



Cast Steel Valves

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.

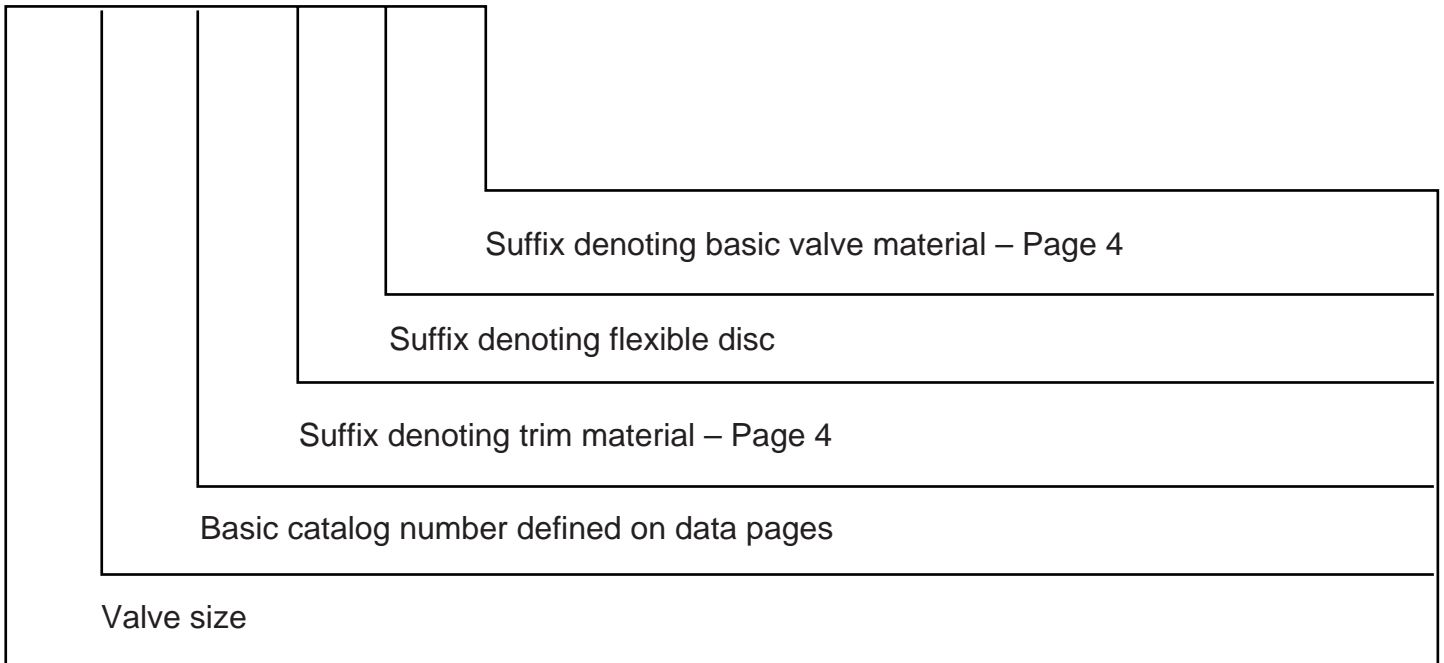
CAUTION: When servicing, disassembling or disposing of valves containing asbestos gaskets or packing, avoid breathing dust or fibers from these parts. Disposal of asbestos and asbestos related products should comply with local, state and federal laws and regulations.

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.

Examples

8" 33¹/₂ XU F 9



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.

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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.

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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.

Crane valves are universally accepted by industry for virtually every application ranging from vacuum pressures and cryogenic temperatures to elevated pressures and temperatures.

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	Seat Leakage Rate ⁽¹⁾ API 598	
		Low Pressure Test	High Pressure Test
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 Leakage rates are in bubbles per minute for low-pressure test and drops per minute for high-pressure test.

2 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

Crane Designation	Cat. No. Suffix	ASTM Spec.	Material Classification	Service Recommendations
Carbon Steel	None	A216 GR. WCB	Carbon Steel	Steam, water, oil, oil vapor gas and general services at temperatures -20 to 1000° F (1) (4) (5)
No. 5 Steel	5	A217 GR. C5	5% CR, 1/2% Mo	Corrosive-erosive Oil Refinery Service at temperatures -20 to 1100° F. (2)
No 7 Steel	9	A217 GR. WC9	1 1/4% CR, 1/2% Mo	Steam, water, oil, oil vapor, gas, general services at temperatures -20 to 1100° F (3) (4) (5)
No. 9 Steel	9	A217 GR. WC9	21/4% CR, 1% Mo	
“LCB” Steel	2	A352-LCB	Low Carbon Steel	Low Temperature Service to -50° F. Not for use above 650° F.
“Artic” Steel	3	A352-LC3	31/2% Nickel Steel	Low Temperature Service to -50° F. Not for use above 650° F.

(1) Valves regularly rated at 850° F maximum upon prolonged exposure to temperatures above approximately 800° F, the carbide phase of carbon steel may be converted to graphite.

(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 placed upon the material in Table PG-23.1.

(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 123.2.

Seating Trim Description and Service Recommendations

Cat. No. Suffix	Seating Surfaces	Application
U	Hard Facing (1)	Premium Trim – Suitable for severe services to 1200° F.
X	13% chromium (2)	Excellent for oil and oil vapors to 100° F. Service on steam, gas and general services limited to globe, angle and check valves to 1100° F.
XU	13% Chromium to	Excellent for steam, gas and general services to 1000° F; oil and oil vapor to 1100° F; and all services for swing check valves to 1100° F.
L	Austenitic (3) Stainless Steel	
LU	Austenitic Stainless Steel to Hard Facing	For liquids and gases that may be corrosive to Exelloy but not Austenitic Stainless Steel at temperatures to 850° F.
A	Monel	Corrosive services including acids, alkalies, salt solutions, etc. to 450° F.
AU	Monel	

(1) Hard Facing is weld deposited Cobalt base alloy.

(2) 13% Chromium AISI Type 410 Stainless Steel.

(3) Austenitic Stainless Steel is a Ni-Cr-Mo stainless steel in the AISI Type 316 category.



Cast Steel Valves

Identification – Marking Installation and Maintenance

Marking and identification of Crane steel valves conforms to the Manufacturer's Standardization Society (MSS) Standard Marking System for Valves, Fittings, Flanges and Unions (MSS SP-25) as well as the appropriate BS valve standard.

