CRANE

Cast Steel Valves

General Index

Crane Valve also manufactures bronze ball valves, iron wafer and lug butterfly valves, bronze and iron gate globe and check valves, and alloy valves. Brochures and catalogs are available on request.

Figure Number Index

FIGURE NO.	VALVE TYPE	PRESSURE CLASS	CONNECTIONS	SIZE RANGE	PAGE NO.
28 28 1/2	Stop Check Valve	300	Flanged Butt-Weld	3" – 10"	30
30 30 1/2	Stop Check Valve	300	Flanged Butt-Weld	3" – 10"	31
33 33 1/2	Gate Valve	300	Flanged Butt-Weld	2" – 24"	9
47 47 1/2	Gate Valve	150	Flanged Butt-Weld	2" – 24"	8
76 76 1/2	Gate Valve	600	Flanged Butt-Weld	2" – 24"	10
123 123 1/2	Tilting Disc Valve	150	Flanged Butt-Weld	2" – 36"	24
143 143 1/2	Globe Valve	150	Flanged Butt-Weld	2" – 14"	14
147 147 1/2	Swing Check Valve	150	Flanged Butt-Weld	2" – 24"	19
151 151 1/2	Globe Valve	300	Flanged Butt-Weld	2" – 12"	15
159 159 1/2	Swing Check Valve	300	Flanged Butt-Weld	2" – 24"	20
171 171 1/2	Globe Valve	600	Flanged Butt-Weld	2" – 8"	16
175 175 1/2	Swing Check Valve	600	Flanged Butt-Weld	2" – 8"	21
323 323 1/2	Tilting Disc Check	300	Flanged Butt-Weld	2" – 36"	25
623 623 1/2	Tilting Disc Check	600	Flanged Butt-Weld	2" – 30"	26
923 923 1/2	Tilting Disc Check	900	Flanged Butt-Weld	2" – 18"	27
1523 1523 1/2	Tilting Disc Check	1500	Flanged Butt-Weld	2" – 10"	28

How to Specify and Order the Correct Valves

Care should be taken to select the most suitable steel valve for your service(s). Exact specification of each valve should be made to avoid ambiguity when requesting quotations or ordering the product.

Size

Nominal size of the pipeline into which the valve will be placed must be determined. Comprehensive data on flow characteristic and pipe properties are contained in the Engineering Data Catalog.

Valve Material

The following facts should be considered in determining the correct valve material.

- The media to be controlled.
- The temperature of the media.
- The possible extraordinary stresses affecting the valve.
- Safety standards and/or piping codes.

Type of Valve

A few minutes spent in reading some simple valve facts on pages 3 and 4 will prove helpful.

Pressure/Temperature Rating

Please pay careful attention that the PRESSURE/TEMPERATURE RATINGS shown on page 32 in this catalog are in keeping with the requirements of the service.

Valve End Connections

Considerations as to pipeline integrity, future maintenance, corrosion factors, field assembly, weight and safety should be given in determining the method of connecting the valve in the pipeline.

CAUTION: When servicing, disassembling or disposing of valves containing asbestos gaskets or packing, avoid breathing dust or fibers from these parts. Disposal of asbestos and asbestos related products should comply with local, state and federal laws and regulations.

Ordering Information

Designate the valve size and the complete catalog number, including prefix and suffix letters, when applicable, to identify regular cataloged items as described on the following pages.

Any special requirements such as Gear operation, Motor operation, Hydraulic or Pneumatic Cylinder operation, Anti-friction bearing yoke sleeve, By-Pass of drain, etc. must also be specified on purchase orders.

Examples

8" 33 1/2 XU F 9 BP

- BP – Suffix denoting special valve modifications – Page 4
- 9 – Suffix denoting basic valve material – Page 4
- F – Suffix denoting flexible disc
- XU – Suffix denoting trim material – Page 4
- 33 1/2 – Basic catalog number defined on data pages
- 8" – Valve size

NOTE: In keeping with our policy of continuous product improvement, we reserve the right to institute changes in design, material, dimensions, and specifications without notice and without incurring any obligation to make such changes and modifications on the product previously or subsequently sold.

CRANE

Cast Steel Valves

Performance In Any Application

In any fluid handling system, valves are the controlling element: starting or stopping flow, regulating or throttling flow, preventing backflow, or relieving and regulating pressure.

Since Crane valves are used in a variety of applications, the following descriptions may provide a basic guideline in the selection of steel valves.

Gate Valves

Gate valves serve as efficient stop valves with flow in either direction. They are commonly used where a minimum pressure drop is important. Throttling is not recommended because partially open gate valves exhibit flow characteristics not conducive to accurate and consistent flow control. Also, the valves may be damaged by the high velocity across the seats. They function best fully open or fully closed.

Globe Valves

Globe valves are ideal for throttling service. Their flow characteristics permit accurate and repeatable flow control. However, caution must be exercised to avoid extremely close throttling when pressure drop exceeds 20%. This creates excessive noise, vibration and possible damage to valves and piping. When these conditions are anticipated, consult Crane for recommendations.

Swing Check Valves

Swing Check valves prevent reversal of flow through pipe lines. Most Crane swing check valves can be installed in horizontal or vertical, upward flow, piping. They offer low resistance to flow and are particularly suited to low velocity service.

Tilting Disc Check Valves

Tilting Disc Check valves are similar to swing check valves. In most installations, slamming is minimized upon reversal of flow so noise and vibration are reduced.

Stop Check Valves

Stop check valves are essentially the same as globe and angle valves, except there is no mechanical connection between the stem and disc. However, they are not designed for throttling. They are used in steam boiler outlet piping when two or more boilers are connected to a common header. Valves must be installed with pressure under the disc, and when the stem is raised, only boiler pressure can raise the disc, whenever boiler pressure exceeds header pressure. They prevent steam backflow from the header to the boiler.

Crane API 600 Gate Valve Seat Tightness

SIZE (in)	CRANE STANDARD[1]	SEAT LEAKAGE RATE[2] API 598	
		Low Pressure Test[3]	High Pressure Test[4]
2	0	0	0
2.5 – 6	0	24	12
8 – 12	0	40	20
14 – 16	0	56	28
18 – 24	14	56	28

1 Low pressure test.
2 Leakage rates are in bubbles per minute for low pressure test and drops per minute for high pressure test.
3 The low pressure test is 60 to 100 psig.
4 The high pressure test is 110% of the maximum allowable working pressure at 100° F. For Gate Valves, the low pressure test is required. Even though the high pressure test is optional, all Crane valves are capable of passing this test.

Materials of Construction

Steel bolted bonnet valves described in this catalog are typically manufactured of carbon steel. When specified, the valves are available in the alloys shown below which are suitable for steam, water, oil, oil vapor, gas and general services. Please contact factory or customer service for availability and material breakdowns.

Body and Bonnet or Cap Materials

Part No. Suffix	ASTM Classification	Material Classification	Service Conditions
None	A216 WCB	Carbon Steel	For service up to 1000° F where corrosion and oxidation are not a factor. (1) (4) (5)
6	A217 WC6	1 1/4 CR, 1/2 Mo	For service up to 1000° F. (3) (4) (5)
9	A217 WC9	2 1/4 CR, 1 Mo	For service up to 1100° F where good creep strength is required. (3) (4) (5)
5	A217 C5	5% CR, 1/2 Mo	For service up to 1200° F. Best corrosion and oxidation resistance plus high creep strength are required.
12	A217 C12	9% CR, 1 Mo	For service up to 1200° F. Best corrosion and oxidation resistance than other grades.
2	A351 LCC	Low Carbon Steel	For service from –50° F to 650° F. This material must be quenched and tempered to obtain tensile and impact properties needed at subzero temperatures.
3	A351 LC3	3 1/2% Nickel Steel	For service from –150° F to 650° F. A subsequent heat treat is given to obtain tensile and impact properties needed at subzero temperatures.

(1) Upon prolonged exposure to temperatures above 800° F, the carbide phase of carbon steel may be converted to graphite. Permissable, but not recommended for prolonged usage above 800°F.
(2) Valve regularly rated to 1000° F.
(3) Considerations should be given to the possibility of excessive oxidation (scaling) when used above 1050° F.
(4) Product used within the jurisdiction of Section 1 Power Boilers of the ASME Boiler and Pressure Vessel code is subject to the same temperature limitations as specified in that document.
(5) Product used within the jurisdiction of Power Piping, ANSI Code for Pressure Piping B31.1, is subject to the same maximum temperature limitations placed upon the material in paragraph 124.2.

Trim Material

Part No. Suffix	API Trim Number	Nominal Trim	Seating Surfaces	Stem Material	Temperature
X	1	F6 / F6 (1)	13 Cr ASTM A217 (CA15)	13 Cr (410)	1100° F
U	5	HF / HF (2)	Stellite 6	13 Cr (410)	1200° F
A	9	Monel / Monel (4)	Monel	Monel	450° F
L	10	316 / 316 (3)	316 SS	316 SS	850° F
XU	8	F6 / HF (1) (2)	13 Cr ASTM A217 (CA 215) Stellite 6	13 Cr (410)	1100° F
AU	11	Monel / HF (4) (2)	Monel Stellite 6	Monel	450° F
LU	12	316 / HF (3) (2)	316 SS Stellite 6	316 SS	850° F

(1) 13% Chromium AISI Type 410 Stainless Steel.
(2) Hard Facing is weld deposited Cobalt base alloy.
(3) Austenitic Stainless Steel is a Ni-Cr-Mo stainless steel in the AISI Type 316 category.
(4) Ni-Cu Alloy.

Valve Modification Suffix Identification

S.I.	Description	S.I.	Description	S.I.	Description	S.I.	Description	
TD	Drain, Drill, and Tap	ST	Special Trim	SP	Special Paint	OV	(1) Gear	(4) Pneumatic
BP	Bypass	BW	Special Butt-Weld End Prep	LD	Locking Device		(2) Chainwheel	(5) Hydraulic
PG	Special Packing and/or Gasket	RJ	Ring Joint	LR	Lantern Ring		(3) Electric	(6) Other

Installation, Marking, and Identification

When purchasing valves, reference should also be made to MSS 6683 "Guide to the Installation and Use of Valves." Inquires relating specifically to Crane products may be referred to our factory or customer service department.

Marking and identification of Crane steel valves conforms to ANSI B16.34 and MSS-SP-25.

It is important to properly identify valves in service to allow for the ordering of replacement parts or address questions or concerns relating to our products. Body markings and information shown on the identification plate helps to properly identify valves, allowing timely and accurate responses to such inquiries.

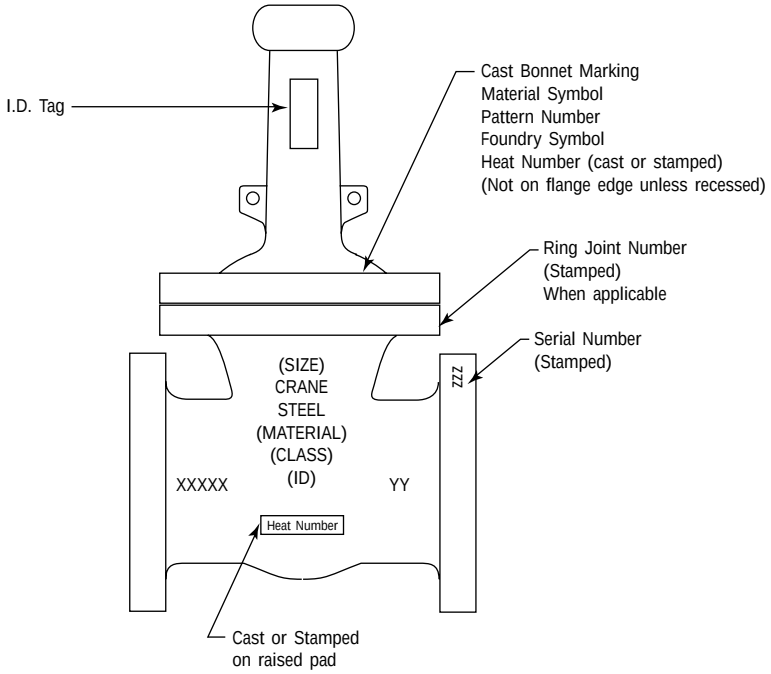
Integrally cast body marking data includes the following information and helps to provide traceability:

- Crane logo
- Pressure class
- Valve size
- "Steel" symbol for the grade of material (i.e. WCB for carbon steel)
- Heat number – on body and bonnet (cast or stamped)

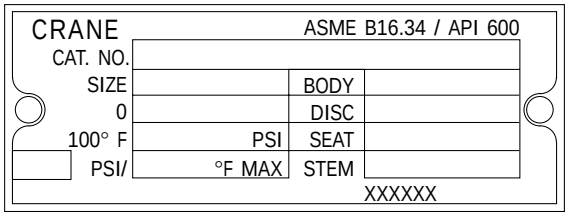
The body markings are supplemented by an identification plate which, depending on valve type and size, is mounted in the most practicable position. Tag location for gate and globe valves is typically on the valve yoke. Check valve tags are typically mounted on the rim cap.

