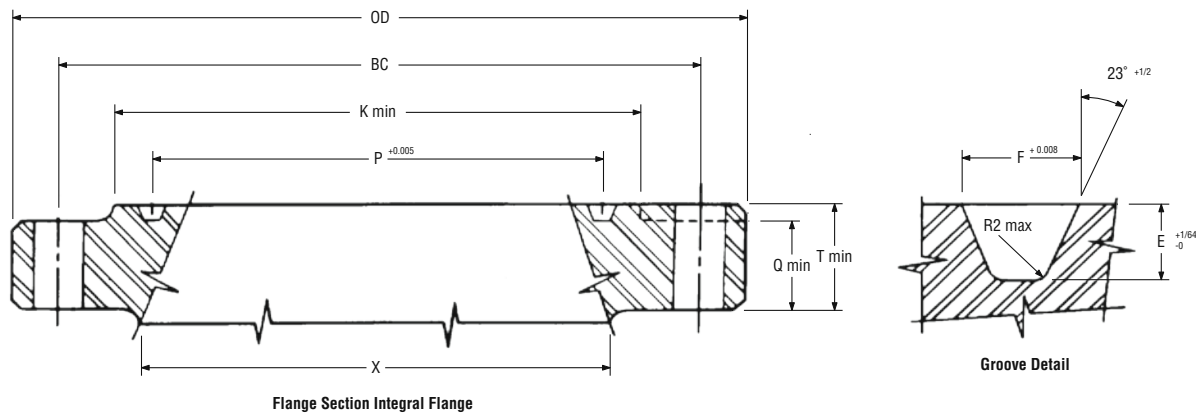
ASME Class 600 Steel Flange Standard (ASME B16.5-1998) Dimensions in Inches

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	3/8	5.50	5.25	5.50
4	10.75	1.50	6.19	R37	5.875	.312	.469	6.88	8.50	8	3/8	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 1/8	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 1/8	10.75	10.50	10.75
20	32.00	3.50	23.00	R73	23.000	.375	.531	25.00	28.50	24	1 1/8	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.