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:

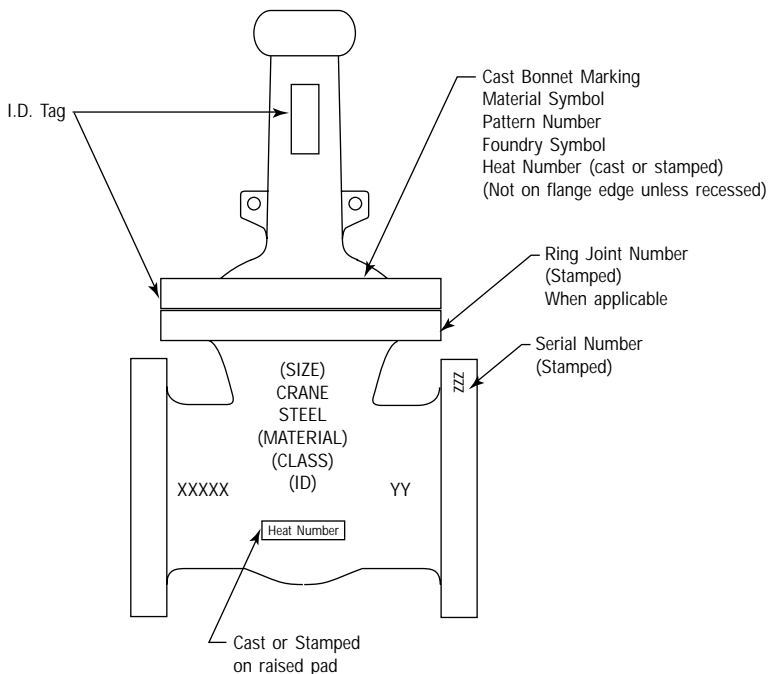
- Crane logo
- Pressure class
- Valve size
- "Steel" symbol for the grade of material (i.e. WCB for carbon steel)
- Heat number – on body and bonnet (cast or stamped)

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

When purchasing valves, reference should also be made to MSS 6683 "Guide to the Installation and Use of Valves" as well as to MSS SP-92 "Valve User Guide." Inquiries relating specifically to Crane products may be referred to our factory or customer service department.



Product Marking

CRANE		ASME B16.34 / API 600	
CAT. NO.			
SIZE		BODY	
0		DISC	
100° F	PSI	SEAT	
	°F MAX	STEM	
XXXXXX			

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

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. Valves 30" and larger can be drilled in accordance with MSS-SP-44 or API 605.
- 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.

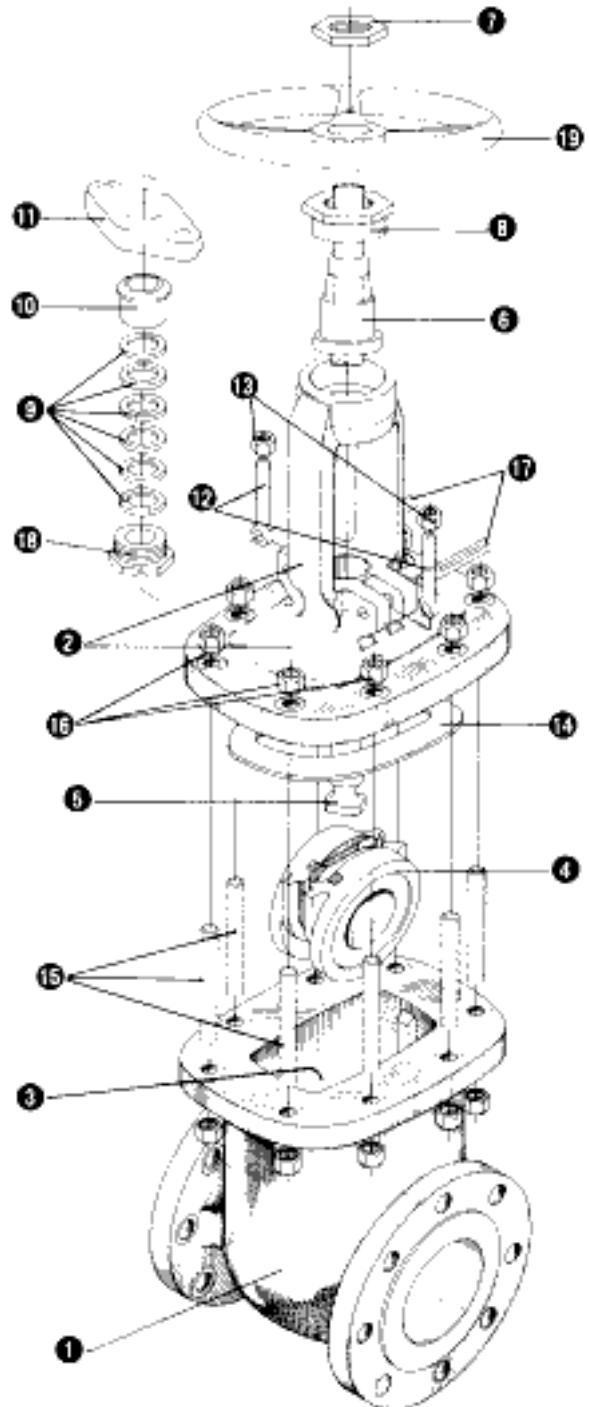
Typical Bolted Bonnet Gate Valve Features

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.



Class 150 • Outside Screw & Yoke • Flexible Wedge Disc

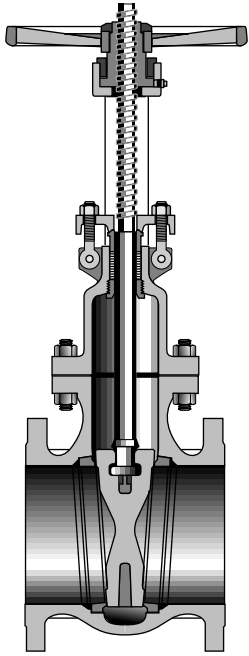


Figure 47
Flanged
Figure 47^{1/2}
Butt Weld

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

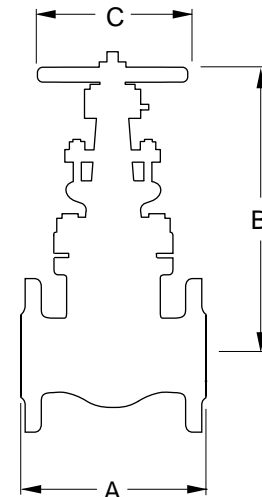
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Soft Iron
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable or Ductile
Handwheel Nut	Ductile
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}		
2	46	45	7.00	8.50	15.75	8.00
2 ^{1/2}	70	60	7.50	9.50	16.50	8.00
3	76	62	8.00	11.12	18.88	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	10.5	15.88	31.00	12.00
8	310	260	11.50	16.50	38.75	14.00
10	455	410	13.00	18.00	46.75	18.00
12	650	580	14.00	19.75	55.00	20.00
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	76.50	24.00
20	2125	1855	18.00	28.00	89.00	30.00
24	3120	2500	20.00	32.00	104.00	36.00



Class 300 • Outside Screw & Yoke • Flexible Wedge Disc

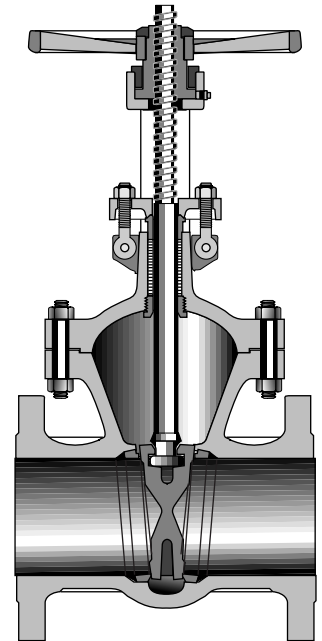
Material of Construction

Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Spiral Wound
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable or Ductile
Handwheel Nut	Ductile
I.D. Tags	SS
I.D. Pins	Steel
Spacer	Steel

