Gates • Globes • Angles • Swing Checks • Tilting Disc Checks • Stop Checks

Product Line Technical Data

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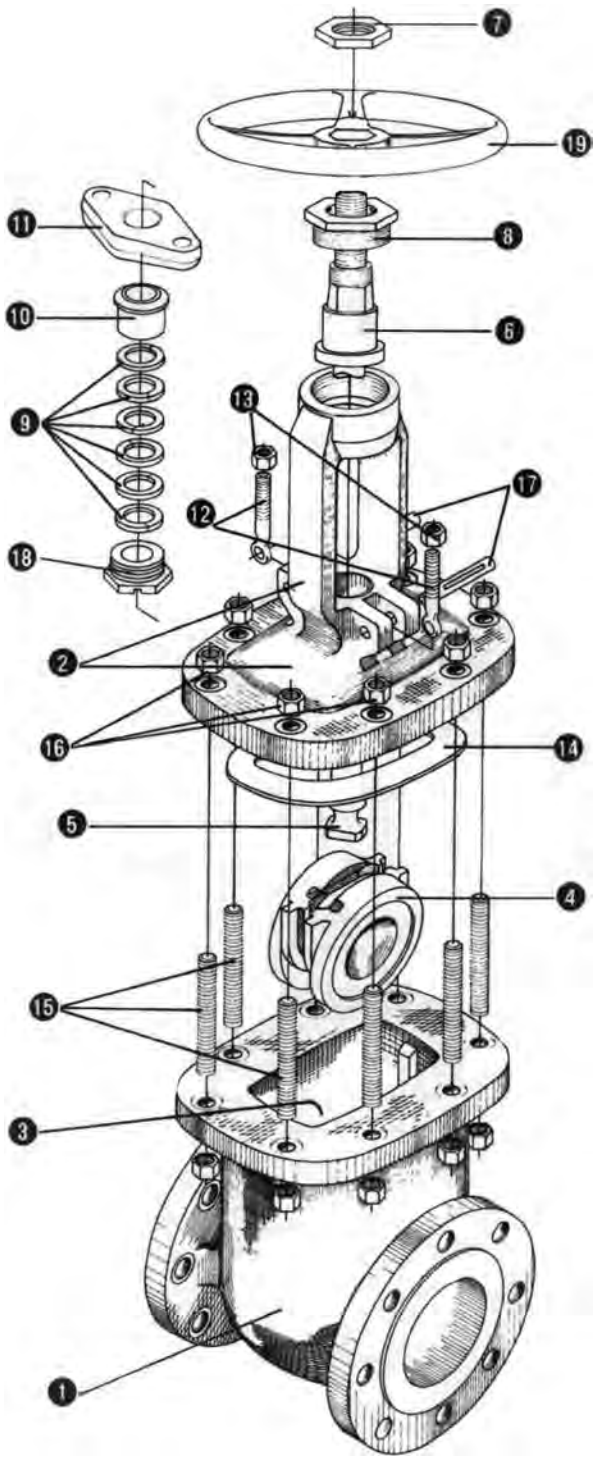
Typical Bolted Bonnet Gate Valve Features

Crane gate valves offer the ultimate in dependable service for steam, air, gas, oil, oil vapor, and high pressure installations. All have straight-through ports to assure minimum turbulence, erosion, and resistance to flow. They are available in a wide variety of trims.

1. **Body:** Body is cast to provide liberal strength to meet operating conditions and to permit unobstructed flow. Turbulence, erosion and pressure drop are minimized.

   Flanged End-Crane cast steel gate valves are available in flanged end and butt weld ends. All flanged and butt welding end valves are designed to conform to ASME B16.5 and ASME B16.34 standards.
2. **Integral Yoke & Bonnet:** Some designs incorporate a two-piece bonnet and yoke. All bonnet assemblies are cast and finished to the same exacting tolerances as the bodies for accurate alignment of stems and ease of sealing. Bonnet joint varies from flat face gasket-joint to ring-type bonnet joint, depending on class.
3. **Seat Rings:** Seat rings are seal welded to eliminate leak path behind rings and for long trouble-free service. The surfaces are precision ground to fit accurately with the disc.
4. **Disc:** Crane's one piece flexible disc provides accurate alignment of mating seating surfaces so the valve can absorb piping strains without leakage. Also, it avoids any tendency to stick in the seated position.
5. **Stem:** The tee-head disc-stem connection prevents lateral strain on the stem for smooth, easy operation. Accurately cut threads engage the yoke sleeve for positive control of disc position.
6. **Yoke Sleeve**
7. **Handwheel Nut**
8. **Yoke Sleeve Retaining Nut**
9. **Packing:** Packing contains corrosion inhibitor to avoid stem pitting. Stuffing box is deep, assuring long packing life.
10. **Gland:** Gland is a two-piece ball-type which exerts even pressure on the packing without binding the stem.
11. **Gland Flange**
12. **Gland Eye Bolts:** Eyebolts swing aside for ease in repacking the stuffing box.
13. **Gland Eye Bolt Nuts**
14. **Bonnet Gasket**
15. **Bonnet Studs:** Number is dependent on valve size and class.
16. **Bonnet Nuts:** Number is dependent on valve size and class.
17. **Gland Eyebolt Pins**
18. **Bonnet Bushing**
19. **Handwheel:** Crane gate valves can also be supplied with gear or motor operators.
20. **Hydraulic Grease Fitting:** Hydraulic grease fitting provides for lubrication of yoke sleeve bearing surfaces (not shown).



NOTE: Crane recommends the use of gear assistance for certain multi-turn valves for optimal functional performance in larger sizes and high flow-rate applications. Please refer to the note on specific product pages.

Cast Steel Gate Valves

Class 150 • Outside Screw & Yoke • Flexible Wedge Disc

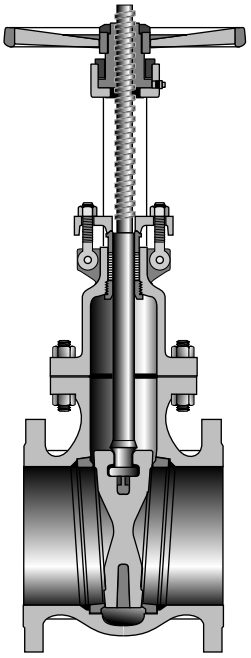
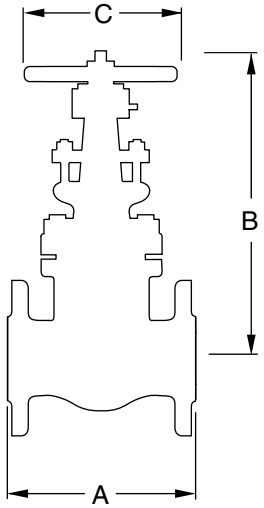


Figure 47
Flanged

Figure 47½
Butt Weld

Size Range:
2 through 24 inches
(50 - 600 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F
(20 bar @ -28°C to 37°C)



Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Corrugated Soft Steel or Steel/ Stainless Steel w/Graphite
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable, Ductile or Steel
Handwheel Nut	Ductile or Steel
I.D. Tags	SS
I.D. Pins	Steel
Spacer	Steel
Grease Fittings	Steel

NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 10" and larger.

Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Basic Design	API 600
Testing	API 598

Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)
A (47)	7.00 (178)	7.50 (191)	8.00 (203)	9.00 (229)	10.50 (267)	11.50 (292)	13.00 (330)	14.00 (356)	15.00 (381)	16.00 (406)	17.00 (432)	18.00 (457)	20.00 (508)
A (47½)	8.50 (216)	9.50 (241)	11.12 (282)	12.00 (305)	15.88 (403)	16.50 (419)	18.00 (457)	19.75 (502)	22.50 (572)	24.00 (610)	26.00 (660)	28.00 (711)	32.00 (813)
B (Open)	17 (432)	17 (432)	19 (483)	23 (584)	31 (787)	39 (990)	47 (1193)	55 (1397)	61 (1549)	71 (1803)	78 (1981)	90 (2286)	99 (2515)
C	8 (203)	8 (203)	9 (229)	10 (254)	12 (305)	14 (356)	16 (406)	18 (457)	22 (559)	24 (610)	25 (635)	27 (686)	30 (762)
Wt. (47)	49 (22)	55 (25)	74 (33)	110 (50)	192 (87)	300 (136)	420 (190)	630 (285)	905 (410)	1260 (571)	1590 (721)	2580 (1170)	3240 (1469)
Wt. (47½)	45 (20)	48 (21)	67 (30)	98 (44)	180 (81)	290 (131)	430 (195)	625 (283)	910 (412)	1260 (571)	1590 (721)	2580 (1170)	3250 (1474)

Cast Steel Gate Valves

Class 300 • Outside Screw & Yoke • Flexible Wedge Disc

Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Stainless Steel spiral wound Graphite
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable, Ductile or Steel
Handwheel Nut	Ductile or Steel
I.D. Tags	SS
I.D. Pins	Steel
Spacer	Steel
Grease Fittings	Steel

NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 8" and larger.

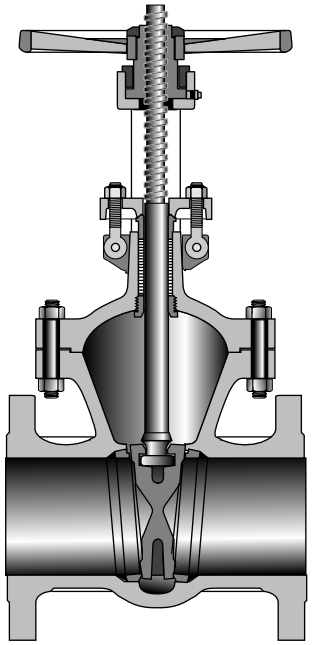
Figure 33
Flanged

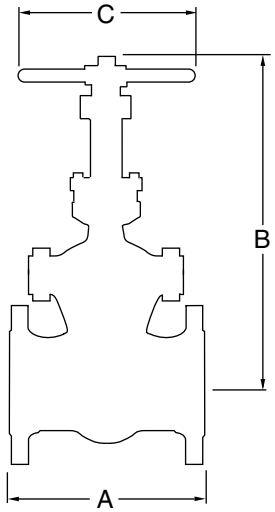
Figure 33½
Butt Weld

Size Range:

2 through 24 inches
(50 - 600 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F
(51 bar @ -28°C to 37°C)





Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Basic Design	API 600
Testing	API 598

Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)
A	8.50 (216)	9.50 (241)	11.12 (282)	12.00 (305)	15.88 (403)	16.50 (419)	18.00 (457)	19.75 (502)	30.00 (762)	33.00 (838)	36.00 (914)	39.00 (990)	45.00 (1143)
B (Open)	18 (457)	18 (457)	21 (533)	24 (609)	33 (838)	42 (1066)	50 (1270)	58 (1473)	62 (1574)	71 (1803)	79 (2006)	85 (2154)	100 (2540)
C	8 (203)	8 (203)	9 (229)	10 (254)	14 (356)	16 (406)	18 (457)	20 (508)	22 (559)	24 (610)	25 (635)	30 (762)	30 (762)
Wt. (33)	69 (31)	77 (34)	112 (50)	165 (74)	310 (140)	500 (226)	760 (344)	1050 (476)	1530 (693)	2380 (1079)	2722 (1234)	3650 (1655)	5115 (2320)
Wt. (33½)	57 (25)	64 (29)	92 (41)	132 (59)	256 (116)	410 (185)	650 (294)	880 (399)	1530 (693)	2380 (1079)	2000 (907)	3370 (1528)	4675 (2120)

Cast Steel Gate Valves

Class 600 • Outside Screw & Yoke • Flexible Wedge Disc

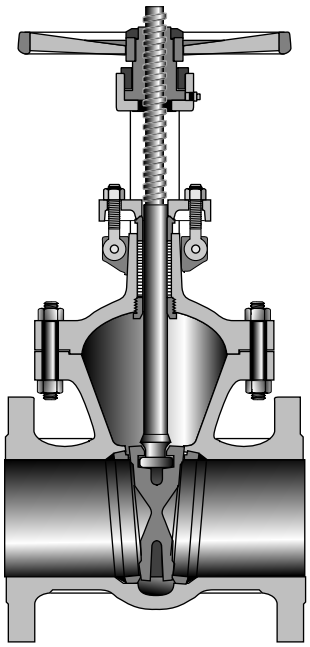


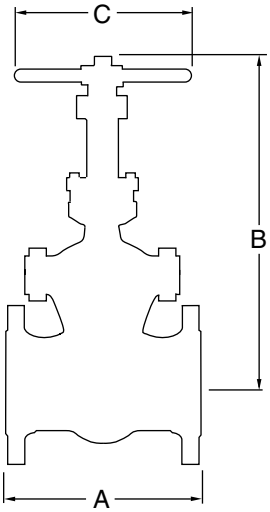
Figure 76
Flanged

Figure 76½
Butt Weld

Size Range:

2 through 12 inches
(50 - 300 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F
(102 bar @ -28°C to 37°C)



Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring Type Joint
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable, Ductile or Steel
Handwheel Nut	Ductile or Steel
I.D. Tags	SS
I.D. Pins	Steel
Spacer	Steel
Grease Fittings	Steel

NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 6" and larger.

Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Basic Design	API 600
Testing	API 598

Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)
A	11.50 (292)	13.00 (330)	14.00 (355)	17.00 (431)	22.00 (558)	26.00 (660)	31.00 (787)	33.00 (838)
B (Open)	17 (431)	19 (482)	23 (584)	27 (685)	36 (914)	42 (1066)	51 (1295)	58 (1473)
C	10 (254)	10 (254)	12 (304)	14 (355)	18 (457)	20 (508)	25 (635)	27 (685)
Wt. (76)	99 (44)	121 (54)	170 (77)	280 (127)	590 (267)	1080 (489)	1660 (752)	2070 (938)
Wt. (76½)	85 (38)	110 (49)	167 (75)	280 (127)	610 (276)	1070 (485)	1670 (757)	2070 (938)

NACE Trim Steel Valves

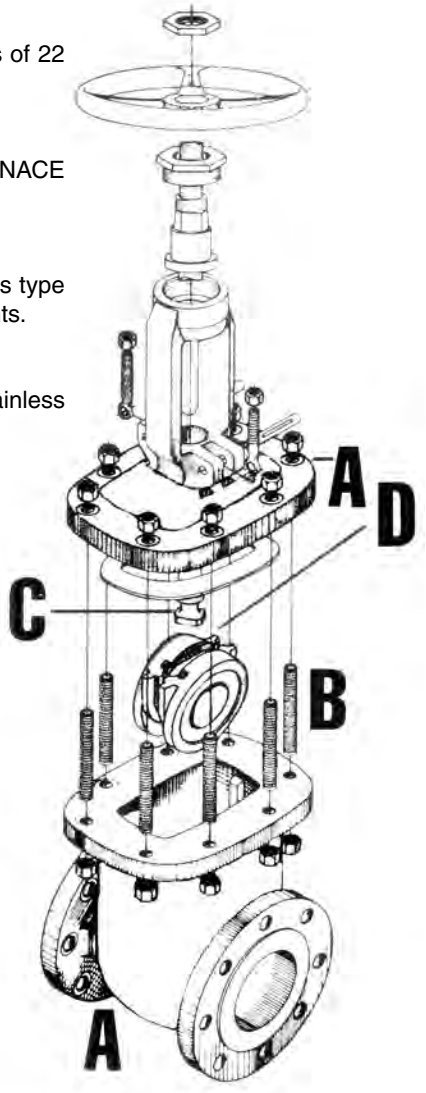
For servicing sour environments of Hydrogen Sulfide (H_2S) bearing hydrocarbons, Crane offers NACE valves made of component materials specially heat-treated and hardness-controlled in compliance with NACE standard MR0103. Typical NACE material configurations are shown below for Crane cast steel gate valves.