Nom. Pipe Size	Flange Dimensions		Facing Dimensions						Drilling			Length of Stud-Bolts		
	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
			Dia. of ¼" Raised Face	Ring No.	Pitch Dia. of Groove	Depth of Groove	Width of Groove	Dia. of Raised Face						
ASME Class 900 Steel Flange Standard (ASME B16.5-1998)														
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	1⅛	6.75	6.50	6.75
5	13.75	2.00	7.31	R41	7.125	.312	.469	8.50	11.00	8	1¼	7.50	7.25	7.50
6	15.00	2.19	8.50	R45	8.312	.312	.469	9.50	12.50	12	1½	7.50	7.25	7.75
8	18.50	2.50	10.62	R49	10.625	.312	.469	12.12	15.50	12	1¾	8.75	8.50	8.75
10	21.50	2.75	12.75	R53	12.750	.312	.469	14.25	18.50	16	1⅞	9.25	9.00	9.25
12	24.00	3.12	15.00	R57	15.000	.312	.469	16.50	21.00	20	1⅞	10.00	9.75	10.00
14	25.25	3.38	16.25	R62	16.500	.438	.656	18.38	22.00	20	1½	10.75	10.50	11.00
16	27.75	3.50	18.50	R66	18.500	.438	.656	20.62	24.25	20	1¾	11.25	11.00	11.50
18	31.00	4.00	21.00	R70	21.000	.500	.781	23.38	27.00	20	1⅞	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	2½	17.25	17.00	18.00
ASME Class 1500 Steel Flange Standard (ASME B16.5-1998)														
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	⅞	5.00	4.75	5.00
1¼	6.25	1.12	2.50	R18	2.375	.250	.344	3.19	4.38	4	⅞	5.00	4.75	5.00
1½	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	⅞	5.75	5.50	5.75
2½	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	1⅛	7.00	6.75	7.00
4	12.25	2.12	6.19	R39	6.375	.312	.469	7.62	9.50	8	1¼	7.75	7.50	7.75
5	14.75	2.88	7.31	R44	7.625	.312	.469	9.00	11.50	8	1½	9.75	9.50	9.75
6	15.50	3.25	8.50	R46	8.312	.375	.531	9.75	12.50	12	1¾	10.25	10.00	10.50
8	19.00	3.62	10.62	R50	10.625	.438	.656	12.50	15.50	12	1⅞	11.50	11.25	12.75
10	23.00	4.25	12.75	R54	12.750	.438	.656	14.62	19.00	12	1⅞	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	2¼	16.00	15.75	16.75
16	32.50	5.75	18.50	R67	18.500	.688	1.188	21.50	27.75	16	2½	17.50	17.25	18.50
18	36.00	6.38	21.00	R71	21.000	.688	1.188	24.12	30.50	16	2¾	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	3½	24.25	24.00	25.50
ASME Class 2500 Steel Flange Standard (ASME B16.5-1998)														
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	⅞	5.50	5.25	5.50
1¼	7.25	1.50	2.50	R21	2.844	.312	.469	4.00	5.12	4	1	6.00	5.75	6.00
1½	8.00	1.75	2.88	R23	3.250	.312	.469	4.50	5.75	4	1⅛	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
2½	10.50	2.25	4.12	R28	4.375	.375	.531	5.88	7.75	8	1⅛	7.75	7.50	8.00
3	12.00	2.62	5.00	R32	5.000	.375	.531	6.62	9.00	8	1¼	8.75	8.50	9.00
4	14.00	3.00	6.19	R38	6.188	.438	.656	8.00	10.75	8	1½	10.00	9.75	10.25
5	16.50	3.62	7.31	R42	7.500	.500	.781	9.50	12.75	8	1¾	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	2½	19.25	19.00	20.00
12	30.00	7.25	15.00	R60	16.000	.688	1.312	19.50	24.38	12	2¾	21.25	21.00	22.00

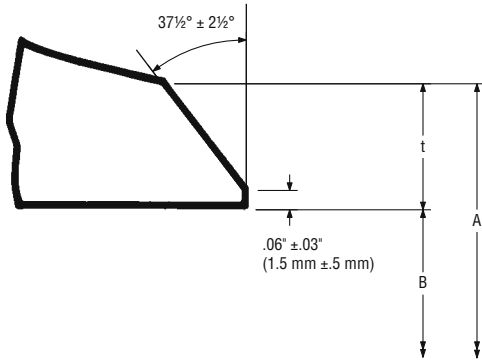
NOTE: Always check thickness of valve flanges, gaskets and companion flanges to determine correct bolt lengths required.