Figure 33
Flanged
Figure 33^{1/2}
Butt Weld

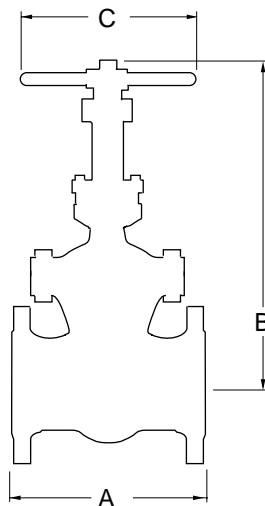
Size Range:
2 through 24 inches

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}		
2	74	49	8.50	18.00	8.00
2 ^{1/2}	80	74	9.50	19.00	8.00
3	108	85	11.12	19.88	9.00
4	165	120	12.00	23.75	10.0
5	235	185	15.00	28.38	12.00
6	320	245	15.88	32.50	14.00
8	500	410	16.50	40.75	16.00
10	760	625	18.00	49.50	18.00
12	1020	890	19.75	57.25	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	78.00	24.00
20	3890	3370	39.00	95.75	30.00
24	5955	4675	45.00	113.00	36.00

Class 600 • Outside Screw & Yoke • Flexible Wedge Disc

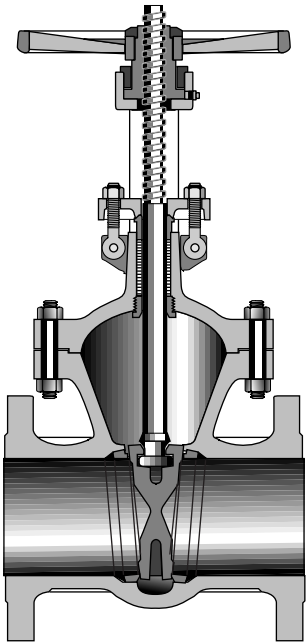


Figure 76
Flanged
Figure 76^{1/2}
Butt Weld

Size Range:
2 through 12 inches

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

Material of Construction

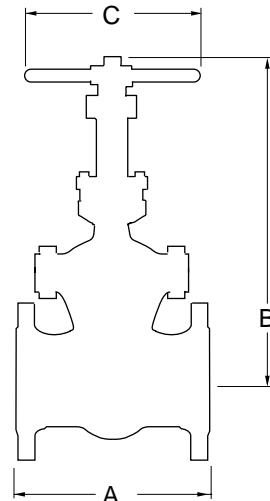
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	CA-15
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring Joint
Back Seat	410 SS
Yoke Sleeve	D2 Ni-Resist
Retaining Nut	Malleable
Gland	Steel
Gland Flange	Steel
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	Steel
Bonnet Studs	A193 Gr. B7
Bonnet Nuts	A194 Gr. 2H
Handwheel	Malleable or Ductile
Handwheel Nut	Ductile
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

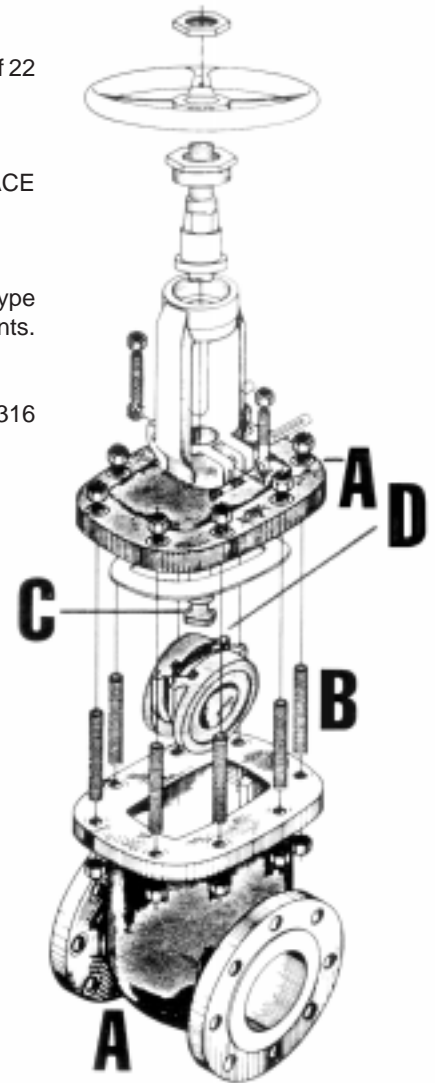
Valve Size	Weight (pounds)		Dimensions (inches)		
			A	B	C
	76	76 ^{1/2}	76 & 76 ^{1/2}		
2	84	72	11.50	16.50	8.00
2 ^{1/2}	130	112	13.00	20.00	9.00
3	160	140	14.00	22.62	10.00
4	300	270	17.00	28.62	12.00
6	640	520	22.00	38.62	18.00
8	1080	940	26.00	47.25	20.00
10	1550	1250	31.00	58.25	24.00
12	2100	1800	33.00	68.12	30.00



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; 300-350 HB	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

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.

Fugitive Emissions

- Less than 100 ppm with standard requirements.