A Body & Bonnet – Most NACE requirements for heat treatment and maximum hardness of 22 HRC. Standard material is ASTM A216 Grade WCB.

B Bolting – ASTM A193 Grade B7M bolts and ASTM A194 Grade 2HM nuts meet both NACE Classes I and II.

C Stem – Offering superior resistance to stress corrosion cracking, standard NACE stem is type 316 stainless steel in conformance with NACE hardness and heat treatment requirements.

D Disc – Standard disc is one piece flexible wedge ASTM A351 Grade CF8M, type 316 stainless steel in conformance with NACE hardness and heat treatment requirements.

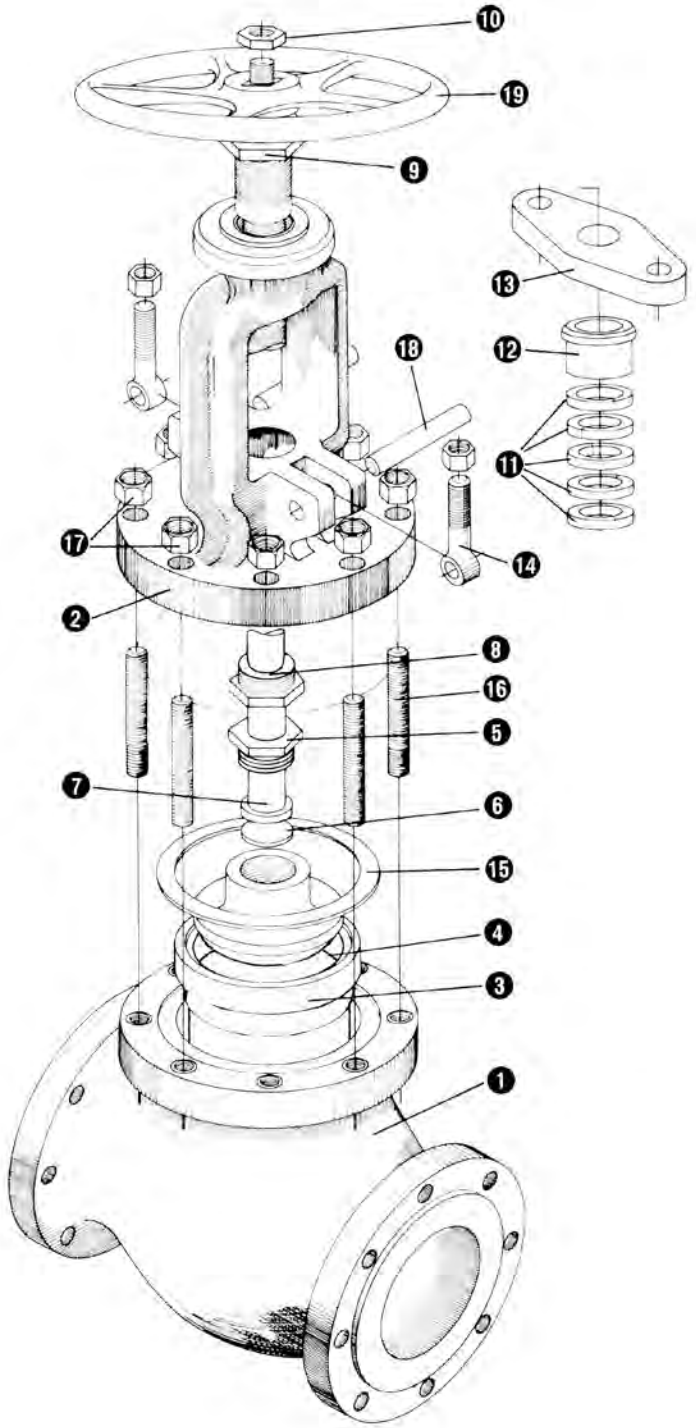


NACE Valves Compared to API 600 Valves			
Valve Parts	**API and Hardness**	**LF Trim NACE**	**LUF Trim NACE**
Body/Bonnet	ASTM A216 Grade WCB	ASTM A216 Grade WCB; ≤22HRC	ASTM A216 Grade WCB; ≤22HRC
Disc – Solid Metal	ASTM A217 Grade CA15; 250 min.	ASTM A351 Grade CF8M; ≤22HRC	ASTM A351 Grade CF8M; ≤22HRC
Seat Ring	Stellite® Overlayed; Overlay ≥350 HB	316L Overlayed; Base Metal ≤22 HRC	Stellite® Overlayed; Base Metal ≤22 HRC
Gland	Steel Zinc Plated	Steel Zinc Plated; Base Metal ≤22 HRC	Steel Zinc Plated; Base Metal ≤22 HRC
Stem	13Cr; 200-275 HB	ASTM A182 Grade F316; ≤22HRC	ASTM A182 Grade F316; ≤22HRC
Backseat Bushing	13Cr; 250 HB min.	ASTM 479 Grade T316; ≤22 HRC	ASTM 479 Grade T316; ≤22HRC
Body/Bonnet Studs	ASTM A193 Grade 2H	ASTM A193 Grade B7M	ASTM A193 Grade B7M
Body/Bonnet Nuts	ASTM A194 Grade 2H	ASTM A194 Grade 2HM	ASTM A194 Grade 2HM

Typical Globe Valve Features

Crane globe valves are highly efficient for services requiring frequent operation and throttling when pressure drop across the valve is about 20% of inlet pressure. Closer throttling, creating higher pressure drops may cause cavitation or excessive velocities which could cause high noise levels, vibration and possible damage to the valve or adjacent piping. Globe valves can be equipped with optional operators and are available with a variety of trims to match service requirements.

1. **Body:** Body is cast with heavy sections reinforced at points subjected to the greatest stress. Valves are available in both flanged and butt welding ends. All conform to ASME specifications.
2. **Bonnet**
3. **Seat Ring**
4. **Disc**
5. **Disc Stem Nut:** Disc Stem Ring connects the disc to the stem, permitting the disc to swivel and aid in securing tight seating for trouble-free service.
6. **Disc Washer**
7. **Stem:** Stem has long engagement with yoke bushing for accurate seating.
8. **Bonnet Bushing**
9. **Yoke Bushing**
10. **Wheel Nut**
11. **Packing**
12. **Gland:** Gland is a two-piece, ball-type which exerts even pressure on the packing without binding the stem.
13. **Gland Flange**
14. **Gland Eye Bolts:** Eye bolts are securely fastened to the bonnet yet swing away to permit easy access to the stuffing box.
15. **Bonnet Gasket:** Bonnet gasket provides a positive seal against leakage. Class 150 and 300 valves have a male/female bonnet joint. A ring-type gasket is employed in Class 600.
16. **Bonnet Studs**
17. **Bonnet Nuts**
18. **Pin**
19. **Handwheel**



NOTE: Crane recommends the use of gear assistance for certain mult-turn valves for optimal functional performance in larger sizes and high flow-rate applications. Please refer to the note on specific product pages.