Identification plates bear the following information:

- Catalog number
- Valve size
- Body material
- Disc material
- Stem material
- Seat and trim material
- Fluid recommendation
- Pressure and temperature rating



Product Marking



I.D. Tag Marking Information

General Information • Class 150, 300, and 600 Valves

Features

Flexible Wedge
- Compensates for deformation of body due to pipe stresses.
- Will not stick when valve is closed hot and allowed to cool.

Welded-in Seat Ring
- Seat ring is seal welded to eliminate leak path.

Leakage Across Disc
- Zero bubbles per minute 2"-16"
- Fourteen bubbles per minute 18"-24"

Fugitive Emissions
- Less than 100 ppm with standard requirements.

Standards

These valves comply with the applicable requirements of the following standards:

- API 600
- API 598
- API RP591
- ANSI B16.34
- ANSI B16.25
- ANSI B16.10
- ANSIB16.5
- Underwriter's Laboratories UL 262 (Fire Protection Service) certification is available for valve 2-1/2" through 12", Class 150 only, when specified.

Inspection Policy for Crane Valves

Every Crane cast steel valve is subjected to a 100% pressure test according to API 598 requirements. Manufacturer's material test reports and Inspection and Test Certifications are available upon request. Some of the additional inspections and tests performed are:

- Random Radiograph Inspection of Body and Bonnet Castings to ASME B16.34 Appendix B
- Random Chemical Composition and Mechanical Properties Verification of Fasteners to ASTM A-193/A-194
- Liquid Penetrate Inspection of Seat Rings
- Visual Inspection of Casting to MSS-SP-55
- Receiving, In-Process, and Final Dimensional Inspections to Relevant Valve Standards

Other inspections or tests can be performed or evaluation criteria applied when specified by the customer.

Notes

- Standard material is ASTM A216 Grade WCB.
- Standard trim is XU (13% Cr to hardface) which is suitable for a wide range of applications.
- See Engineering Data section for end flange dimensions and drilling templates.
- Butt weld ends on valves 24" and smaller are bored to match standard pipe unless otherwise specified. See Engineering Data catalog for details.
- See Engineering Data section for locations of by-passes, taps, and drains.

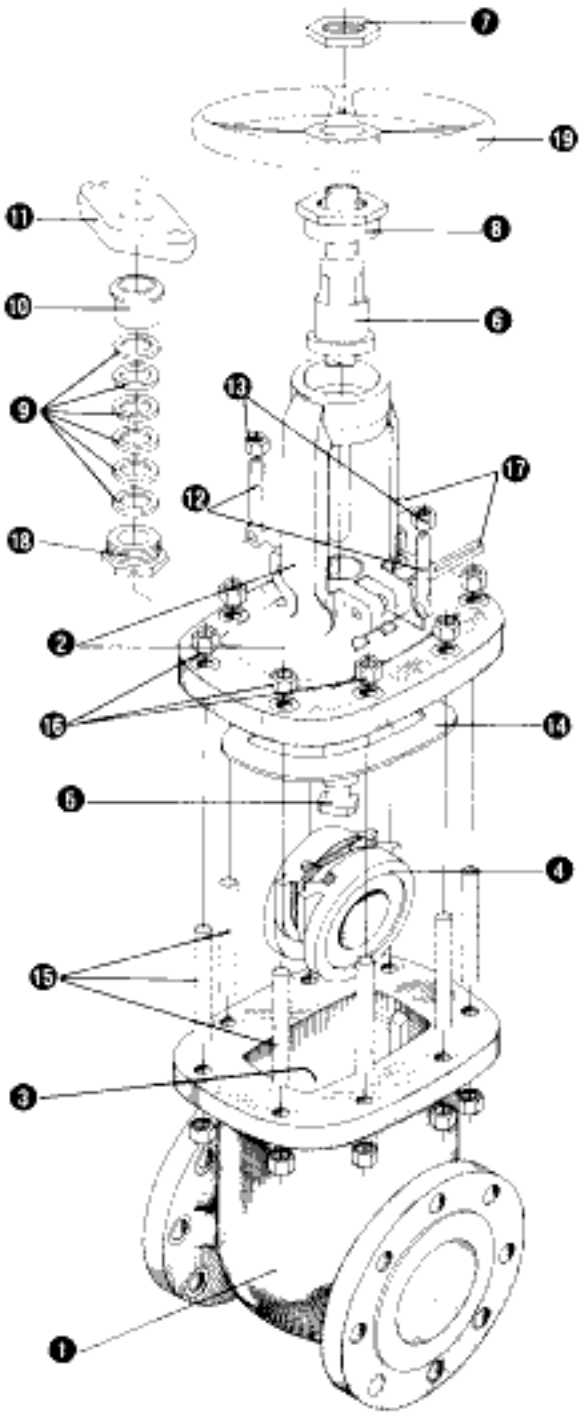
CRANE

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 ANSI B16.5 and ANSI 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. Valves are also furnished with solid wedge discs that have proved successful in millions of applications.
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. **Hydraulic Grease Fitting:** Hydraulic grease fitting provides for lubrication of yoke sleeve bearing surfaces.
17. **Groove-Pin**
18. **Bonnet Bushing**
19. **Handwheel:** Crane gate valves can also be supplied with gear or motor operators.



Cast Steel Gate Valves

CRANE

Class 150 • Outside Screw & Yoke • Flexible Wedge Disc

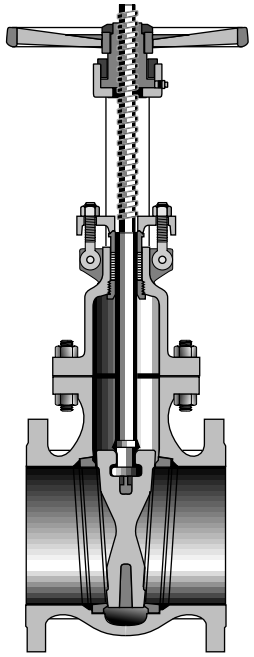


Figure 47
Flanged
Figure 47 1/2
Butt Weld

Size Range:

2 through 24 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F

Material of Construction

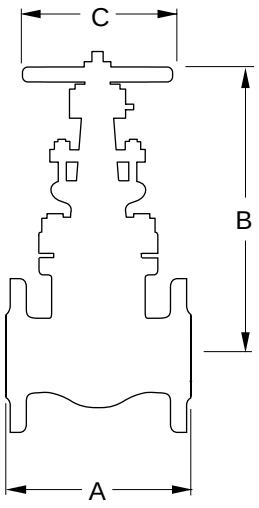
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Soft Iron
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet 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

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Basic Design	API 600
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)			
			A		B	C
	47	47 1/2	47	47 1/2	Valve Open	
2	46	45	7.00	8.50	16.50	8.00
2 1/2	70	60	7.50	9.50	16.50	8.00
3	76	62	8.00	11.12	19.00	9.00
4	110	95	9.00	12.00	23.00	10.00
5	155	140	10.00	15.00	27.88	12.00
6	175	165	10.50	15.88	31.00	12.00
8	310	260	11.50	16.50	39.00	14.00
10	455	410	13.00	18.00	46.75	16.00
12	650	580	14.00	19.75	55.00	18.00
14	860	730	15.00	22.50	60.50	20.00
16	1120	960	16.00	24.00	66.75	20.00
18	1400	1250	17.00	26.00	77.50	23.62
20	2125	1855	18.00	28.00	84.00	23.62
24	3120	2500	20.00	32.00	101.00	28.35



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Class 300 • Outside Screw & Yoke • Flexible Wedge Disc

Material of Construction

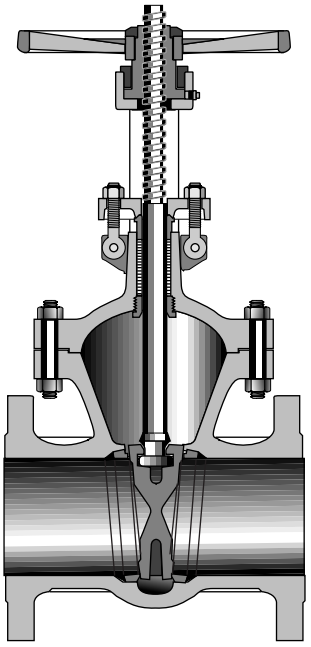
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Spiral Wound
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet 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

Figure 33
Flanged
Figure 33 1/2
Butt Weld

Size Range:

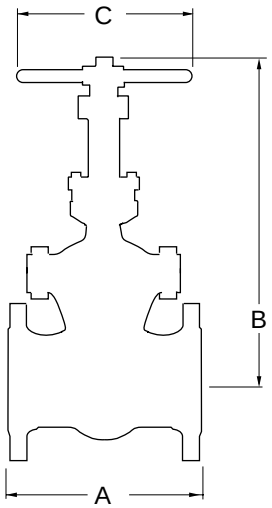
2 through 24 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F



Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Basic Design	API 600
Testing	API 598
Acceptance	API RP591



Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	33	33 1/2	33 & 33 1/2	Valve Open	
2	74	49	8.50	17.50	8.00
2 1/2	80	74	9.50	17.50	8.00
3	108	85	11.12	20.25	9.00
4	165	120	12.00	24.00	10.00
5	235	185	15.00	28.38	12.00
6	320	245	15.88	32.75	14.00
8	500	410	16.50	41.25	16.00
10	760	625	18.00	49.50	18.00
12	1020	890	19.75	57.50	20.00
14	1380	1220	30.00	61.25	20.00
16	1960	1620	33.00	71.50	24.00
18	2450	2000	36.00	78.50	23.62
20	3890	3370	39.00	86.50	28.35
24	6292	4675	45.00	104.00	35.43

Cast Steel Gate Valves

CRANE

Class 600 • Outside Screw & Yoke • Flexible Wedge Disc

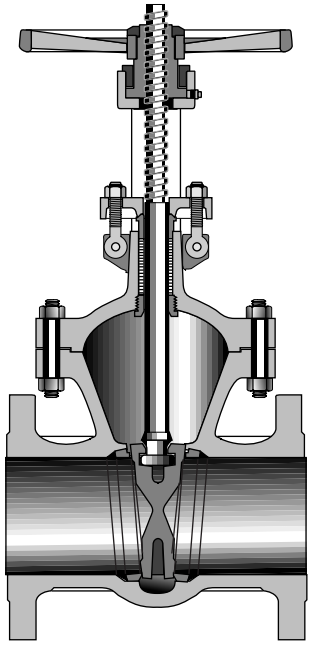


Figure 76
Flanged
Figure 76½
Butt Weld

Size Range:
2 through 12 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F

Material of Construction

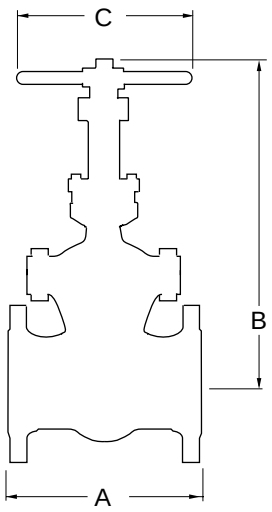
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15 or 13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring Joint
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable or Steel
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	Steel
Pins	Steel
Bonnet 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