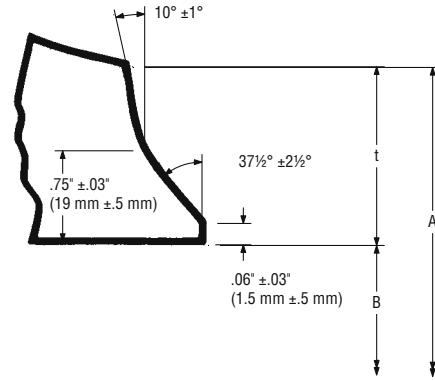
Nom. Pipe Size	Basic Flange Dimensions			Bolting Dimensions					Ring Joint Groove and Flange Facing Dimensions				
	Outside Dia. of Flange	Total Thickness of Flange	Basic Thickness of Flange	Dia. of Hub	Dia. of Bolt Circle	No. of Bolts	Dia. of Bolts	Length of Stud Bolts	Ring No.	Pitch Dia. of Type R 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)													
2½	6.50	1.31	1.00	3.31	5.00	8	¾	4.50	23	3.250	.469	.31	4.25
2½	7.50	1.44	1.12	3.94	5.88	8	¾	5.00	26	4.000	.469	.31	5.00
3½	8.25	1.56	1.25	4.62	6.62	8	¾	5.25	31	4.875	.469	.31	5.75
4½	10.75	1.81	1.50	6.00	8.50	8	¾	6.00	37	5.875	.469	.31	6.88
5½	13.00	2.06	1.75	7.44	10.50	8	1	6.75	41	7.125	.469	.31	8.25
7½	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	1½	8.00	49	10.625	.469	.31	11.88
11	20.00	2.81	2.50	13.50	17.00	16	1¼	8.75	53	12.750	.469	.31	14.00
13½	22.00	2.94	2.62	15.75	19.25	20	1¼	9.00	57	15.000	.469	.31	16.25
16¾	27.00	3.31	3.00	19.50	23.75	20	1½	10.25	65	18.500	.469	.31	20.00
21¼	32.00	3.88	3.50	24.00	28.50	24	1¾	11.75	73	23.000	.531	.38	25.00
API 6B Flanges for 3000 psi Rated Working Pressure (Dimensions in inches)													
2½	8.50	1.81	1.50	4.12	6.50	8	¾	6.00	24	3.750	.469	.31	4.88
2½	9.62	1.94	1.62	4.88	7.50	8	1	6.50	27	4.250	.469	.31	5.38
3½	9.50	1.81	1.50	5.00	7.50	8	¾	6.00	31	4.875	.469	.31	6.12
4½	11.50	2.06	1.75	6.25	9.25	8	1½	7.00	37	5.875	.469	.31	7.12
5½	13.75	2.31	2.00	7.50	11.00	8	1¼	7.75	41	7.125	.469	.31	8.50
7½	15.00	2.50	2.19	9.25	12.50	12	1½	8.00	45	8.313	.469	.31	9.50
9	18.50	2.81	2.50	11.75	15.50	12	1¾	9.00	49	10.625	.469	.31	12.12
11	21.50	3.06	2.75	14.50	18.50	16	1¾	9.50	53	12.750	.469	.31	14.25
13½	24.00	3.44	3.12	16.50	21.00	20	1¾	10.25	57	15.000	.469	.31	16.50
16¾	27.75	3.94	3.50	20.00	24.25	20	1¾	11.75	66	18.500	.656	.44	20.62
20¾	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)													
2½	8.50	1.81	1.50	4.12	6.50	8	¾	6.00	24	3.750	.469	.31	4.88
2½	9.62	1.94	1.62	4.88	7.50	8	1	6.50	27	4.250	.469	.31	5.38
3½	10.50	2.19	1.88	5.25	8.00	8	1½	7.25	35	5.375	.469	.31	6.62
4½	12.25	2.44	2.12	6.38	9.50	8	1¼	8.00	39	6.375	.469	.31	7.62
5½	14.75	3.19	2.88	7.75	11.50	8	1½	10.00	44	7.625	.469	.31	9.00
7½	15.50	3.62	3.25	9.00	12.50	12	1¾	10.75	46	8.313	.531	.38	9.75
9	19.00	4.06	3.62	11.50	15.50	12	1¾	12.00	50	10.625	.656	.44	12.50
11	23.00	4.69	4.25	14.50	19.00	12	1¾	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.

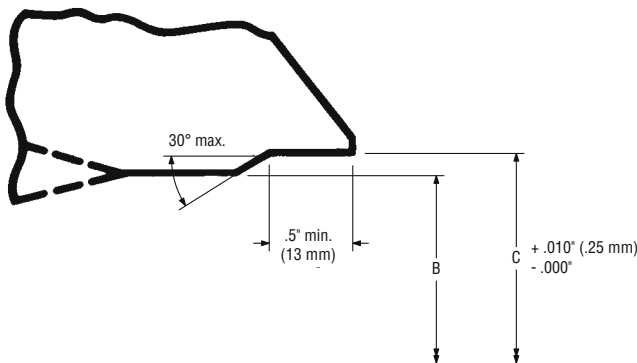
Standard Preparation of Valve Butt Welding Ends