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

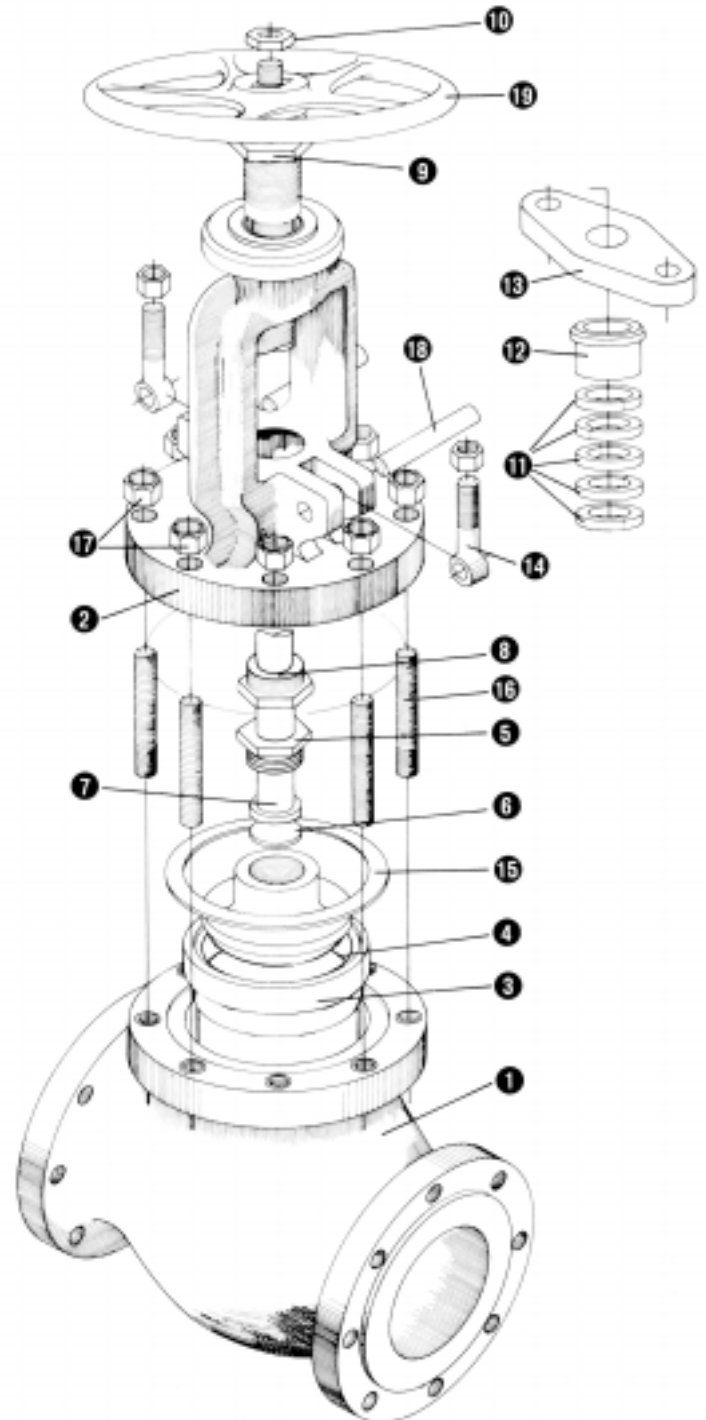
Notes

- 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 Engineering Data section for end flange dimensions and drilling templates. Valves 30" and larger can be drilled in accordance with MSS-SP-44 or API 605.
- 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.

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**



Class 150 • Outside Screw & Yoke • Bolted Bonnet

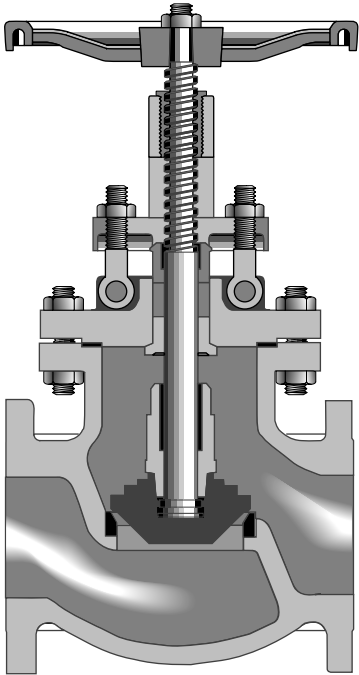


Figure 143
Flanged
Figure 143^{1/2}
Butt Weld

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

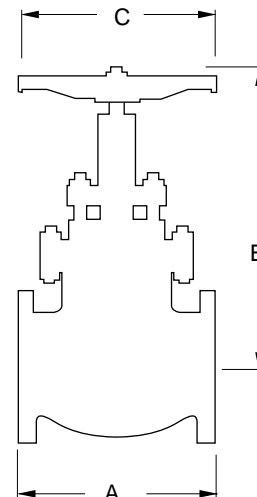
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13 CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Soft Iron
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	-
Bonnet Studs	A193 Gr. 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}		
2	47	43	8.00	15.00	8.00
2 ^{1/2}	66	60	8.50	17.12	10.00
3	82	73	9.50	18.50	10.00
4	134	112	11.50	21.00	12.00
5	199	165	14.00	23.00	12.00
6	240	195	16.00	25.50	14.00
8	370	330	19.50	30.00	16.00
10	525	480	24.50	34.00	20.00
12	900	820	27.50	39.50	24.00
14	1000	880	31.00	41.38	24.00



Class 300 • Outside Screw & Yoke • Bolted Bonnet

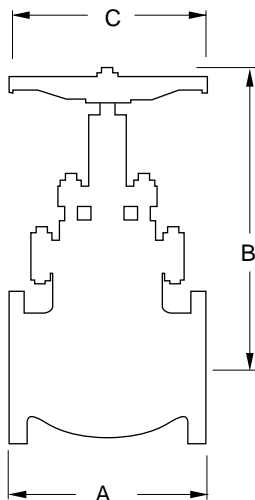
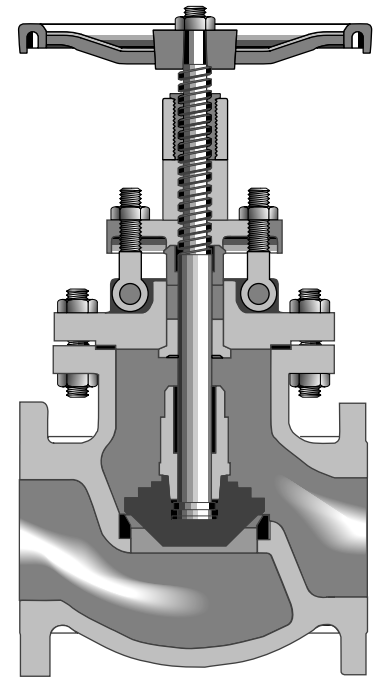
Material of Construction

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}		
2	60	48	10.50	16.75	8.00
2 ^{1/2}	88	73	11.50	19.00	10.00
3	117	97	12.50	21.00	10.00
4	176	140	14.00	24.00	12.00
5	290	240	15.75	27.50	12.00
6	340	280	17.50	31.00	16.00
8	530	460	22.00	34.25	20.00
10	750	620	24.50	36.00	20.00
12	1100	900	28.00	37.25	24.00

Class 600 • Outside Screw & Yoke • Bolted Bonnet

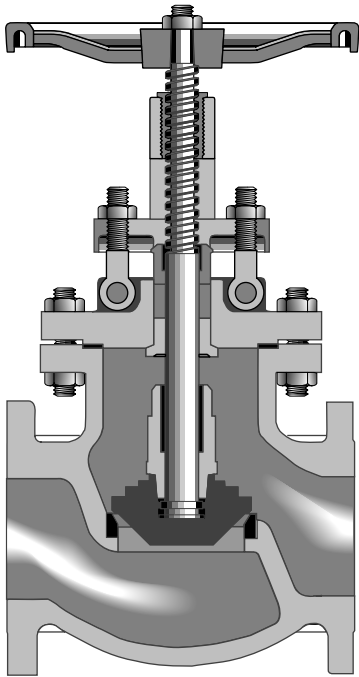


Figure 171
Flanged
Figure 171½
Butt Weld

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

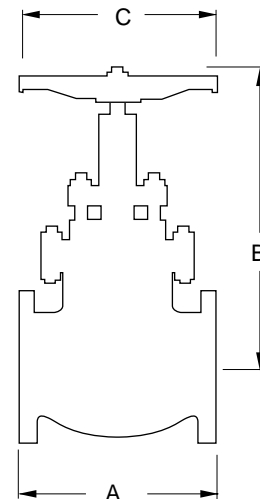
Description	Material
Body	WCB
Bonnet	WCB
Seat Rings	Hardfaced
Disc	13 CR Overlay
Stem	410 SS
Packing	Graphite
Bonnet Gasket	Ring Joint
Back Seat	410 SS
Disc Stem Nut	410 SS
Disc Washer	Carbon Steel
Gland	410 SS
Gland Flange	WCB
Eye Bolt	Steel
Eye Bolt Nuts	A563 Gr. A or O
Pins	-
Bonnet Studs	A193 Gr. 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		
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	12.00
4	270	215	17.00	26.50	14.00
6	550	490	22.00	35.00	18.00
8	1000	790	26.00	37.25	20.00