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Basic Design	API 600
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	76	76½	76 & 76½	Valve Open	
2	84	72	11.50	18.00	10.00
2½	130	112	13.00	20.50	10.00
3	160	140	14.00	22.00	12.00
4	300	270	17.00	26.50	14.00
6	640	520	22.00	36.00	18.00
8	1080	940	26.00	39.50	20.00
10	1550	1250	31.00	47.00	25.00
12	2100	1800	33.00	57.50	28.00



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Specialty Steel Valves

NACE Trim Steel Valves

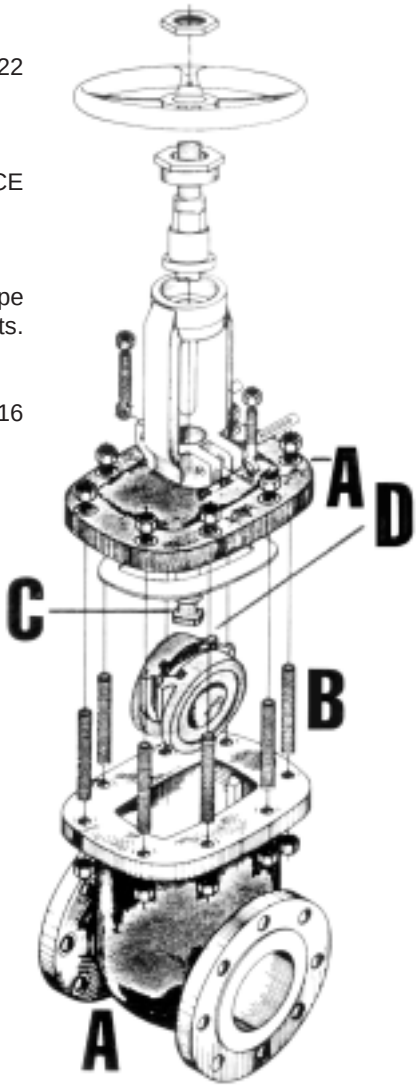
For servicing sour environments of Hydrogen Sulfide (H2S) bearing hydrocarbons, Crane offers NACE valves made of component materials specially heat-treated and hardness-controlled in compliance with NACE standard MR0175. Typical NACE material configurations are shown below for Crane cast steel gate valves.

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

General Information • Class 150, 300, and 600 Valves

Features

Welded-in Seat Ring
• Seat ring is seal welded to eliminate leak path.

Fugitive Emissions
• Less than 100 ppm with standard requiremnets.

Basic Standards

These valves comply with the applicable requirements of the following standards:

• API 598
• API RP591
• ANSI B16.34
• ANSI B16.25
• ANSI B16.10
• ANSIB16.5

Notes

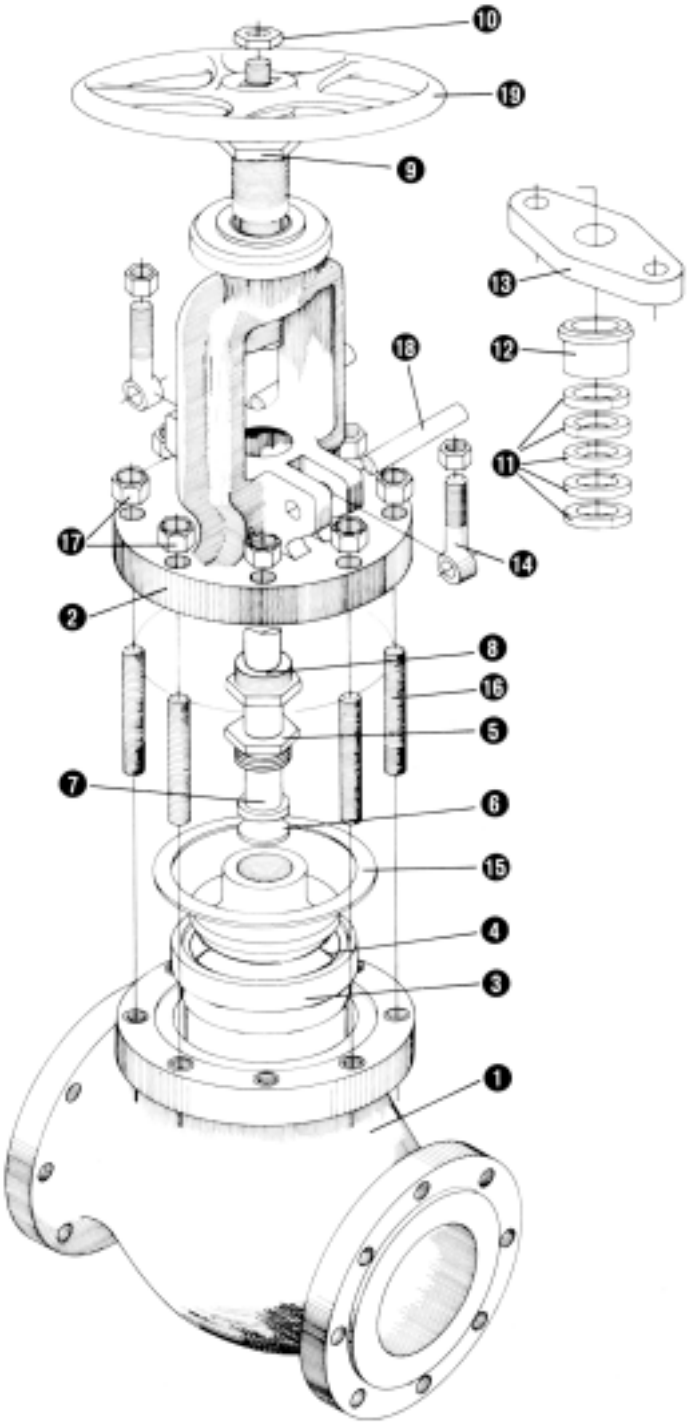
• Standard material is ASTM A216 Grade WCB.
• Standard trim is XU (13% CR to hardface) which is suitable for a wide range of applications.
• See “Technical Data” section for end flange dimensions and drilling templates.
• Butt weld ends on valves 24" and smaller are bored to match standard pipe unless otherwise specified. See “Engineering Data” catalog for details.
• See “Technical Data” section for locations of bypasses, taps, and drains.

Cast Steel Globe Valves

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 ANSI 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**



Cast Steel Globe Valves

CRANE

Class 150 • Outside Screw & Yoke • Bolted Bonnet

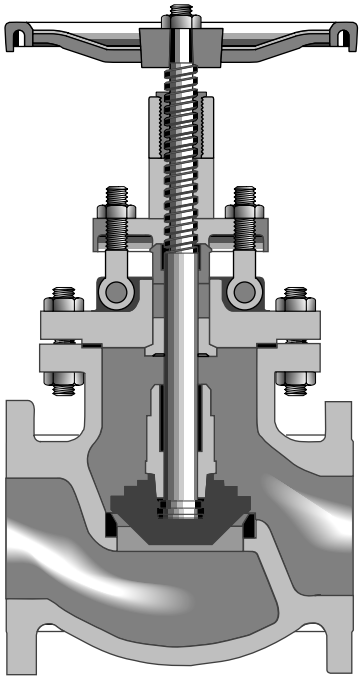


Figure 143
Flanged
Figure 143 1/2
Butt Weld

Size Range:
2 through 14 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F

Material of Construction

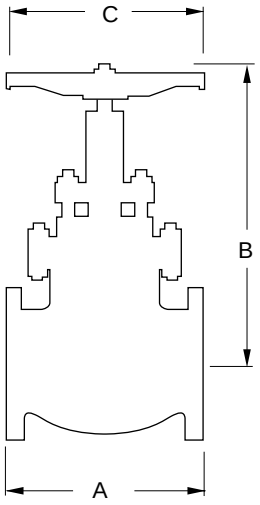
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Soft Iron
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	–
Bonnet Studs	A193 Gr.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

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	143	143 1/2	143 & 143 1/2	Valve Open	
2	53	43	8.00	15.00	8.00
2 1/2	70	60	8.50	17.12	8.00
3	90	73	9.50	18.50	10.00
4	143	112	11.50	21.00	12.00
5	199	165	14.00	23.00	12.00
6	246	195	16.00	25.50	16.00
8	392	330	19.50	30.00	16.00
10	605	480	24.50	34.00	20.00
12	900	820	27.50	39.50	20.00
14	1000	880	31.00	41.38	24.00



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UPDATED 0303

Class 300 • Outside Screw & Yoke • Bolted Bonnet

Material of Construction

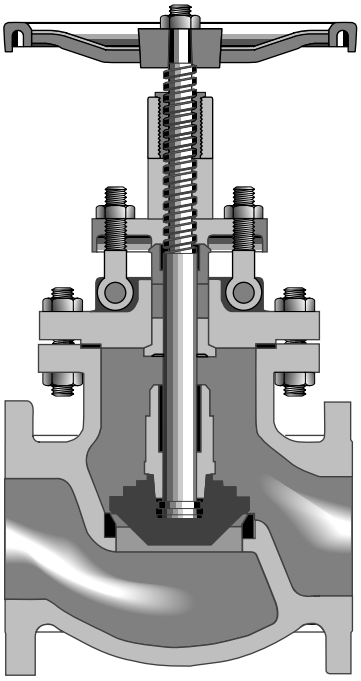
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Spiral Wound
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	–
Bonnet Studs	A193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

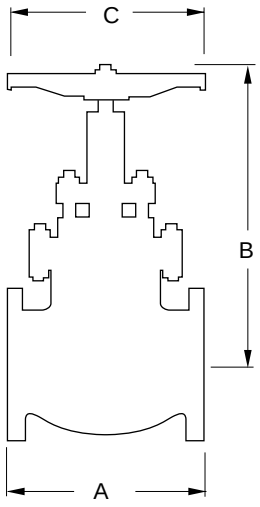
Figure 151
Flanged

Figure 151 1/2
Butt Weld

Size Range:
2 through 12 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F





Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	151	151 1/2	151 & 151 1/2	Valve Open	
2	75	48	10.50	16.75	8.00
2 1/2	99	73	11.50	19.00	10.00
3	132	97	12.50	21.00	10.00
4	209	140	14.00	24.00	14.00
5	290	240	15.75	27.50	14.00
6	440	280	17.50	31.00	18.00
8	693	460	22.00	34.25	24.00
10	1008	620	24.50	37.00	24.00
12	1100	900	28.00	50.00	24.00

Cast Steel Globe Valves

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Class 600 • Outside Screw & Yoke • Bolted Bonnet

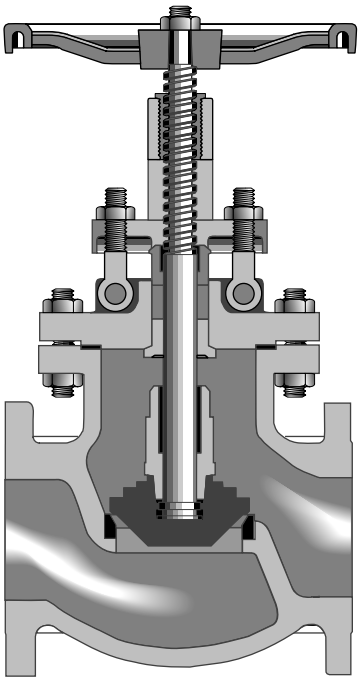


Figure 171
Flanged
Figure 171½
Butt Weld

Size Range:
2 through 8 inches

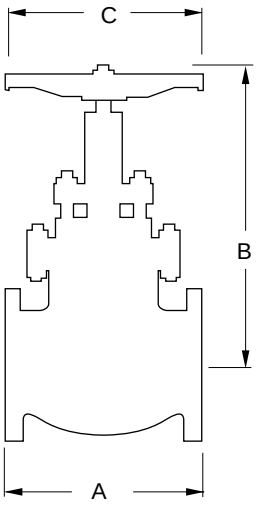
Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F

Material of Construction

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13% CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring 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	SS

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591



Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	171	171½	171 & 171½	Valve Open	
2	88	79	11.50	18.75	10.00
2½	126	100	13.00	20.25	10.00
3	160	135	14.00	23.00	14.00
4	270	215	17.00	26.50	18.00
6	550	490	22.00	27.00	20.00
8	1000	790	26.00	28.50	22.00

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Cast Steel Check Valves

General Information • Class 150, 300, and 600 Valves

Features

Disc Type

- For class 600 valves, a ring joint bonnet gasket assures positive seal against leakage and accurate alignment of moving parts

Welded-in Seat Ring

- Seat ring is seal welded to eliminate leak path.