Cast Steel Globe Valves

Class 150 • Outside Screw & Yoke • Bolted Bonnet

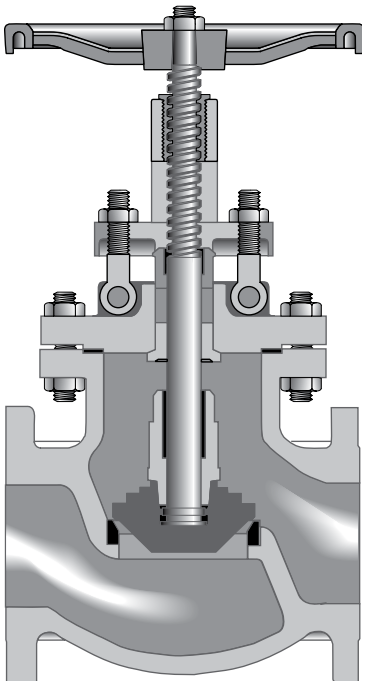
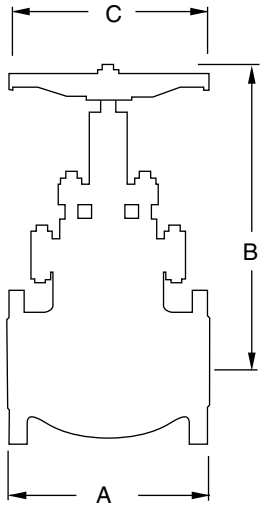


Figure 143
Flanged

Figure 143½
Butt Weld

Size Range:
2 through 12 inches
(50 - 300 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F
(20 bar @ -28°C to 37°C)



Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Corrugated Soft Steel or Steel/ Stainless Steel w/Graphite
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	_
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	WCB
Handwheel Nut	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 6" and larger.

Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)
A	8.00 (203)	8.50 (216)	9.50 (241)	11.50 (292)	16.00 (406)	19.50 (495)	24.50 (622)	27.50 (698)
B (Open)	14 (356)	16 (406)	16 (406)	19 (482)	21 (533)	24 (610)	29 (736)	40 (1016)
C	8 (203)	8 (203)	10 (254)	12 (304)	14 (355)	18 (457)	20 (508)	24 (610)
Wt. (143)	48 (21)	70 (31)	92 (41)	132 (59)	223 (101)	355 (161)	640 (290)	1100 (498)
Wt. (143½)	49 (22)	60 (27)	84 (38)	137 (62)	230 (104)	350 (158)	680 (308)	1190 (539)

Cast Steel Globe Valves

Class 300 • Outside Screw & Yoke • Bolted Bonnet

Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Stainless Steel spiral wound Graphite
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	_
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	WCB
Handwheel Nut	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

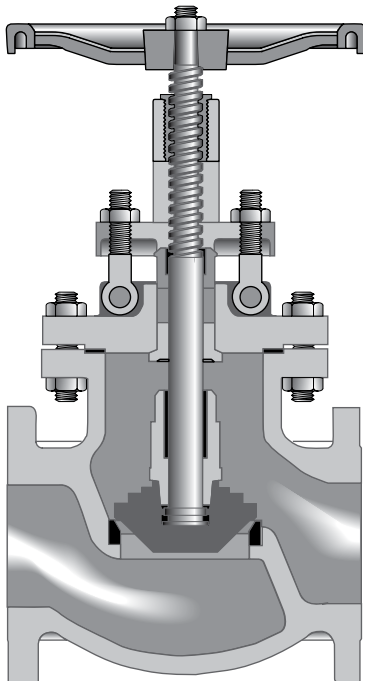
NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 6" and larger.

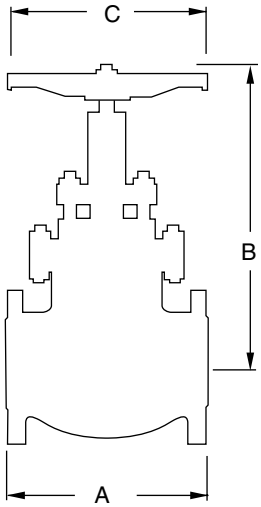
Figure 151
Flanged

Figure 151½
Butt Weld

Size Range:
2 through 12 inches
(50 - 300 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F
(51 bar @ -28°C to 37°C)





Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)
A	10.50 (267)	11.50 (292)	12.50 (317)	14.00 (356)	17.50 (444)	22.00 (558)	24.50 (622)	28.00 (711)
B (Open)	15 (381)	18 (457)	18 (457)	21 (533)	25 (635)	36 (914)	41 (1041)	51 (1295)
C	8 (203)	10 (254)	10 (254)	14 (355)	18 (457)	22 (559)	24 (610)	25 (635)
Wt. (151)	69 (31)	99 (44)	128 (58)	190 (86)	330 (149)	330 (149)	700 (317)	1360 (616)
Wt. (151½)	62 (28)	73 (33)	124 (56)	181 (82)	340 (154)	530 (240)	710 (322)	1400 (635)

Cast Steel Globe Valves

Class 600 • Outside Screw & Yoke • Bolted Bonnet

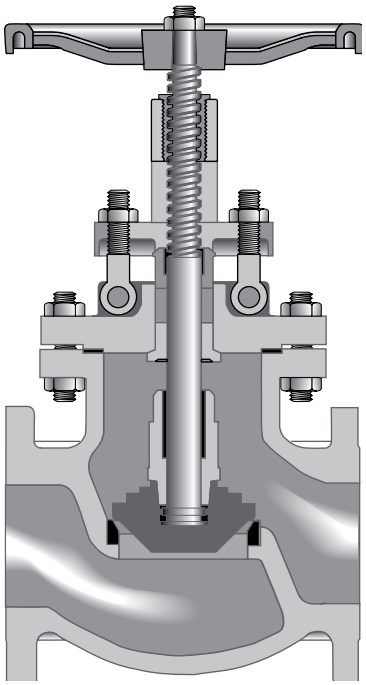
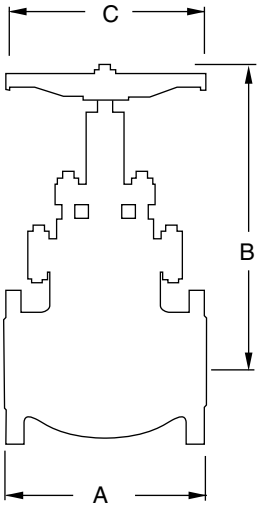


Figure 171
Flanged

Figure 171½
Butt Weld

Size Range:
2 through 8 inches
(50 - 200 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F
(102 bar @ -28°C to 37°C)



Material of Construction*

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring Type Joint
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	_
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	WCB
Handwheel Nut	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

NOTES:
*Standard construction: WCB-Trim 8, other options are available. Crane recommends the use of manual or powered gear assistance for sizes 4" and larger.

Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)
A	11.50 (292)	13.00 (330)	14.00 (356)	17.00 (431)	22.00 (558)	26.00 (660)
B (Open)	19 (482)	21 (533)	23 (584)	27 (685)	33 (838)	36 (914)
C	10 (254)	10 (254)	14 (355)	18 (457)	20 (508)	26 (660)
Wt. (171)	126 (57)	154 (69)	188 (85)	270 (122)	890 (403)	990 (449)
Wt. (171½)	79 (35)	100 (45)	187 (84)	271 (122)	890 (403)	990 (449)

Cast Steel Swing Check Valve

Typical Swing Check Valve Features

Check valves are automatically actuated. They are opened and sustained in the open position by the force of velocity pressure, and closed by the force of gravity. Seating load and resultant tightness is dependent upon back pressure. The disc and associated moving parts may be in a constant state of movement if the velocity pressure is not sufficient to hold the valve in a wide open and stable position. Premature wear and noisy operation or vibration of the moving parts can be avoided by selecting the size of check valve on the basis of flow conditions. The minimum velocity required to hold a swing check valve in the wide open and stable position has been developed by analysis of extensive test data and is expressed by the formula:

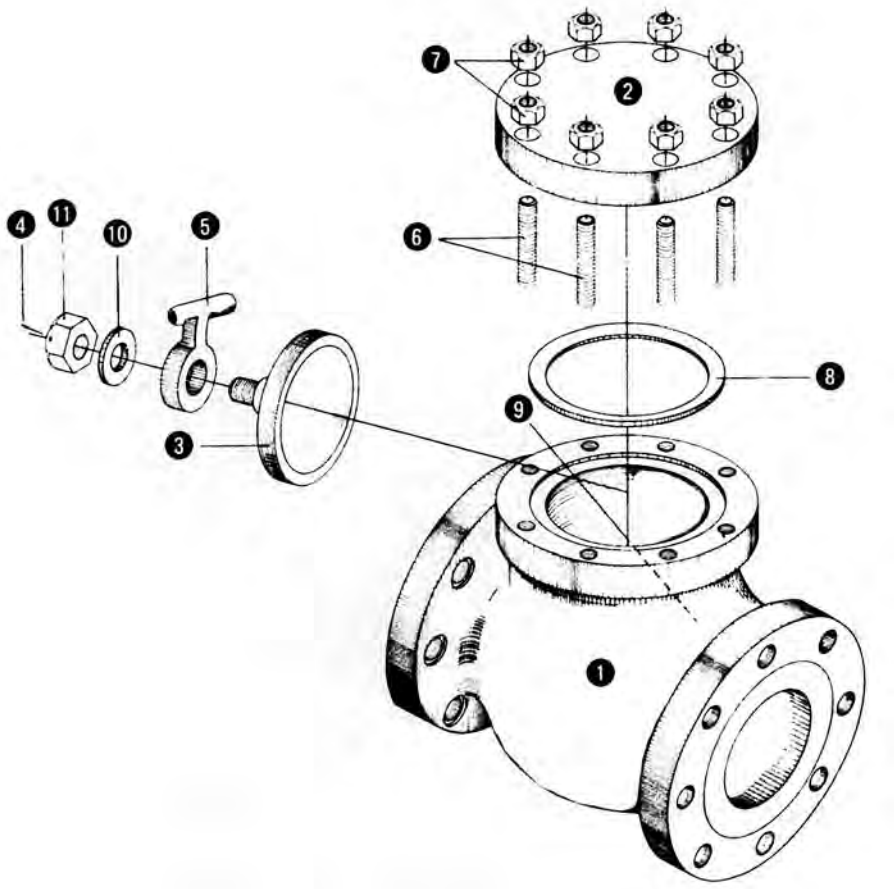
$$v = 60\sqrt{\bar{v}}$$

The value for v is equal to flow in feet per second and $\bar{v}$ is the specific volume of fluid in cubic feet per pound. Sizing swing check valves on this basis may often result in the use of valves that are smaller than the pipe in which they are used, necessitating the use of reducers for installation. The pressure drop will be no greater than that of the larger valve that is only partially open, and valve life will be greatly extended. The added bonus, of course, is the lower cost of the smaller valve.

There is no tendency for the seating surfaces of swing check valves to gall or score, because the disc meets the flat seat squarely without rubbing contact upon closing.

Crane cast steel swing check valves can be furnished with outside lever and adjustable weight in certain sizes when so ordered. With the lever and weight mounted so that the weight assists the disc in closing, the valve closes more rapidly when flow stops, thus minimizing reversal of flow and resultant surge and shock. With the lever and weight mounted to balance the weight of the disc, the valve becomes more sensitive to low flow velocities. For more information about the size range for which this modification is available, please consult your local sales representative or customer service office.

Swing check valves are used to prevent reversal of flow in horizontal pipe lines. Crane does not recommend the use of swing check valves in vertical pipelines, however when using this style of valve in a vertical application the valve must be installed for upward flow only.



1. **Body:** Strong construction assures maximum safety over the recommended pressure and temperature range. Both flange and butt weld ends are available.
2. **Cap:** permits access to hinge and disc without removing valve from line.
3. **Disc:** is designed to close on its own weight to stop backflow from gaining sufficient velocity to create damaging shock.
4. **Disc Nut Pin:** retained by physical deformation or welding.
5. **Hinge**
6. **Cap Stud**
7. **Cap Stud Nuts**
8. **Cap Gasket**
9. **Body Seat Ring** (welded in)
10. **Disc Washer**
11. **Disc Nut**

NOTE: The above sketch is generic. Valve supplied may be internal hung or external hung type units depending upon pressure class and size.

Cast Steel Swing Check Valve

GTV VALVE

Class 150 • Bolted Cap

Material of Construction*

Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Corrugated Soft Steel or Steel/ Stainless Steel w/Graphite
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

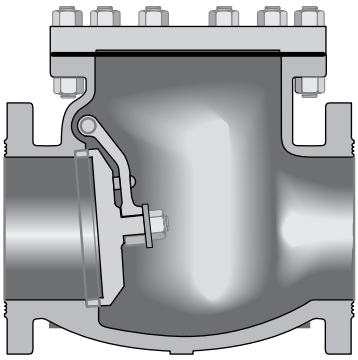
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

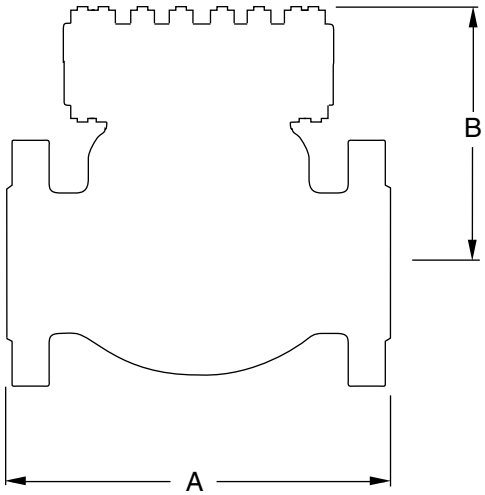
Figure 147
Flanged

Figure 147½
Butt Weld

Size Range:
2 through 24 inches
(50 - 600 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F
(20 bar @ -28°C to 37°C)





Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)
A	8.00 (203)	8.50 (216)	9.50 (241)	11.50 (292)	14.00 (356)	19.50 (495)	24.50 (622)	27.50 (698)	31.00 (787)	34.00 (863)	38.50 (977)	38.50 (977)	51.00 (1295)
B (Open)	9 (229)	7 (178)	7 (178)	9 (229)	11 (279)	13 (330)	15 (381)	17 (432)	15 (381)	17 (432)	18 (457)	19 (482)	22 (558)
Wt. (147)	41 (18)	57 (25)	64 (29)	101 (45)	170 (77)	360 (163)	485 (219)	765 (346)	950 (430)	1225 (555)	1700 (771)	1850 (839)	2600 (1179)
Wt. (147½)	42 (19)	57 (25)	64 (29)	101 (45)	170 (77)	360 (163)	485 (219)	807 (366)	950 (430)	1225 (555)	1700 (771)	1850 (839)	2600 (1179)

Cast Steel Swing Check Valve

Class 300 • Bolted Cap

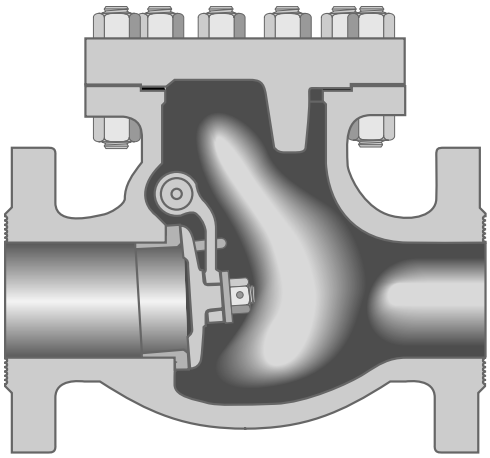


Figure 159
Flanged

Figure 159½
Butt Weld

Size Range:
2 through 24 inches
(50 - 600 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F
(51 bar @ -28°C to 37°C)

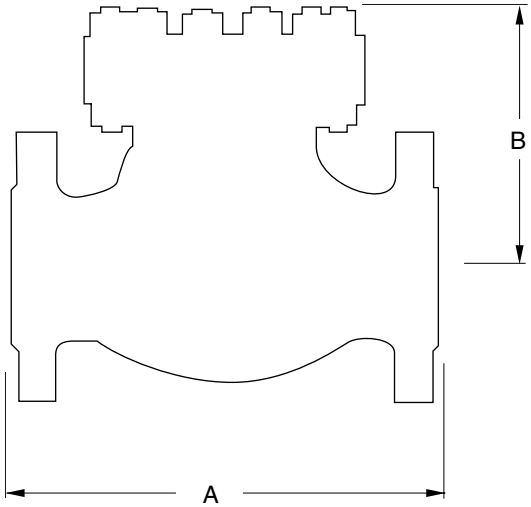
Material of Construction*

Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Stainless Steel spiral wound Graphite
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

NOTE:
*Standard construction: WCB-Trim 8, other options are available.

Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598



Dimensions and Weights

Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)
A	10.50 (266)	11.50 (292)	12.50 (317)	14.00 (356)	17.50 (444)	21.00 (533)	24.50 (622)	28.00 (711)	33.00 (838)	34.00 (863)	38.50 (977)	40.00 (1016)	53.00 (1346)
B (Open)	7 (178)	8 (203)	8 (203)	9 (229)	11 (279)	14 (355)	16 (406)	19 (482)	19 (482)	22 (558)	23 (584)	25 (635)	30 (762)
Wt. (159)	46 (20)	66 (29)	86 (39)	154 (69)	276 (125)	460 (208)	675 (306)	860 (390)	1500 (680)	1850 (839)	2250 (1020)	2900 (1315)	4350 (1973)
Wt. (159½)	33 (14)	49 (22)	86 (39)	97 (43)	276 (125)	460 (208)	677 (307)	992 (449)	1500 (680)	1850 (839)	2250 (1020)	2900 (1315)	4350 (1973)

Cast Steel Swing Check Valve

GTV VALVE

Class 600 • Bolted Cap

Material of Construction*

Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Ring Type Joint
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

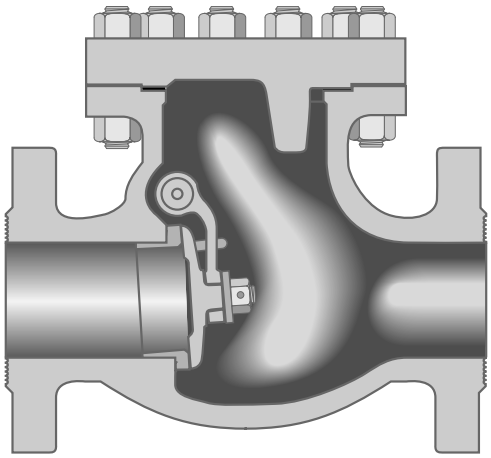
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

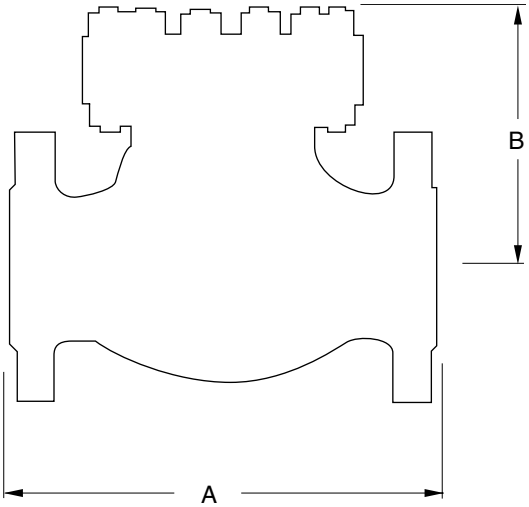
Figure 175
Flanged

Figure 175½
Butt Weld

Size Range:
2 through 12 inches
(50 - 300 mm)

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F
(102 bar @ -28°C to 37°C)





Industry Standards

Steel Valves	ASME B16.34
Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)
A	11.50 (292)	13.00 (330)	14.00 (356)	17.00 (431)	22.00 (558)	26.00 (660)	31.00 (787)	33.00 (838)
B (Open)	7 (178)	8 (203)	9 (229)	11 (279)	13 (330)	16 (406)	19 (482)	21 (533)
Wt. (175)	115 (52)	145 (65)	161 (73)	284 (128)	500 (226)	1025 (464)	1400 (635)	1950 (884)
Wt. (175½)	100 (45)	125 (56)	154 (69)	250 (113)	450 (204)	850 (385)	1300 (589)	1800 (816)

Typical Tilting Disc Check Valve

Tilting Disc Check Valves consist of a cylindrical housing, with a pivoted circular disc. The pivots are located just above the center of the disc, and offset from the plane of the body seat. This design gives a bell-crank action to the disc. The seat is of circular bevel type and the disc drops in or out of contact without rubbing or sliding.

Features

Slamming of check valves is the result of failure of the valve disc to reach its closed position before the fluid flow reversal. Tilting disc check valves have to close rapidly since the disc has a shorter distance to travel and therefore arrives at the seat faster...minimizing a slam.

Tilting disc check valves are used to prevent reversal of flow in horizontal or vertical pipe lines. In vertical lines, or for any angle from horizontal to vertical, they can be used for upward flow only.

Tilting check valves are automatically actuated. They are opened by velocity pressure, and closed by gravity. Seating load and tightness is dependent on back pressure. The disc and moving parts may constantly move if the velocity pressure is not sufficient to hold the valve in a wide open and stable position. Premature wear and noisy operation or vibration of the moving parts can be avoided by selecting the size of check valve on the basis of flow conditions. The minimum velocity required to hold a tilting disc check valve wide open and stable can be determined by the formula:

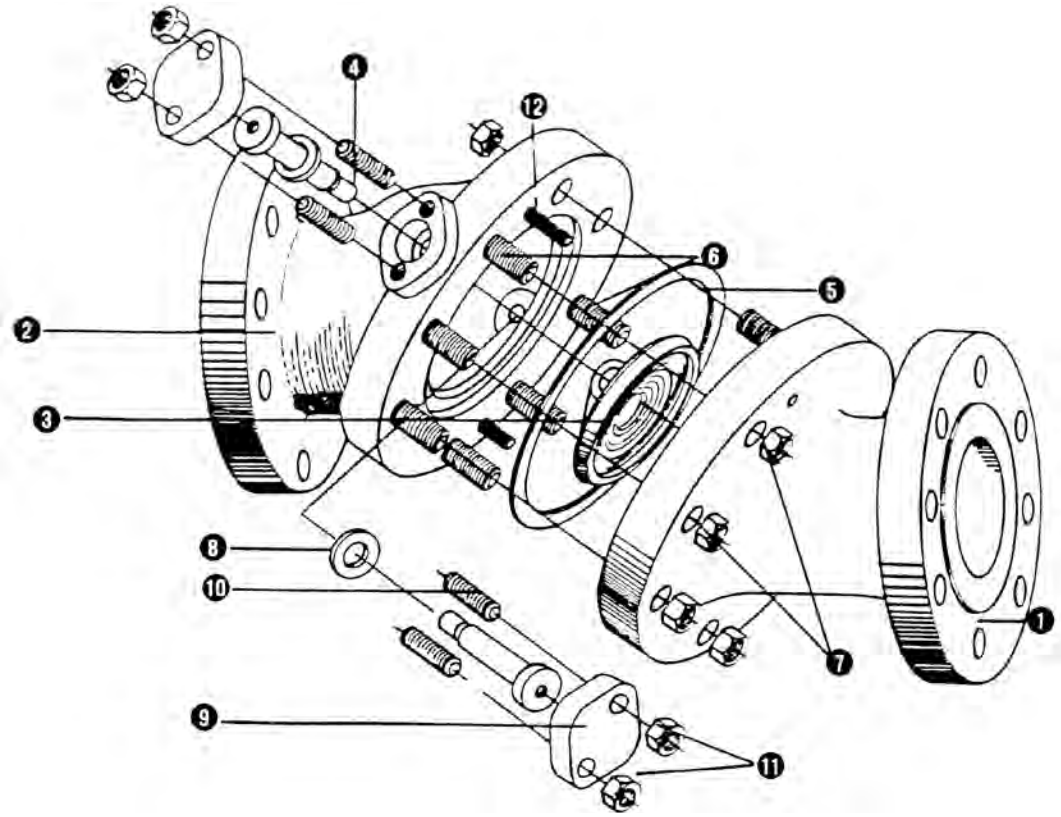
$$v = 80\sqrt{\bar{v}}$$

The value for v is equal to flow in feet per second and where $\bar{v}$ is the specific volume of the fluid in cubic feet per pound. Sizing check valves on this basis may often result in the use of valves that are smaller than the pipe in which they are used, necessitating the use of reducers for installation. The pressure drop will not be greater than that of the larger valve that is only partially open, and valve life will be greatly extended. The added bonus, of course, is the lower cost of the smaller valve.