General Information • Class 150, 300 and 600 Valves

Features

Disc Type

- Class 150 valves-2"-12" and Class 300 valves-sizes 2"-8" feature an internally mounted hinge pin which eliminates a leak path
- 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.

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 Engineering Data section for end flange dimensions and drilling templates. Valves 30" and larger can be drilled in accordance with MSS-SP-44 or API 605.
- 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.

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:

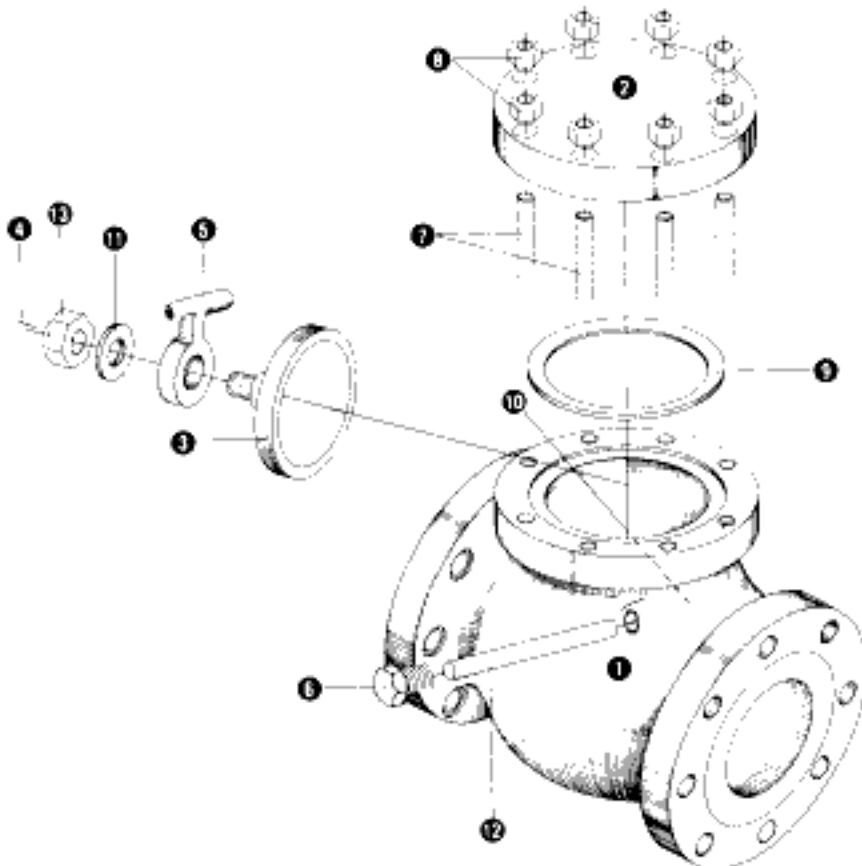
$$v = 60\sqrt{\bar{v}}$$

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. 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

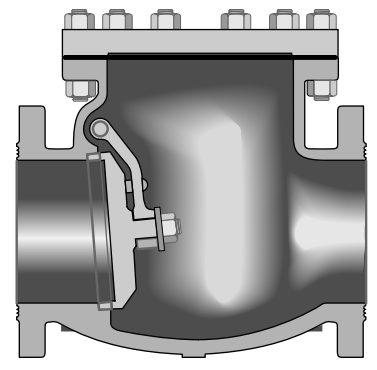
Material of Construction

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

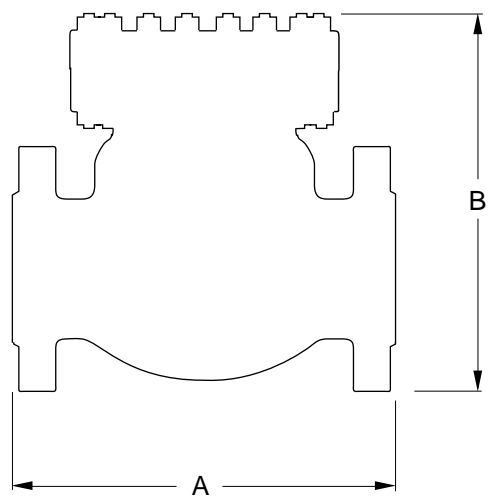
Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F



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)	
	147	147 ^{1/2}	A	B
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

Class 300 • Bolted Cap

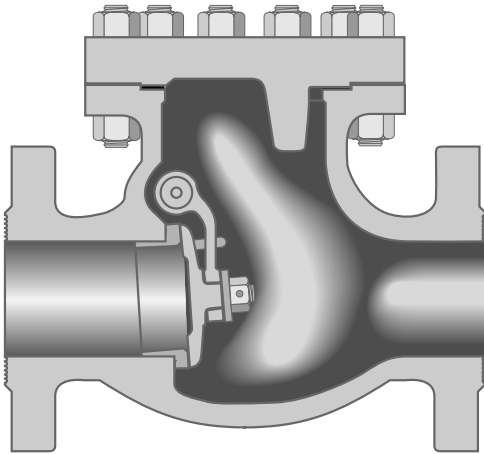


Figure 159
Flanged
Figure 159^{1/2}
Butt Weld

Size Range:
2 through 24 inches

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

Material of Construction

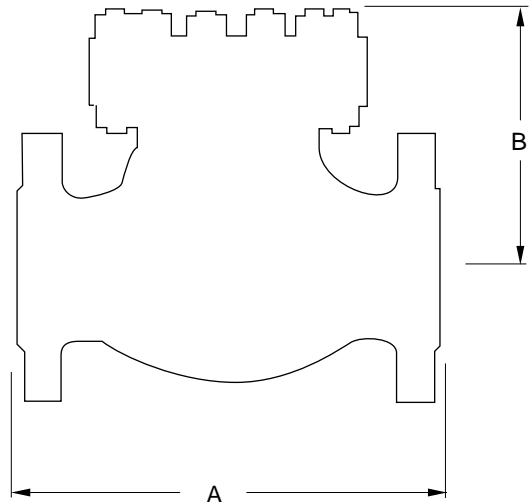
Description	Material
Body	WCB
Cap	WCB
Seat Ring	Hardfaced
Disc	13 CR Overlay
Hinge	WCB
Pins, Hinge	410 SS
Disc Washer	Steel
Cap Screw	A307 Gr. B
Cap Gasket	Spiral Wound
Cap Studs	A193 Gr. B7
Cap Nuts	A194 Gr. 2H
I.D. Tags	SS
I.D. Pins	Steel