Basic Standards

These valves comply with the applicable requirements of the following standards:

- API 598
- API RP591
- ANSI B16.34
- ANSI B16.25
- ANSI B16.10
- ANSIB16.5

Notes

- Standard material is ASTM A216 Grade WCB.
- Standard trim is XU (13% CR to hardface) which is suitable for a wide range of applications.
- See “Technical Data” section for end flange dimensions and drilling templates.
- Butt weld ends on valves 24" and smaller are bored to match standard pipe unless otherwise specified. See “Engineering Data” catalog for details.
- See “Technical Data” section for locations of bypasses, taps, and drains.

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:

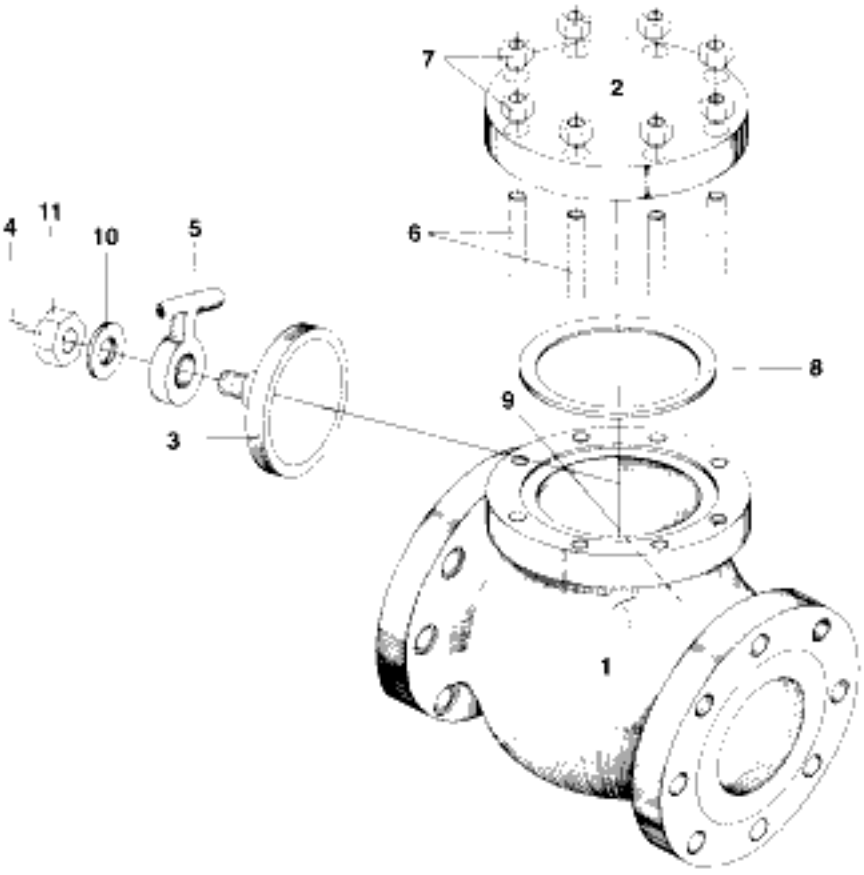
$$v = 60\sqrt{\bar{v}}$$

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. The regularly furnished “X” or “XU” trim is therefore suitable for all services that require U trim at temperatures to 1100° F. “A” and “L” or “AU” and “LU” trims are also available when specified.

Crane cast steel swing check valves can be furnished with outside lever and adjustable weight 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 inlet velocities.

Swing 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.



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**
5. **Hinge**
6. **Hinge Pin Plug**
7. **Cap Studs**
8. **Cap Stud Nuts**
9. **Cap Gasket**
10. **Body Seat Ring** (welded in)
11. **Disc Washer**
12. **Hinge Pin**
13. **Disc Nut**

Class 150 • Bolted Cap

Material of Construction

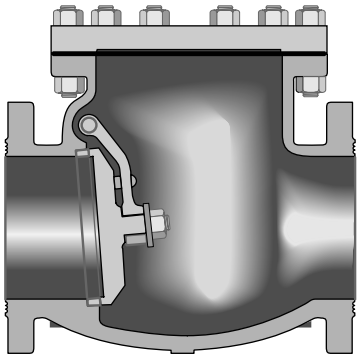
Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Soft Iron
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

Figure 147
Flanged

Figure 147 1/2
Butt Weld

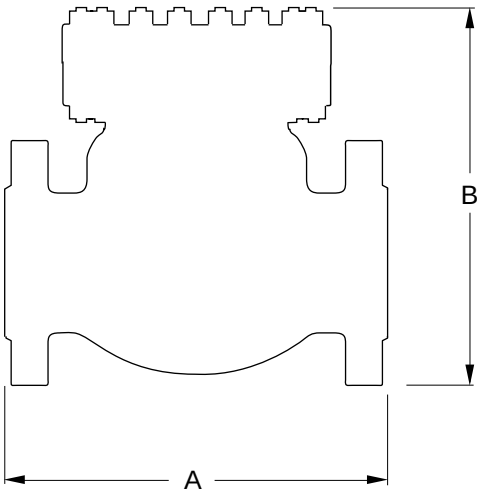
Size Range:
2 through 24 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F



Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591



Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)	
			A	B
	147	147 1/2	147 & 147 1/2	
2	33	26	8.00	6.75
2 1/2	57	37	8.50	7.12
3	59	40	9.50	7.38
4	93	71	11.50	8.50
5	152	126	13.00	9.50
6	165	132	14.00	10.25
8	275	235	19.50	11.88
10	440	385	24.50	13.88
12	680	570	27.50	15.75
14	950	810	31.00	17.75
16	1225	1065	34.00	19.00
18	1700	1500	38.50	21.25
20	1850	1600	38.50	23.58
24	2900	2550	51.00	26.75

Figures 159 159½ Cast Steel Swing Check Valve

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Class 300 • Bolted Cap

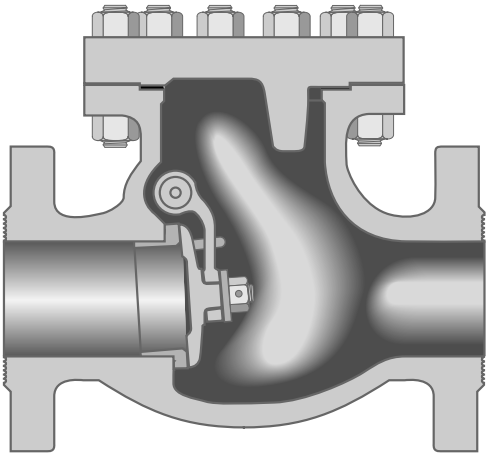


Figure 159
Flanged

Figure 159½
Butt Weld

Size Range:
2 through 24 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F

Material of Construction

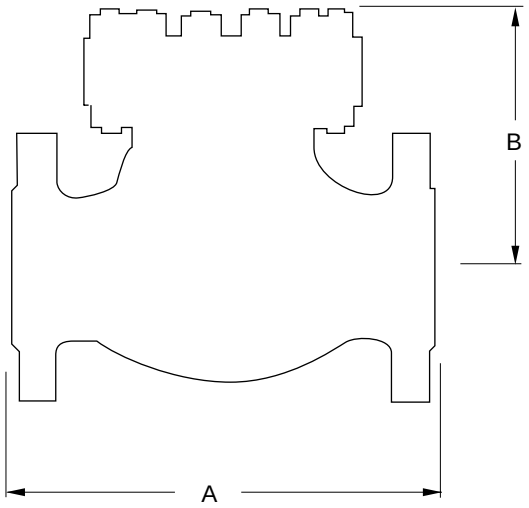
Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Spiral Wound
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)	
			A	B
	159	159½	159 & 159½	
2	46	33	10.50	6.75
2½	66	49	11.50	7.38
3	86	66	12.50	8.50
4	154	97	14.00	9.25
5	255	203	15.75	10.62
6	276	216	17.50	11.88
8	420	330	21.00	13.38
10	640	500	24.50	13.88
12	1000	830	28.00	16.62
14	1550	1100	33.00	18.88
16	1700	1400	34.00	20.50
18	2200	1900	38.50	23.62
20	2800	2425	40.00	26.38
24	3650	3100	53.00	29.62



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Class 600 • Bolted Cap

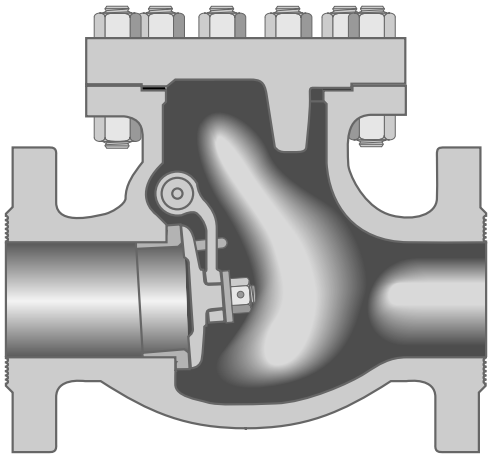
Material of Construction

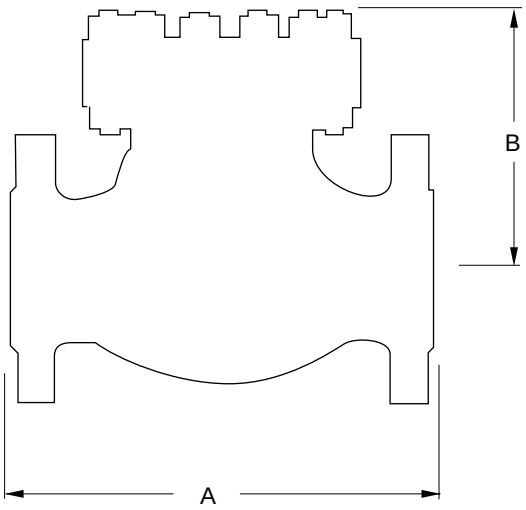
Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13% CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Ring Joint
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

Figure 175
Flanged
Figure 175 1/2
Butt Weld

Size Range:
2 through 12 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F





Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)	
	175	175 1/2	A	B
2	62	44	11.50	6.88
2 1/2	84	66	13.00	7.88
3	115	88	14.00	9.12
4	192	145	17.00	11.62
6	495	300	22.00	14.25
8	780	620	26.00	15.75
10	1400	1175	31.00	18.12
12	1750	1500	33.00	20.50

Cast Steel Tilting Disc Check Valve

CRANE

General Information • Class 150, 300, and 600 Valves

Features

- Reduced maintenance is assured because the disc is the only moving part and is designed to minimize flutter in the closed position, thus reducing wear on the pivot pin, disc, and seat.
- Loss of head is minimized by the balanced disc and its “aerofoil” design. Streamlined body without pockets contributes to straight-through flow.
- Short distance of travel, combined with a balanced disc allows rapid closure while minimizing slamming.
- Drop tight seating is accomplished over the full pressure range because a slight clearance at the pivot pin assures complete seating between the disc ring and body ring.
- Pivot pins are constructed of stainless steel.