Standard body design configurations

The seat, disc and pivot pins are combined into one subassembly secured to the inlet side of the body with a locking ring in sizes 3" (80 mm) and smaller. This construction avoids the need for extending the pivot pins through the valve body.
The seat formed on the end of the inlet body section by cobalt base alloy hard facing deposit in sizes 4" (100 mm) and larger. The pivot pins supporting the disc are inserted through capped and gasketed bearing bosses in the outlet section of the body.

1. **Body Inlet Half**
2. **Body Outlet Half**
3. **Disc**
4. **Pivot Pin**
5. **Body Gasket**
6. **Body Studs**
7. **Body Stud Nuts**
8. **Bearing Cap Gasket**
9. **Bearing Cap**
10. **Bearing Cap Studs**
11. **Bearing Cap Stud Nuts**
12. **Dowel Pins**



Tilting Disc Check Valve

Class 150 • Bolted Cap

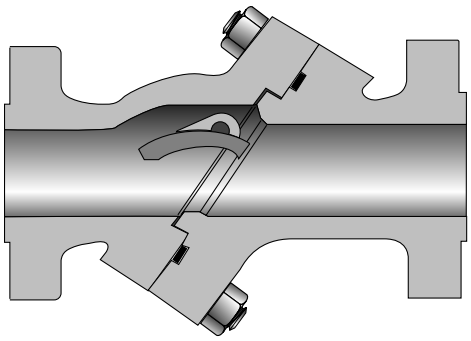


Figure 123
Flanged

Figure 123½
Butt Weld

Size Range:
2 through 36 inches
(50 - 900 mm)

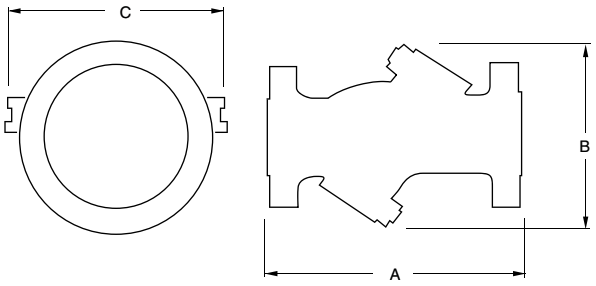
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F
(20 bar @ -28°C to 37°C)

Material of Construction*

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Stainless Steel spiral wound Graphite
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 2H
Dowel Pins	Carbon Steel

NOTE:
*Standard construction: WCB-Trim 8, other options are available.

Industry Standards
All materials comply with ASME B16.34



Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	5 (125)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)	30 (750)	36 (900)
A	8.00 (203)	8.50 (216)	9.50 (241)	11.50 (292)	13.00 (330)	19.50 (495)	24.50 (622)	27.50 (698)	31.00 (787)	30.00 (762)	33.00 (838)	32.50 (825)	38.00 (965)	49.50 (1257)	59.50 (1511)
B	7 (177)	9 (229)	9 (229)	10 (254)	11 (279)	16 (406)	19 (482)	21 (533)	22 (558)	25 (635)	28 (711)	31 (787)	36 (914)	44 (1117)	50 (1270)
C	8 (203)	9 (229)	9 (229)	13 (330)	16 (406)	21 (533)	25 (635)	28 (711)	29 (736)	34 (863)	36 (914)	39 (990)	45 (1143)	54 (1371)	60 (1524)
Wt. (123)	38 (17)	51 (23)	59 (26)	102 (46)	139 (63)	293 (132)	488 (221)	690 (312)	823 (373)	1070 (485)	1435 (650)	1825 (827)	2887 (1309)	4790 (2172)	6795 (3082)
Wt. (123½)	22 (9)	38 (17)	42 (19)	75 (34)	108 (48)	240 (108)	400 (181)	570 (258)	690 (312)	885 (401)	1213 (550)	1760 (798)	2265 (1027)	4025 (1825)	5755 (2610)

Tilting Disc Check Valve

GTV VALVE

Class 300 • Bolted Cap

Material of Construction*

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Stainless Steel spiral wound Graphite
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 2H
Dowel Pins	Carbon Steel

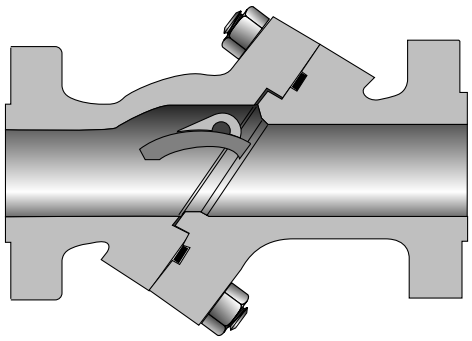
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

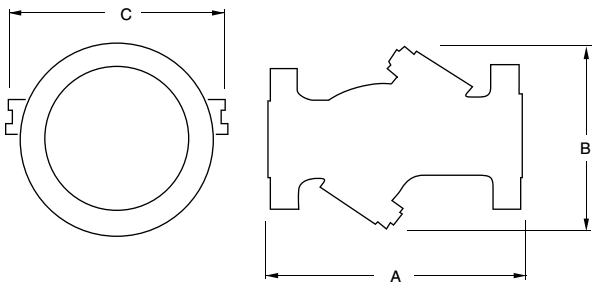
Figure 323
Flanged

Figure 323½
Butt Weld

Size Range:
2 through 36 inches
(50 - 900 mm)

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F
(51 bar @ -28°C to 37°C)





Industry Standards
All materials comply with ASME B16.34

Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	5 (125)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)	30 (750)	36 (900)
A	10.50 (266)	11.50 (292)	12.50 (317)	14.00 (355)	15.75 (400)	21.00 (533)	24.50 (622)	28.00 (711)	30.00 (762)	33.00 (838)	36.00 (914)	39.00 (990)	45.00 (1143)	54.00 (1371)	60.00 (1524)
B	8 (203)	10 (254)	10 (254)	11 (279)	13 (330)	17 (431)	20 (508)	24 (609)	25 (635)	28 (711)	31 (787)	33 (838)	38 (965)	45 (1143)	57 (1447)
C	9 (229)	10 (254)	10 (254)	14 (355)	16 (406)	22 (558)	25 (635)	30 (762)	30 (762)	36 (914)	40 (1016)	41 (1041)	45 (1143)	54 (1371)	68 (1727)
Wt. (323)	38 (17)	51 (23)	59 (26)	102 (46)	139 (63)	293 (132)	488 (221)	690 (312)	823 (373)	1070 (485)	1435 (650)	1825 (827)	2887 (1309)	4790 (2172)	6795 (3082)
Wt. (323½)	22 (9)	38 (17)	42 (19)	75 (34)	108 (48)	240 (108)	400 (181)	570 (258)	690 (312)	885 (401)	1213 (550)	1760 (798)	2265 (1027)	4025 (1825)	5755 (2610)