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	159 ^{1/2}	159 & 159 ^{1/2}	
2	46	33	10.50	6.75
2 ^{1/2}	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



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:

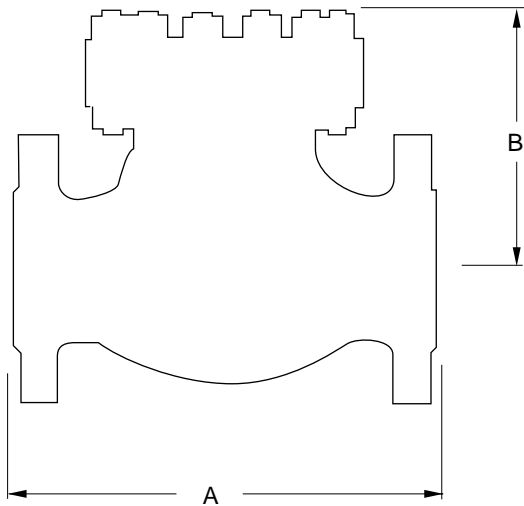
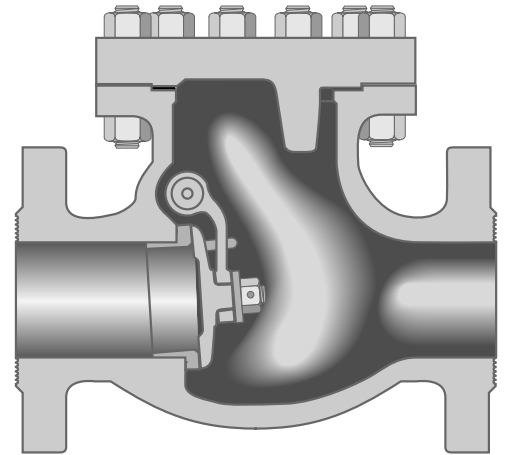
2 through 12 inches

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

- Reduce 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.

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:

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

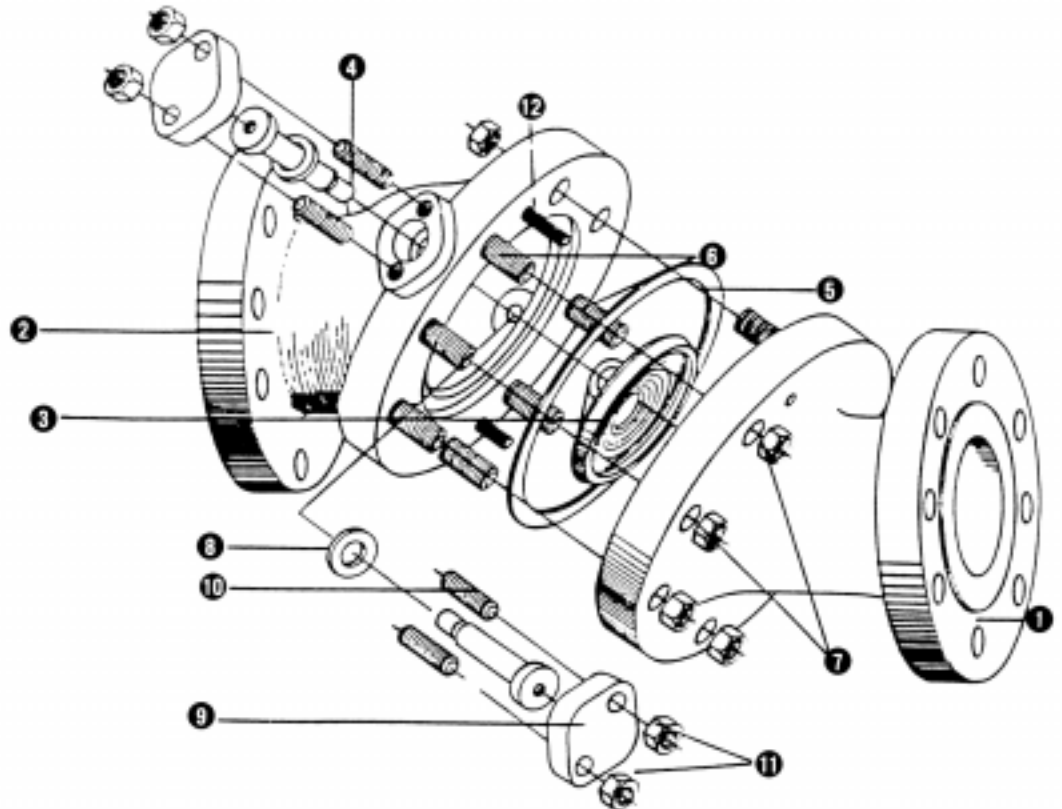
The value for v is equal to flow in feet per second and where \bar{v} is the specific volume of the fluid in cubic feet per pound. Sizing check valves on this basis may often result in the use of valves that are smaller than the pipe in which they are used, necessitating the use of reducers for installation. 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" 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



Class 150 • Bolted Cap

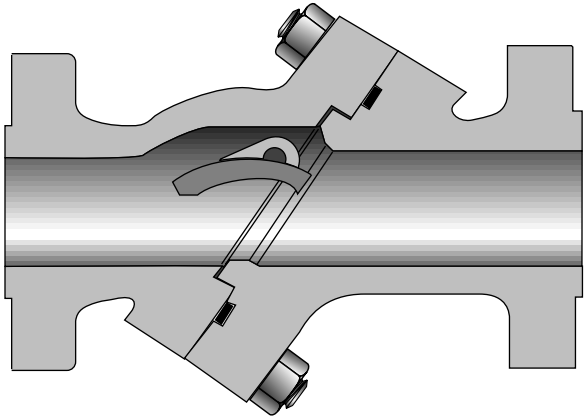


Figure 123
Flanged
Figure 123^{1/2}
Butt Weld

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

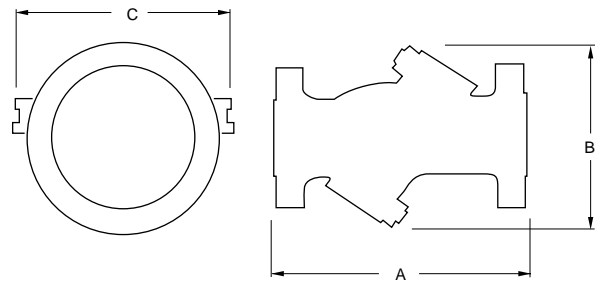
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13& Chrome Trim
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 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	19.5	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	-



Class 300 • Bolted Cap

Material of Construction

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13& Chrome Trim
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:

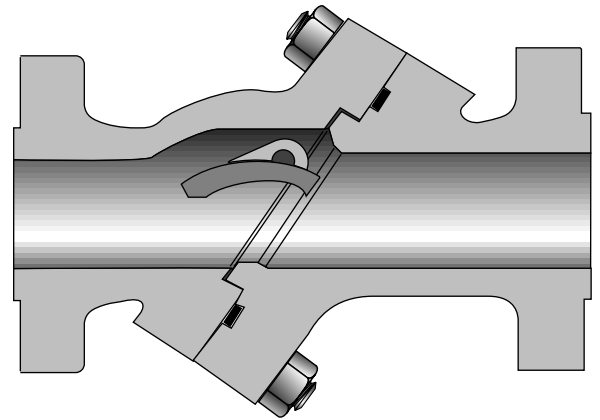
2 through 36 inches

Pressure Temp. Rating

Carbon Steel

ASTM A216 Grade WCB

740 psi @ -20°F to 100°F

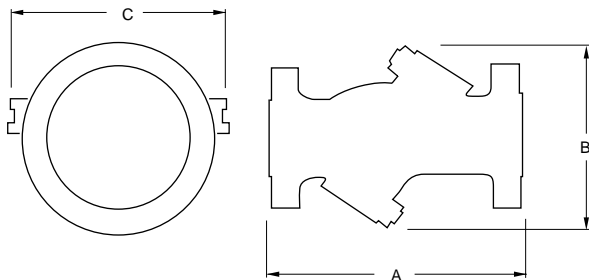


Industry Standards

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	-



Class 600 • Bolted Cap

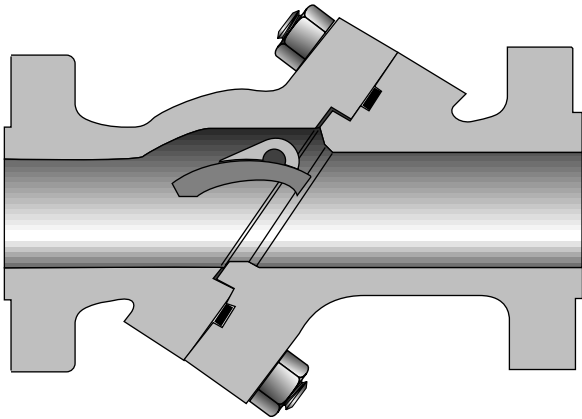


Figure 623
Flanged
Figure 623^{1/2}
Butt Weld

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

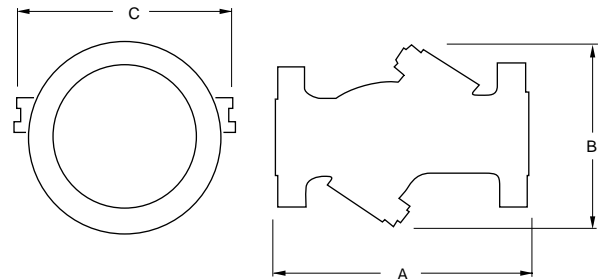
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13& Chrome Trim
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 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	-



Class 900 • Bolted Cap

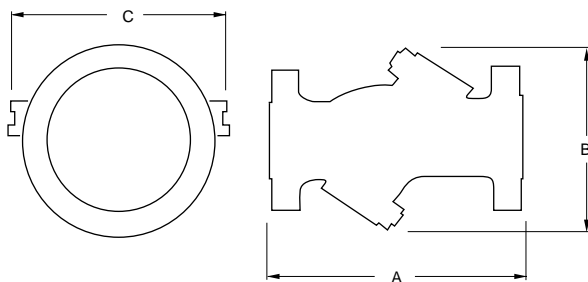
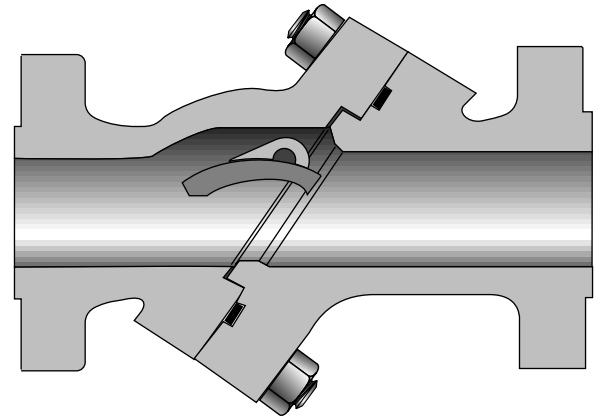
Material of Construction

Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13& Chrome Trim
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

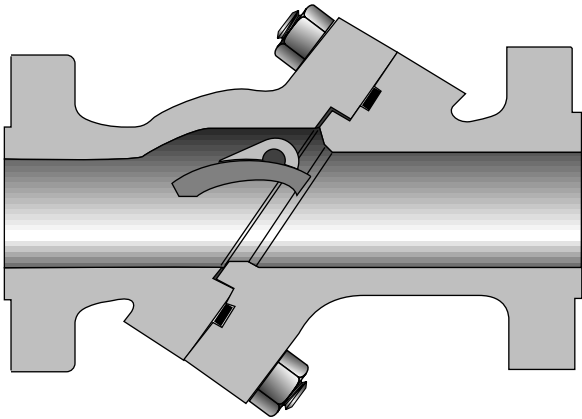


Figure 1523
Flanged
Figure 1523^{1/2}
Butt Weld

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

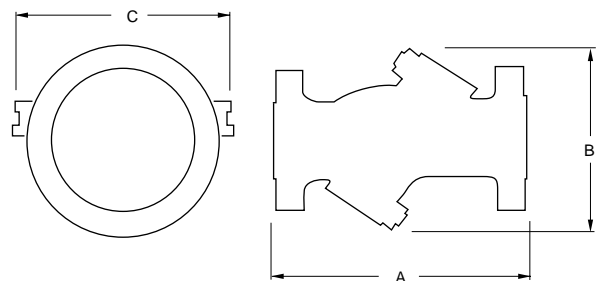
Description	Material
Inlet Body	ASTM A216 WCB
Outlet Body	ASTM A216 WCB
Disc	13& Chrome Trim
Pivot Pin	SS
Body Gasket	Graphite/ SS Spiral Wound
Body Studs	ASTM A193 B7
Body Nuts	ASTM A194 2H
Bearing Cap	Carbon Steel
Bearing Cap Gaskets	Soft Steel
Bearing Cap Studs	ASTM A193 B7
Bearing Cap Nuts	ASTM A194 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



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 accidentally 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.