Standards

These valves comply with the applicable requirements of the following standards:

- ANSI B16.34
- ANSI B16.10
- ANSIB16.5

Notes

- Valves under 4" are typically supplied with “X” trim.
- Valves 4" and larger are supplied with “XU” trim.
- Butt weld ends on valves 24" and smaller are bored to match standard pipe unless otherwise specified. For larger valves, diameter (I.D. of pipe) of bore must be specified.

Cast Steel Tilting Disc Check Valve

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:

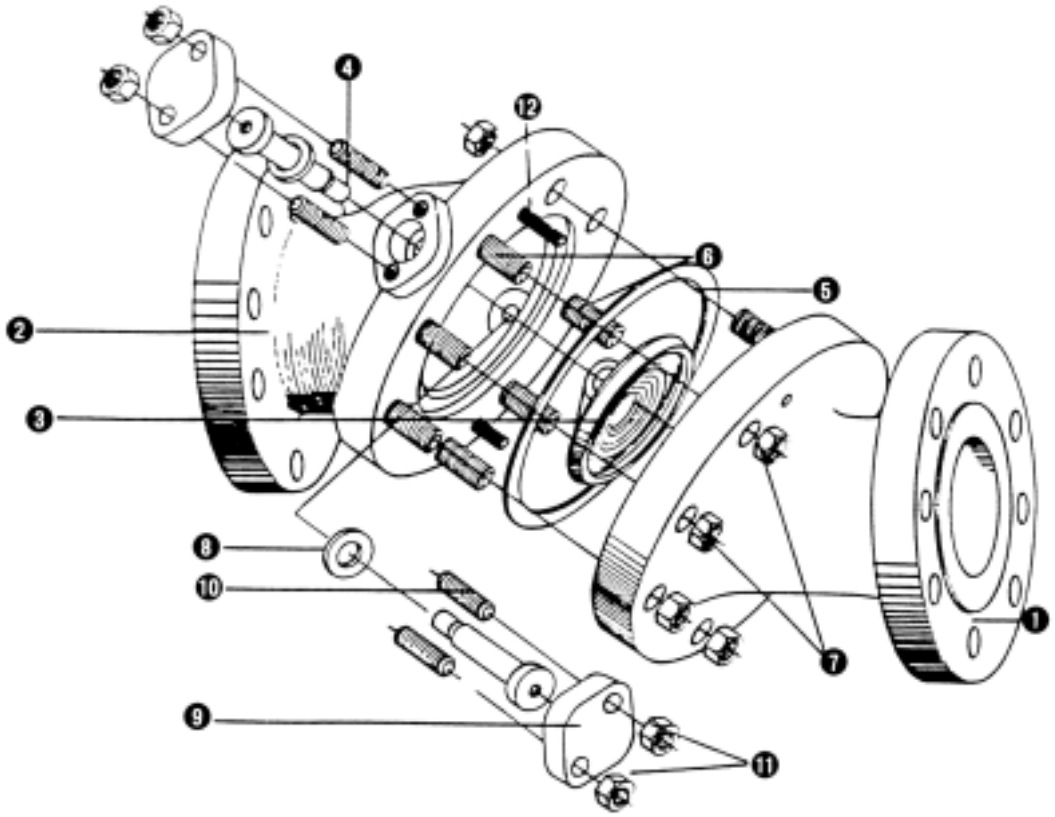
$$v = 80\sqrt{\overline{v}}$$

The value for v is equal to flow in feet per second and where $\overline{v}$ 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" 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" 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

CRANE

Class 150 • Bolted Cap

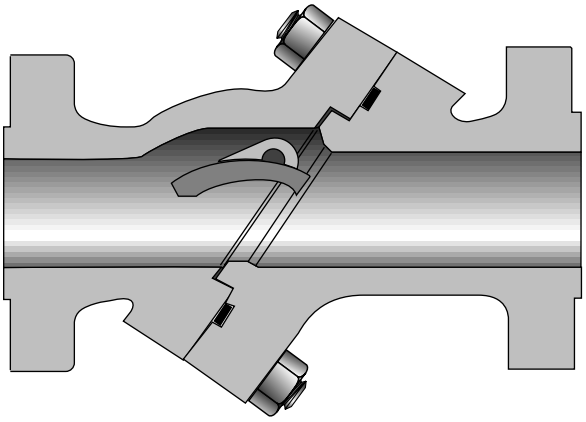


Figure 123
Flanged

Figure 123 1/2
Butt Weld

Size Range:
2 through 36 inches

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F

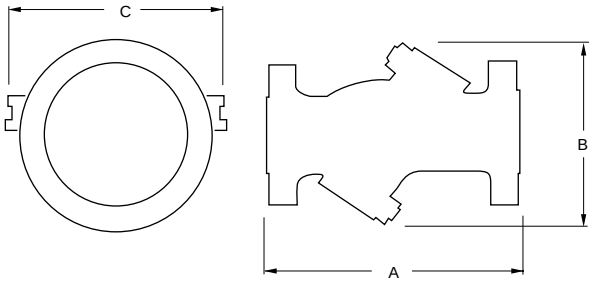
Material of Construction

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
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

Industry Standards
All materials comply with ANSI B16.34

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)			
	123	123 1/2	A	B	C	D
2	38	22	8.00	7.31	–	7.94
2 1/2	51	38	8.50	8.56	–	9.31
3	59	42	9.50	8.56	–	9.31
4	102	75	11.50	9.88	13.25	–
5	139	108	13.00	11.25	15.62	–
8	293	240	19.50	15.88	20.75	–
10	488	400	24.50	18.75	25.00	–
12	690	570	27.50	21.38	27.75	–
14	823	690	31.00	22.44	28.50	–
16	1070	885	30.00	24.94	34.00	–
18	1435	1213	33.00	27.75	35.75	–
20	1825	1760	32.50	30.62	38.88	–
24	2887	2265	38.00	35.82	44.62	–
30	4790	4025	49.50	43.50	53.75	–
36	6795	5755	59.50	50.00	60.25	–



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Class 300 • Bolted Cap

Material of Construction

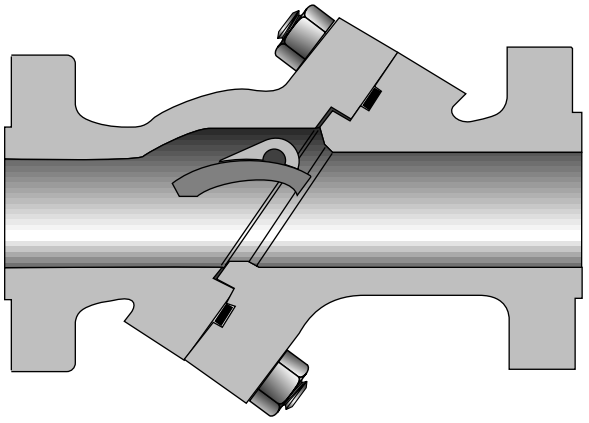
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194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

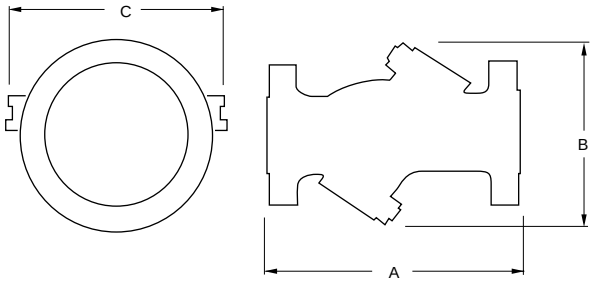
Figure 323
Flanged

Figure 323 1/2
Butt Weld

Size Range:
2 through 36 inches

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F





Industry Standards
All materials comply with ANSI B16.34

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)			
	323	323 1/2	A	B	C	D
2	57	38	10.50	8.06	–	8.50
2 1/2	85	58	11.50	9.50	–	9.88
3	90	60	12.50	9.50	–	9.88
4	167	106	14.00	10.75	14.25	–
5	215	166	15.75	12.50	16.38	–
8	457	338	21.00	17.00	22.00	–
10	670	520	24.50	20.25	25.12	–
12	1030	835	28.00	24.00	29.75	–
14	1245	1060	30.00	24.88	30.25	–
16	1695	1270	33.00	27.81	36.00	–
18	2180	1685	36.00	30.75	39.50	–
20	2648	1850	39.00	32.50	40.75	–
24	4070	2790	45.00	37.50	45.25	–
30	6200	4652	54.00	44.50	53.75	–
36	11853	10000	60.00	56.38	68.00	–

Tilting Disc Check Valve

CRANE

Class 600 • Bolted Cap

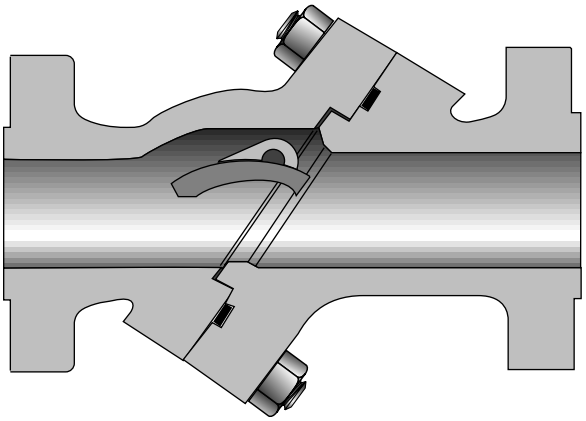


Figure 623
Flanged
Figure 623 1/2
Butt Weld

Size Range:
2 through 30 inches

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F

Material of Construction

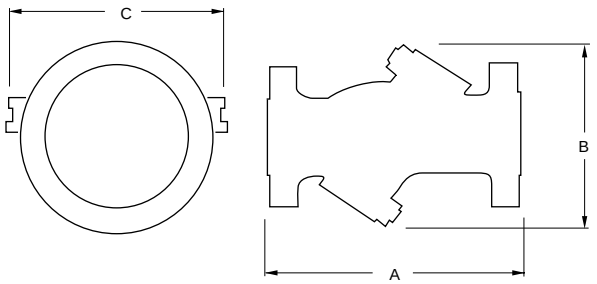
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194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

Industry Standards

All materials comply with ANSI B16.34

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)			
	623	623 1/2	A	B	C	D
2	68	60	11.50	8.38	–	8.50
2 1/2	110	70	13.00	10.00	–	10.25
3	115	85	14.00	10.00	–	10.25
4	222	164	17.00	12.88	16.00	–
5	327	267	20.00	14.50	19.25	–
6	432	295	22.00	16.00	20.25	–
8	725	435	26.00	19.12	23.50	–
10	1035	820	31.00	22.12	27.50	–
12	1470	1055	33.00	25.82	31.25	–
14	1830	1335	35.00	27.38	33.12	–
16	2550	1965	39.00	29.75	36.12	–
18	3570	2010	43.00	34.25	42.75	–
20	4805	4545	47.00	37.50	45.88	–
24	7190	5850	55.00	43.75	53.25	–
30	6925	7715	59.00	48.62	60.00	–



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Class 900 • Bolted Cap

Material of Construction

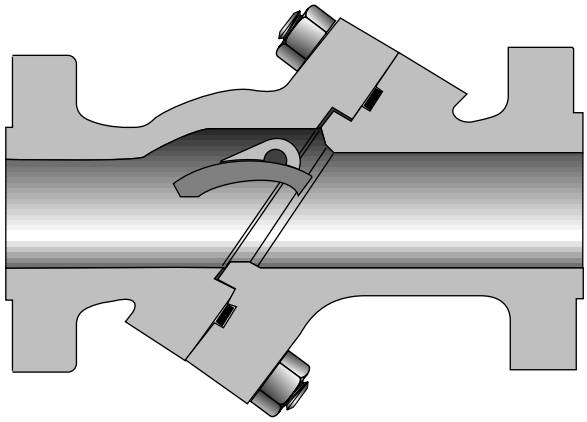
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194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