Tilting Disc Check Valve

Class 600 • Bolted Cap

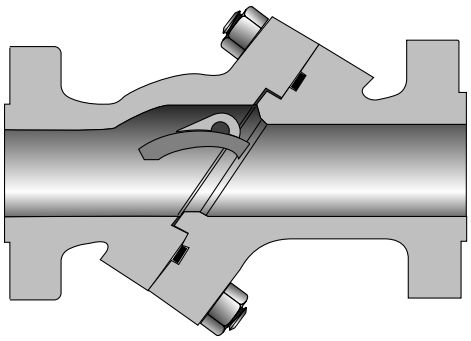


Figure 623
Flanged

Figure 623½
Butt Weld

Size Range:
2 through 30 inches
(50 - 750 mm)

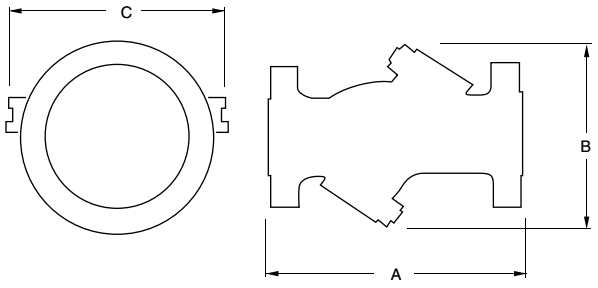
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F
(102 bar @ -28°C to 37°C)

Material of Construction*

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Stainless Steel spiral wound Graphite
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 2H
Dowel Pins	Carbon Steel

NOTE:
*Standard construction: WCB-Trim 8, other options are available.

Industry Standards
All materials comply with ASME B16.34



Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2 ½ (65)	3 (80)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)	30 (750)
A	11.50 (292)	13.00 (330)	14.00 (355)	17.00 (431)	20.00 (508)	22.00 (558)	26.00 (660)	31.00 (787)	33.00 (838)	35.00 (889)	39.00 (990)	43.00 (1092)	47.00 (1193)	55.00 (1397)	59.00 (1498)
B	8 (203)	10 (254)	10 (254)	13 (330)	15 (381)	16 (406)	19 (482)	22 (558)	26 (660)	27 (685)	30 (762)	34 (863)	38 (965)	44 (1117)	49 (1244)
C	9 (229)	10 (254)	10 (254)	16 (406)	19 (482)	20 (508)	24 (609)	28 (711)	31 (787)	33 (838)	36 (914)	43 (1092)	46 (1168)	53 (1346)	60 (1524)
Wt. (623)	68 (30)	110 (49)	115 (52)	222 (100)	327 (148)	432 (195)	725 (328)	1035 (469)	1470 (666)	1830 (830)	2550 (1156)	3570 (1619)	4805 (2179)	7190 (3261)	6925 (3141)
Wt. (623½)	60 (27)	70 (31)	85 (38)	164 (74)	267 (121)	295 (133)	435 (197)	820 (371)	1055 (478)	1335 (605)	1965 (891)	2010 (911)	4545 (2061)	5850 (2653)	7715 (3499)

Tilting Disc Check Valve

GTV VALVE

Class 900 • Bolted Cap

Material of Construction*

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Stainless Steel spiral wound Graphite
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 2H
Dowel Pins	Carbon Steel

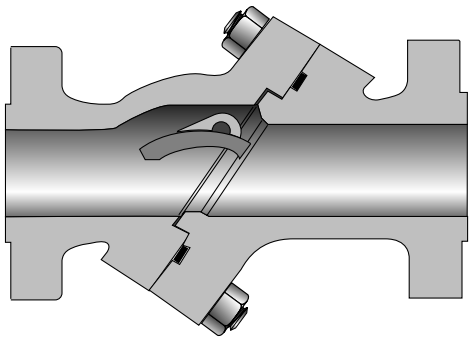
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

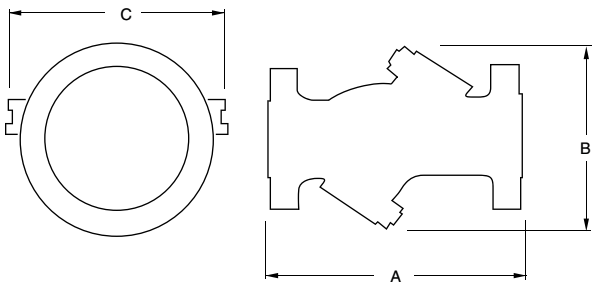
Figure 923
Flanged

Figure 923½
Butt Weld

Size Range:
3 through 18 inches
(80 - 450 mm)

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
2220 psi @ -20°F to 100°F
(153 bar @ -28°C to 37°C)





Industry Standards
All materials comply with ASME B16.34

Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	3 (80)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)
A	15.00 (381)	18.00 (457)	22.00 (558)	24.00 (609)	29.00 (736)	33.00 (838)	38.00 (965)	40.50 (1028)	44.50 (1130)	48.00 (1219)
B	11 (279)	12 (304)	14 (355)	16 (406)	20 (508)	25 (635)	28 (711)	31 (787)	37 (939)	41 (1041)
C	16 (406)	19 (482)	22 (558)	24 (609)	28 (711)	35 (889)	35 (889)	42 (1066)	45 (1143)	50 (1270)
Wt. (923)	177 (80)	273 (123)	438 (198)	604 (273)	1050 (476)	1770 (802)	2415 (1095)	- -	- -	- -
Wt. (923½)	107 (48)	164 (74)	286 (129)	464 (210)	760 (344)	1440 (653)	1610 (730)	2010 (911)	2260 (1025)	2515 (1140)

Tilting Disc Check Valve

Class 1500 • Bolted Cap

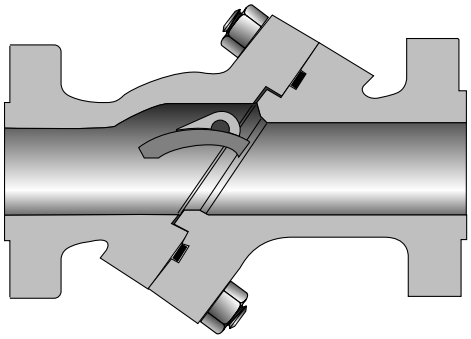


Figure 1523
Flanged

Figure 1523½
Butt Weld

Size Range:
2 through 10 inches
(50 - 250 mm)

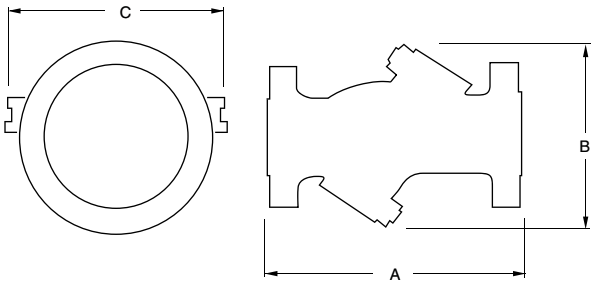
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
3705 psi @ -20°F to 100°F
(256 bar @ -28°C to 37°C)

Material of Construction*

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Stainless Steel spiral wound Graphite
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 2H
Dowel Pins	Carbon Steel

NOTE:
*Standard construction: WCB-Trim 8, other options are available.

Industry Standards
All materials comply with ASME B16.34



Dimensions and Weights
Inches (millimeters) - pounds (kilograms)

Valves	2 (50)	2½ (65)	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)
A	14.50 (368)	16.50 (419)	18.50 (469)	21.50 (546)	27.75 (704)	32.75 (831)	39.00 (990)
B	12 (304)	12 (304)	12 (304)	15 (381)	19 (482)	22 (558)	29 (736)
C	17 (431)	17 (431)	17 (431)	21 (533)	24 (609)	30 (762)	38 (965)
Wt. (1523)	177 (80)	273 (123)	438 (198)	604 (273)	1050 (476)	1770 (802)	2415 (1095)
Wt. (1523½)	107 (48)	164 (74)	286 (129)	464 (210)	760 (344)	1440 (653)	1610 (730)