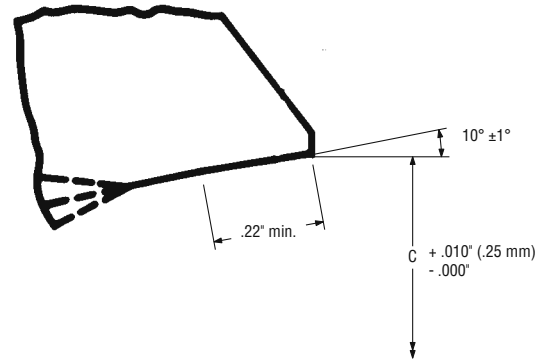
Style "A" for Wall Thickness "t" ≤ .88"



Style "B" for Wall Thickness "t" > .88"



Style "C" Contour for use with Rectangular Blocking



Style "D" Inside Contour for use with Taper Backing Ring

IMPORTANT: When ordering butt welding end valves indicate type of ends desired and give pipe schedule to be used.

A = Nominal Outside Diameter of Pipe

B = Nominal Inside Diameter of Pipe

C = A – 1.75t – 0.041

t = Nominal Wall Thickness of Pipe

For more information on butt welding end preparation, refer to ASME B16.25.

Inside and outside of welding ends of cast steel valves to be finish-machined are carefully inspected where the thickness of these ends is less than 1.15t. Flowserve Nordstrom Valves' standard practice is to machine the outside of the casting as shown to avoid sharp re-entrant angles and abrupt changes in slope. Runout of machined surface diameter of the valve is to have no abrupt change in section. Inside diameter of the valve may be either larger or smaller than the pipe inside diameter.

Every butt welding end made of cast material is magnetic particle or liquid penetrant examined to ensure sound material of the butt welding end.

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 (3)
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) (Wrench-Operated)	Stainless Steel		Stainless Steel		Stainless Steel (3) HRC 22 Max.
Stem (1) (Gear-Operated)	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) (Wrench-Operated)	Stainless Steel		Stainless Steel Double Age Hardened	
Stem (1) (Gear-Operated)	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.

Typical Materials of Construction

Super Nordstrom Valves	
Part Name	Standard Construction
Body	A105Forg or A216GrWCB
Cover	Carbon Steel
Plug and Stem	Carbon Steel
Gland	Carbon Steel
Cover Bolting	A193GrB7
Packing	Compound of Graphite and TFE
Controlled-Dimension Washers	Stainless Steel
Spring	Stainless Steel
Gasket	Stainless Steel and Graphite
Stop Collar	Wrought Carbon Steel
Retainer Ring	Carbon Steel
Sealant Fitting	Carbon Steel
Check Valve	Carbon Steel
Weatherseal	Buna-N

Super Nordstrom Two-Bolt Cover Valves	
Part Name	Standard Construction
Body	A216GrWCB
Cover	Ductile Iron
Plug and Stem	Gray Iron
Cover Bolting	A449-SAEGr5
Spring	Stainless Steel
Cover Seal	Buna-N
Stem Seal	TFE
Weatherseal	Buna-N
Sealant Fitting	Carbon Steel
Check Valve	Carbon Steel

Nordstrom Valves	
Part Name	Standard Construction
Body	A216GrWCB
Cover	Carbon Steel
Plug and Stem	Gray Iron
Gland	Hi Elon Iron
Cover Bolting	A193GrB7
Gland Bolting / Nuts	A193GrB7 / A194Gr2H
Gaskets	Sheet Gasket Material
Diaphragm	Stainless Steel
Gland / Stem Seals	Buna-N
Check Valve	Carbon Steel
Sealant Fitting	Carbon Steel

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