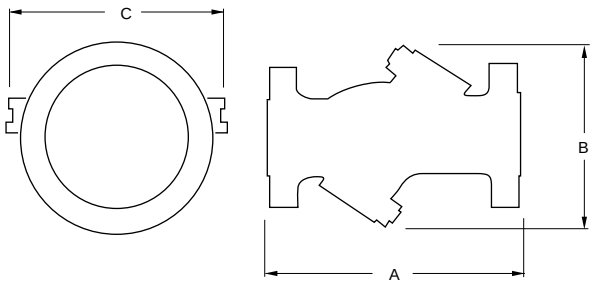
Figure 923
Flanged

Figure 923 1/2
Butt Weld

Size Range:
2 through 18 inches

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
2220 psi @ -20°F to 100°F





Industry Standards
All materials comply with ANSI B16.34

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	923	923 1/2	A	B	C
3	177	107	15.00	11.00	16.00
4	273	164	18.00	12.25	18.50
5	438	286	22.00	14.38	22.25
6	604	464	24.00	16.38	23.75
8	1050	760	29.00	20.00	28.25
10	1770	1440	33.00	24.50	34.81
12	2415	1610	38.00	27.56	34.62
14	–	2010	40.50	30.88	42.12
16	–	2260	44.50	36.50	45.00
18	–	2515	48.00	41.00	50.25

Class 1500 • Bolted Cap

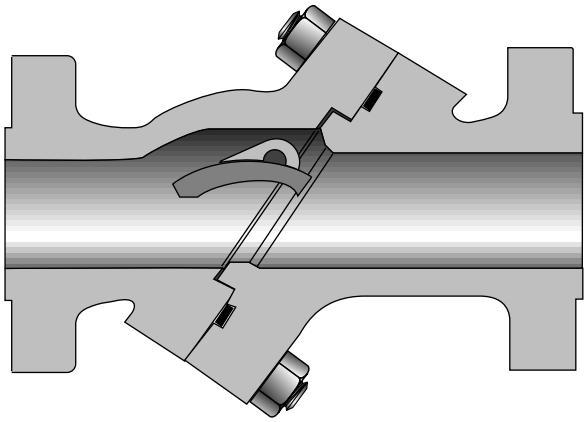


Figure 1523
Flanged

Figure 1523 1/2
Butt Weld

Size Range:
2 through 10 inches

Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
3705 psi @ -20°F to 100°F

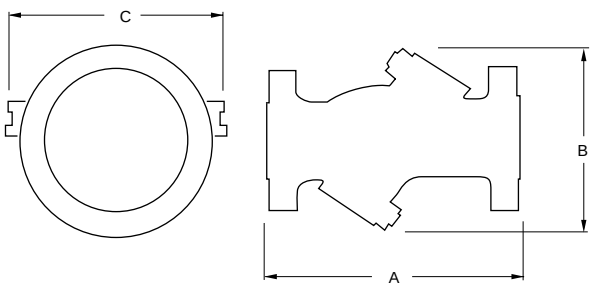
Material of Construction

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13% CR Overlay
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
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

Industry Standards
All materials comply with ANSI B16.34

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	1523	1523 1/2	A	B	C
2	178	155	14.50	12.25	17.12
2 1/2	220	165	16.50	12.25	17.12
3	225	180	18.50	12.25	17.12
4	430	270	21.50	14.75	21.25
6	960	800	27.75	18.50	23.75
8	1700	1220	32.75	22.25	30.25
10	2350	1875	39.00	28.94	38.25



Cast Steel Stop Check Valve

Stop Check Valve Information

Stop Check Valves are as essential to safe operation of a boiler plant as safety valves or other safety devices attached to the boiler. The valves are intended to perform four important functions in boiler steam piping.

First: to act as an automatic non-return valve by preventing a backflow of steam from the main steam header to the boiler.

Second: to assist in cutting out a boiler, when ceasing to fire. In this case, the disc automatically closes and prevents header pressure from entering the boiler.

Third: To assist in bringing a boiler into service after a shutdown. This operation requires considerable care when performed manually, but is accomplished automatically by a stop check valve, without pressure fluctuations or disturbance of the water level.

Fourth: To act as a “safety first” valve by preventing backflow of steam from the header or for shutdown for inspection or repairs, should an attendant accidently open the valve.

When more than one boiler is connected to the main steam header, a stop check valve should be installed in the pipeline between each boiler and the header.

The valve should always be placed so that the pressure in the boiler is under the disc. Straightway valves may be used in horizontal or vertical lines for upward flow. Angle valves may be used for upward horizontal or horizontal downward flow.

Notes

Cylindrical-Shaped Disc is the only moving part. It is especially designed to produce maximum lift at minimum velocities. There are no wing guides to cause “spinning” with resultant rapid wear.

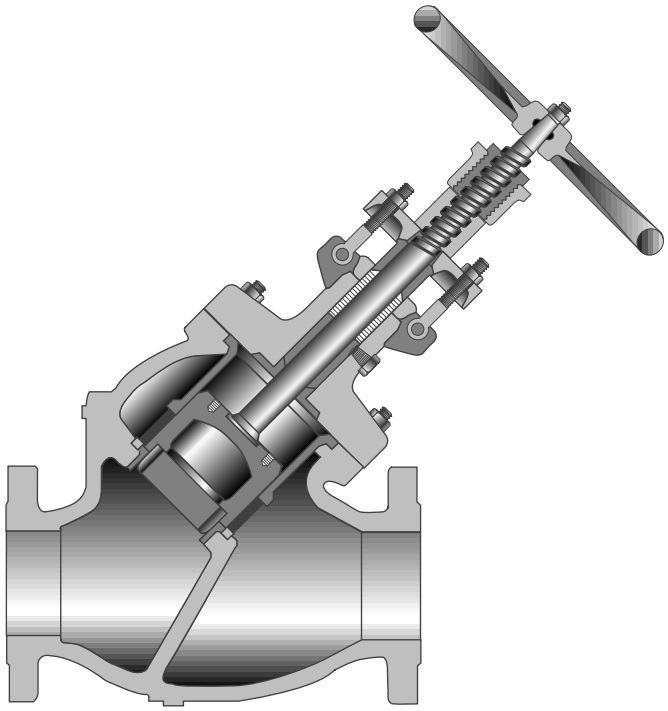
Long Throttling Lip on the disc retards flow when seating position is approached. Disc chattering is prevented, and wiredrawing of seating surfaces is reduced.

Removable Liner guides the disc throughout the full travel. Being entirely independent of the body, it is not subject to distortion by expansion strains.

Piston Ring adds to dashpot's ability to avoid rapid disc movement and where pulsations are extremely severe, two piston rings can be installed.

Easy Regrinding Tap Bosses on top of the disc permit inserting nipples or eye bolts to facilitate quick removal of the disc for grinding.

Large Port Areas in the liner produce only a minimum of pressure drop through the valve and assure unrestricted movement of the disc.



Stop Check Valve

CRANE

Class 300 • Outside Screw & Yoke • Bolted Bonnet

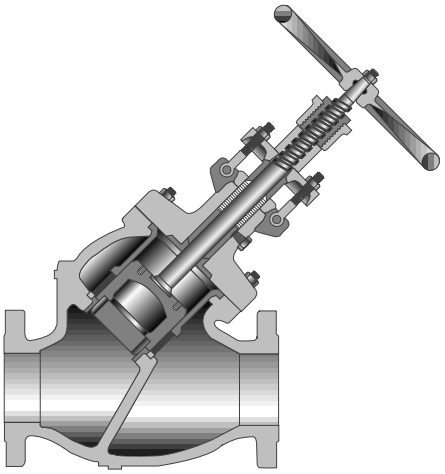


Figure 28
Flanged

Figure 28½
Butt Weld

Size Range:
3 through 10 inches

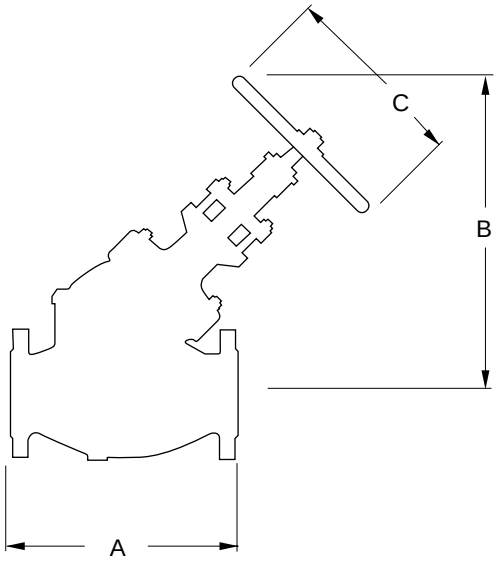
Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F

Notes

- Butt weld ends on valves 10" and smaller are bored to match standard pipe unless otherwise specified. For larger valves, diameter (I.D. of pipe) of bore must be specified
- Sizes 6" and larger (Class 600) and sizes 8" and 10", (Class 300) are equipped with a hammer-blow handwheel.

Material of Construction

Description	Material
Body	ASTM A216 WCB
Bonnet	ASTM A216 WCB
Disc	Hardfaced
Stem	13% Chrome
Body Gasket	Soft Steel
Body Studs	ASTM A194 B7
Body Nuts	ASTM A194 2H
Eyebolts	Carbon Steel
Groove Pins	Carbon Steel
Liner	Carbon Steel
Seat	13% Chrome
Gland	13% Chrome
Gland Flange	Carbon Steel
Handwheel	Ductile Iron
Yokesleeve	Bronze



Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	28	28½	A	B	C
3	140	125	14.75	21.50	10.00
4	260	225	17.00	26.50	14.00
6	430	395	21.50	33.50	18.00
8	770	755	26.00	40.50	20.00
10	1320	1265	30.00	47.50	30.00

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Stop Check Valve

Figures 30 30 1/2

Class 300 • Outside Screw & Yoke • Bolted Bonnet

Material of Construction

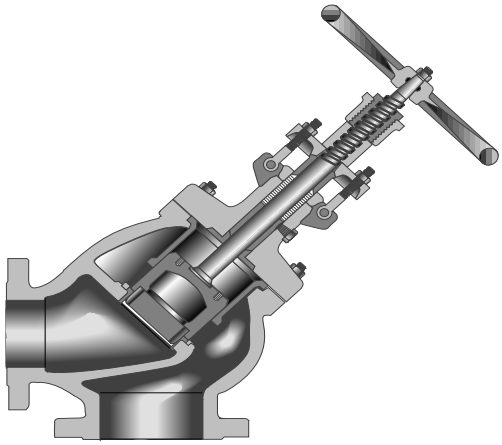
Description	Material
Body	ASTM A216 WCB
Bonnet	ASTM A216 WCB
Disc	Hardfaced
Stem	13% Chrome
Body Gasket	Soft Steel
Body Studs	ASTM A194 B7
Body Nuts	ASTM A194 2H
Eyebolts	Carbon Steel
Groove Pins	Carbon Steel
Liner	Carbon Steel
Seat	13% Chrome
Gland	13% Chrome
Gland Flange	Carbon Steel
Handwheel	Ductile Iron
Yokesleeve	Bronze

Figure 30
Flanged

Figure 30 1/2
Butt Weld

Size Range:
3 through 10 inches

Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F

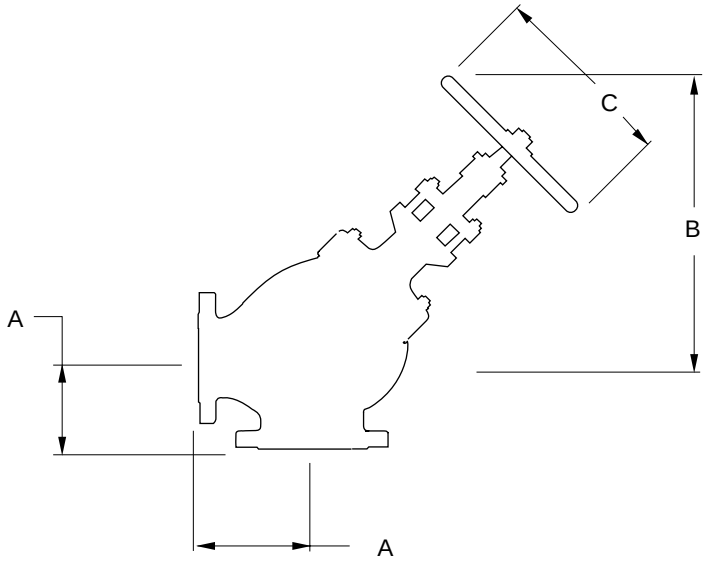


Notes

Butt weld ends on valves 10" and smaller are bored to match standard pipe unless otherwise specified. For larger valves, diameter (I.D. of pipe) of bore must be specified.

Industry Standards

Steel Valves	ANSI B16.34
Face-to-Face/End-to-End	ANSI B16.10
Flange Dimensions	ANSI B16.5
Weld End	ANSI B16.25
Testing	API 598



Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	30	30 1/2	A	B	C
3	120	90	6.25	16.50	10.00
4	200	160	7.00	21.00	14.00
6	370	320	8.75	26.50	18.00
8	680	570	10.50	32.00	20.00
10	1120	970	12.25	38.00	30.00

Technical Data

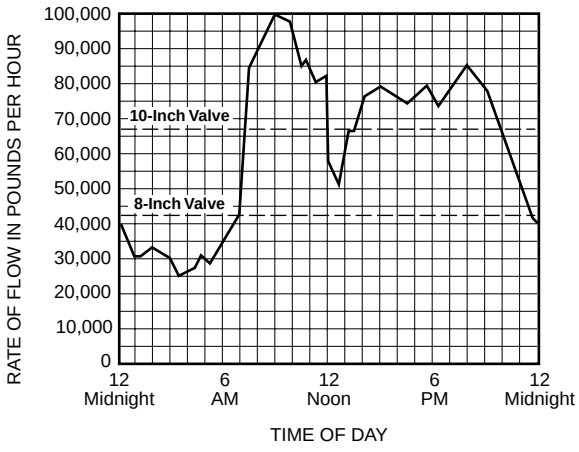
Selecting the Proper Size – Determining Pressure Drop

Since stop-check valves have a floating disc member, it is important the valve be sized to provide full disc lift under flow conditions prevailing during the major portion of the service life. If the valve is too large, the disc will float in a partially open position and may cause fluttering of the disc and rapid wear. Conversely, if the valve is too small, pressure drop will be excessive.
The chart on the opposite page is a graphic representation of flow data determined by test. Its use offers a simple method of determining the best size of stop-check valve, as well as the pressure drop under varying conditions of flow, without any computation.

How to Use the Chart Shown on the Opposite Page

Given: Steam pressure-Temperature...300 psig 750°F
Flow Rate...Typical Daily Demand Curve

Typical Daily Load-Demand Curve



Find: Valve Catalog No. and the best size for above installation.

Solution: Reference to the pressure-temperature ratings on page 29 indicates a Class 300 valve will be required. Therefore, the following valves may be used:

Globe...No. 28 XU, Flanged or No. $28^1/_2$ XU, Butt-Welding
Angle...No. 30 XU, Flanged or No. $30^1/_2$ XU, Butt-Welding

1. Enter the Temperature chart at 750°F. Move vertically upward to the curved line for 300 psi, then horizontally to the right to establish a point on the specific volume scale. From this point, draw a line through the flow rate being investigated (100,000 Lb/H) and establish a point on Index 1.

2. From that point, draw another line through the valve size, for example the 8-inch size, and establish a point on Index 2. Now move horizontally to the diagonal pressure drop line on the right side. Where these lines intersect, the pressure drop is 9 psi for the 8-inch, Class 300 globe valve and 10 psi for the 8-inch Class 300 angle valve.

Chart solutions resulting in a point on Index 2 that falls below the Line A-A for Class 300 valves or below Line B-B for class 600 valves indicate the disc will not be fully lifted under the flow conditions used. Operation under such conditions is not recommended but, at times, must be tolerated for short periods during the low loads.

3. Enter the chart where Line A-A intersects Index 2 for Class 300 valves or below the Line B-B for Class 600 valves. Move diagonally upward through the size being investigated (8-inch) and establish a second point on Index 1. From this point, extend a line to the specific volume established in Step 1 and at its intersection with the flow rate line, read 42,000 Lb/H as the minimum flow rate at which the disc will be in the fully lifted position. The pressure drop at this flow rate is 1.9 psi for globe and 2.1 psi for angle valves.

4. Repeat Steps 2 and 3 for other possible valve sizes, tabulate results, and make size selection on basis of pressure drop and duration of partial disc lift considerations.

Valve Size	Press drop @ Max.Min. Flow rate (100,000 #/Hr.), psi		Flow Rate for Wide open valve
(Inches)	Globe	Angle	#/Hr.
6	24.0	26.0	24,000
8	9.0	10.0	42,000
10	3.8	4.2	68,000
12	2.1	2.3	95,000

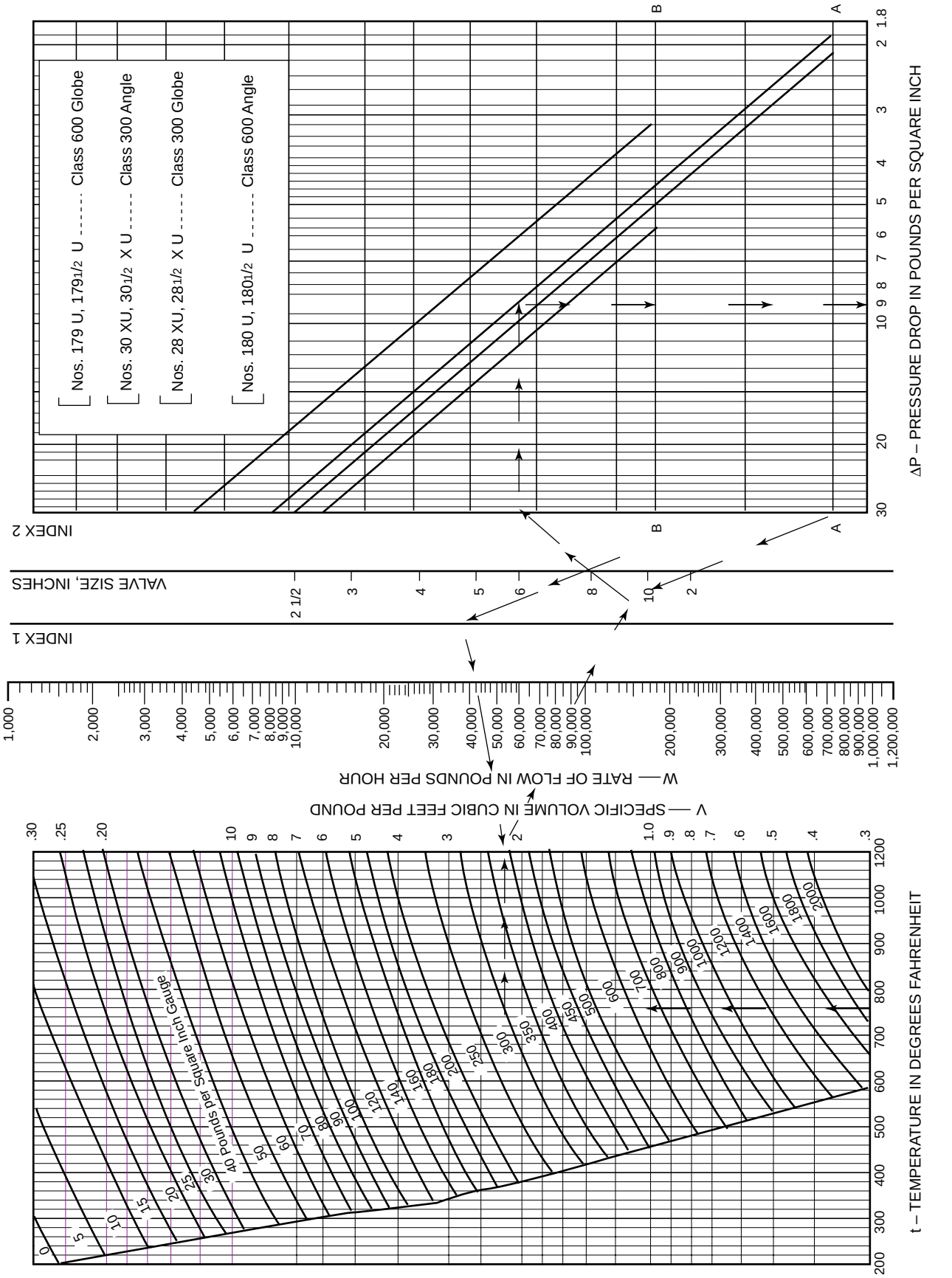
Dotted lines on Demand Curve indicate minimum flow rates for wide open 8" and 10" valves.

5. The best choice for this example would be the 10" size because pressure drop is much lower and duration of partially lifted disc is only slightly greater than for the 8" size.

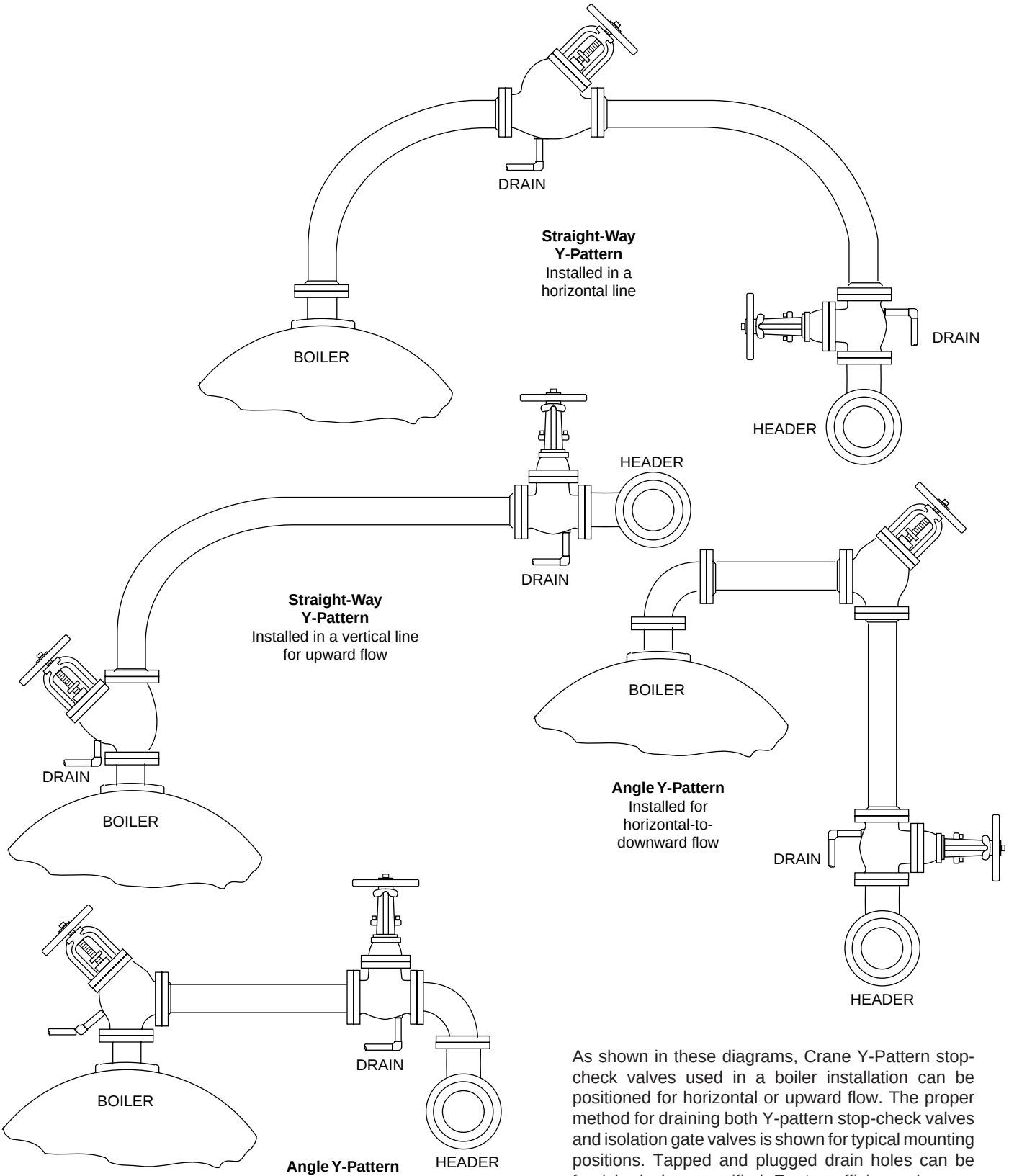
6. Pressure drop for any intermediate flow condition can be determined as outlined in Steps 1 and 2.

Technical Data

Crane Bolted Bonnet Stop-Check Valves
Selecting the Proper Size – Determining Pressure Drop



Y-Pattern Stop-Check and Isolation Gate Valves



Straight-Way Y-Pattern
Installed in a horizontal line

Straight-Way Y-Pattern
Installed in a vertical line for upward flow

Angle Y-Pattern
Installed for horizontal-to-downward flow

Angle Y-Pattern
Installed for upward-to-horizontal flow

As shown in these diagrams, Crane Y-Pattern stop-check valves used in a boiler installation can be positioned for horizontal or upward flow. The proper method for draining both Y-pattern stop-check valves and isolation gate valves is shown for typical mounting positions. Tapped and plugged drain holes can be furnished when specified. For top efficiency, be sure the proper size valve is used.

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Pressure-Temperature Ratings

ENGLISH UNITS

The following pressure-temperature charts are derived from ANSI B16.34 – 1996 Version. They will cover the most commonly used body and bonnet materials in the industry. All Crane Valves are designed to operate through the pressure and temperature ranges shown in these charts for a particular ANSI Class Rating and ASTM Material.

ASTM A216 GR. WCB

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2225	3350	5575	9275	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2450	4100	6800	325	825	1650	2475	4125	6875
–20 to 100	285	740	1480	2220	3705	6170	290	750	1500	2250	3750	6250
200	260	675	1350	2025	3375	5625	290	750	1500	2250	3750	6250
300	230	655	1315	1970	3280	5470	290	750	1500	2250	3750	6250
400	200	635	1270	1900	3170	5280	290	750	1500	2250	3750	6250
500	170	600	1200	1795	2995	4990	290	750	1500	2250	3750	6250
600	140	550	1095	1640	2735	4560	275	715	1425	2140	3565	5940
650	125	535	1075	1610	2685	4475	270	700	1400	2100	3495	5825
700	110	535	1065	1600	2665	4440	265	695	1390	2080	3470	5780
750	95	505	1010	1510	2520	4200	240	630	1260	1890	3150	5250
800	80	410	825	1235	2060	3430	200	515	1030	1545	2570	4285

NOTE: Upon prolonged exposure to temperatures above 800°F, the carbide phase of carbon steel may be converted to graphite. Permissable, but not recommended for prolonged usage above 800°F.

ASTM A352 GR. LCB

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	400	1050	2100	3150	5225	8700	400	1050	2100	3150	5225	8700
Hydrostatic Seat Test	300	775	1550	2300	3825	6375	300	775	1550	2100	3825	6375
–20 to 100	265	695	1390	2085	3470	5785	265	695	1390	2085	3470	5785
200	250	655	1315	1970	3280	5470	265	695	1390	2085	3470	5785
300	230	640	1275	1915	3190	5315	265	695	1390	2085	3470	5785
400	200	620	1235	1850	3085	5145	265	695	1390	2085	3470	5785
500	170	585	1165	1745	2910	4850	265	695	1390	2085	3470	5785
600	140	535	1065	1600	2665	4440	265	695	1390	2085	3470	5780
650	125	525	1045	1570	2615	4355	260	680	1360	2040	3400	5670

NOTE: Not to be used over 650°F.

ASTM A352 GR. LCC and LC3

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2250	3375	5625	9735	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	325	825	1650	2475	4125	6875
–20 to 100	290	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
200	260	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
300	230	730	1465	2185	3640	6070	290	750	1500	2250	3750	6250
400	200	705	1410	2115	3530	5880	290	750	1500	2250	3750	6250
500	170	665	1330	1995	3325	5540	290	750	1500	2250	3750	6250
600	140	605	1210	1815	3025	5040	290	750	1500	2250	3750	6250
650	125	590	1210	1765	2940	4905	290	750	1500	2250	3750	6250

* “Special Class” applies to weld-end valves only and requires NDE testing in accordance with ANSI B16.34.

ANSI Pressure Temperature Ratings

ENGLISH UNITS

ASTM A217 GR. WC6

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2250	3375	5625	9375	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	325	825	1650	2475	4125	6875
–20 to 100	290	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
200	260	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
300	230	720	1445	2165	3610	6015	290	750	1500	2250	3750	6250
400	200	695	1385	2080	3465	5775	290	750	1500	2250	3750	6250
500	170	665	1330	1995	3325	5540	290	750	1500	2250	3750	6250
600	140	605	1210	1815	3025	5040	290	750	1500	2250	3750	6250
650	125	590	1175	1765	2940	4905	290	750	1500	2250	3750	6250
700	110	570	1135	1705	2840	4730	280	735	1465	2200	3665	6110
750	95	530	1065	1595	2660	4430	280	730	1460	2185	3645	6070
800	80	510	1015	1525	2540	4230	275	720	1440	2160	3600	6000
850	65	485	975	1460	2435	4060	260	680	1355	2030	3385	5645
900	50	450	900	1350	2245	3745	225	585	1175	1760	2935	4895
950	35	320	640	955	1595	2655	155	400	795	1195	1995	3320
1000	20	215	430	650	1080	1800	105	270	540	810	1350	2250
1050	20†	145	290	430	720	1200	70	180	360	540	900	1500
1100	20†	95	190	290	480	800	45	120	240	360	600	1000

† For weld end valves only. Flanged end valve ratings end at 1000°F.
NOTE: Must not be used over 1100°F.

ASTM A217 GR. WC9

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2250	3375	5625	9375	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	325	825	1650	2475	4125	6875
–20 to 100	290	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
200	260	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
300	230	730	1455	2185	3640	6070	285	740	1485	2225	3705	6180
400	200	705	1410	2115	3530	5880	280	725	1450	2175	3620	6035
500	170	665	1330	1995	3325	5540	275	720	1440	2160	3600	6000
600	140	605	1210	1815	3025	5040	275	720	1440	2160	3600	6000
650	125	590	1175	1765	2940	4905	275	715	1430	2145	3580	5965
700	110	570	1135	1705	2840	4730	275	710	1425	2135	3555	5930
750	95	530	1065	1595	2660	4430	265	690	1380	2070	3450	5750
800	80	510	1015	1525	2540	4230	260	675	1345	2020	3365	5605
850	65	485	975	1460	2435	4060	245	645	1285	1930	3215	5355
900	50	450	900	1350	2245	3745	230	600	1200	1800	3000	5000
950	35	375	755	1130	1885	3145	180	470	945	1415	2355	3930
1000	20	260	520	780	1305	2170	125	325	650	975	1630	2715
1050	20†	175	350	525	875	1455	85	220	435	655	1095	1820
1100	20†	110	220	330	550	915	55	135	275	410	685	1145

† For weld end valves only. Flanged end valve ratings end at 1000°F.
NOTE: Must not be used over 1100°F.

* “Special Class” applies to weld-end valves only and requires NDE testing in accordance with ANSI B16.34.

ANSI Pressure Temperature Ratings

ENGLISH UNITS

ASTM A217 GR. C5

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2250	3375	5625	9375	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	325	825	1650	2475	4125	6875
–20 to 100	290	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
200	260	745	1490	2235	3725	6205	290	750	1500	2250	3750	6250
300	230	715	1430	2150	3580	5965	280	730	1455	2185	3645	6070
400	200	705	1410	2115	3530	5880	275	720	1440	2160	3600	6000
500	170	665	1330	1995	3325	5540	275	720	1440	2160	3600	6000
600	140	605	1210	1815	3025	5040	270	705	1415	2120	3535	5895
650	125	590	1175	1765	2940	4905	270	700	1395	2095	3495	5820
700	110	570	1135	1705	2840	4730	265	685	1370	2055	3430	5715
750	95	530	1055	1585	2640	4400	255	660	1320	1980	3300	5500
800	80	510	1015	1525	2540	4230	245	640	1275	1915	3195	5320
850	65	485	965	1450	2415	4030	230	605	1210	1815	3020	5035
900	50	370	740	1110	1850	3085	175	465	925	1390	2315	3855
950	35	275	550	825	1370	2285	130	345	685	1030	1715	2855
1000	20	200	400	595	995	1655	95	250	495	745	1245	2070
1050	20†	145	290	430	720	1200	70	180	360	540	900	1500
1100	20†	100	200	300	495	830	50	125	250	375	620	1035
1150	20†	60	125	185	310	515	30	75	155	230	385	645
1200	15†	35	70	105	170	285	15	45	85	130	215	355

† For weld end valves only. Flanged end valve ratings end at 1000°F.

ASTM A217 GR. C12

°F	Standard Class B16.34 – 1996 Maximum Non-Shock Working Pressure, PSIG						Special Class B16.34 – 1996* Maximum Non-Shock Working Pressure, PSIG					
	150	**300**	**600**	**900**	**1500**	**2500**	**150**	**300**	**600**	**900**	**1500**	**2500**
Hydrostatic Shell Test	450	1125	2250	3375	5625	9375	450	1125	2250	3375	5625	9375
Hydrostatic Seat Test	325	825	1650	2475	4125	6875	325	825	1650	2475	4125	6875
–20 to 100	290	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
200	260	750	1500	2250	3750	6250	290	750	1500	2250	3750	6250
300	230	730	1455	2185	3640	6070	290	750	1500	2250	3750	6250
400	200	705	1410	2115	3530	5880	290	750	1500	2250	3750	6250
500	170	665	1330	1995	3325	5540	290	750	1500	2250	3750	6250
600	140	605	1210	1815	3025	5040	290	750	1500	2250	3750	6250
650	125	590	1175	1765	2940	4905	290	750	1500	2250	3750	6250
700	110	570	1135	1705	2840	4730	280	735	1465	2200	3655	6110
750	95	530	1065	1595	2660	4430	280	730	1460	2185	3645	6070
800	80	510	1015	1525	2540	4230	275	720	1440	2160	3600	6000
850	65	485	975	1460	2435	4060	260	680	1355	2030	3385	5645
900	50	450	900	1350	2245	3745	230	600	1200	1800	3000	5000
950	35	375	755	1130	1885	3145	180	470	945	1415	2355	3930
1000	20	255	505	760	1270	2115	120	315	635	950	1585	2645
1050	20†	170	345	515	855	1430	80	215	430	645	1070	1785
1100	20†	115	225	340	565	945	55	140	285	425	710	1180
1150	20†	75	150	225	375	630	35	95	190	285	470	785
1200	20†	50	105	155	255	430	25	65	130	195	320	535

† For weld end valves only. Flanged end valve ratings end at 1000°F.

* “Special Class” applies to weld-end valves only and requires NDE testing in accordance with ANSI B16.34.