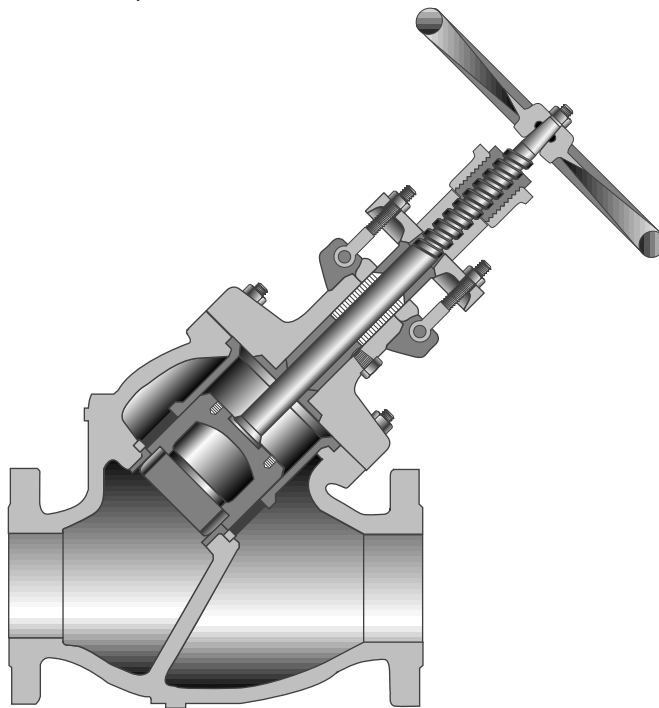
Long Throttling Lip on the disc retards flow when seating position is approached. Disc chattering is prevented, and wiredrawing of seating surfaces is reduced.

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.



Class 300 • Outside Screw & Yoke • Bolted Bonnet

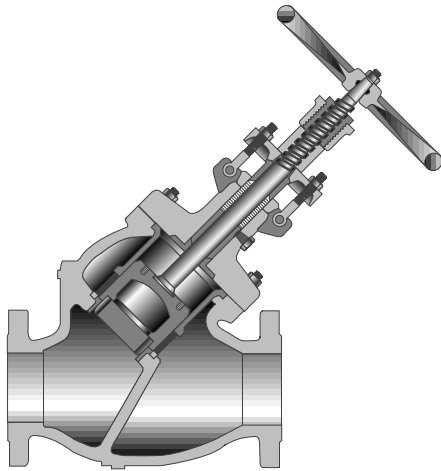


Figure 28
Flanged
Figure 28^{1/2}
Butt Weld

Size Range:
3 through 10 inches

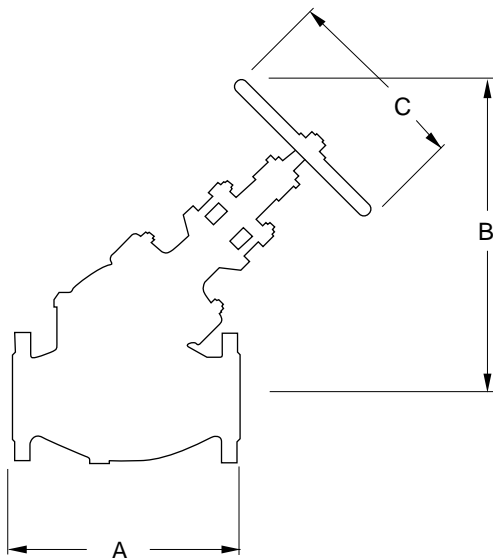
Pressure Temperature Rating
Carbon Steel
ASTM A216 Grade WCB
740 psi @ -20°F to 100°F

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
- 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 Trim
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
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	28	28 ^{1/2}	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

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 Trim
Gland	13% Chrome
Gland Flange	Carbon Steel
Handwheel	Ductile Iron
Yokesleeve	Bronze

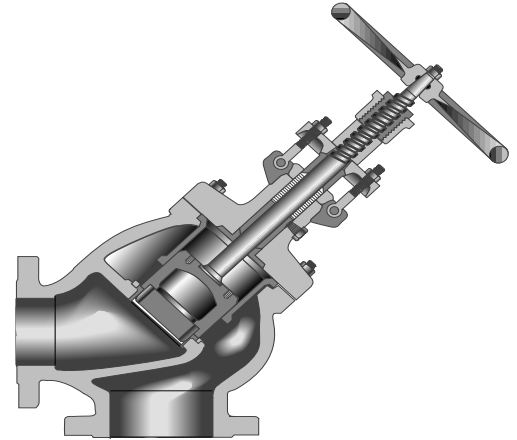
Figure 30
Flanged
Figure 30^{1/2}
Butt Weld

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.

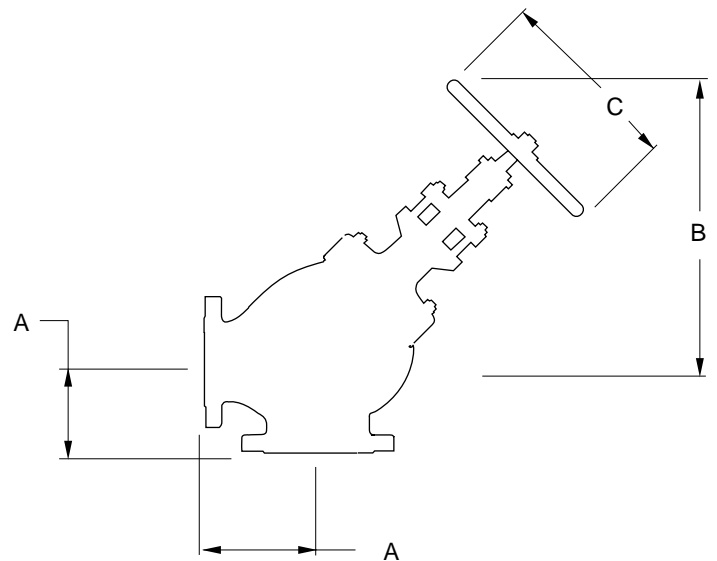


Industry Standards

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
Acceptance	API RP591

Dimensions and Weights

Valve Size	Weight (pounds)		Dimensions (inches)		
	28	28 ^{1/2}	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



Technical Data

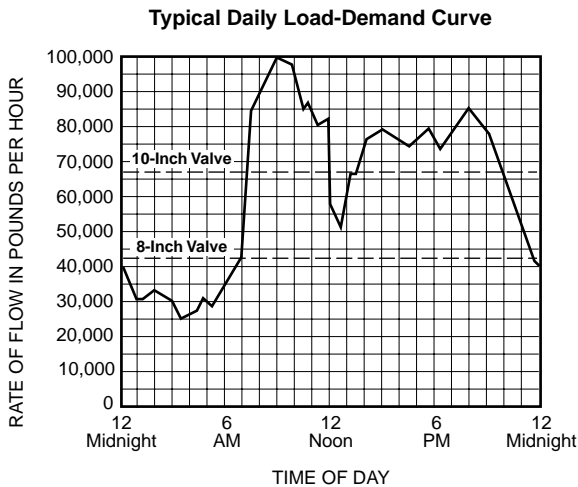
Selecting the Proper Size – Determining Pressure Drop

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 presentation 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



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. 28¹/₂ XU, Butt-Welding
- Angle...No. 30 XU, Flanged or No. 30¹/₂ 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 (Inches)	Press drop @ Max.Min. Flow rate (100,000 #/Hr.), psi		Flow Rate for Wide open valve #/Hr.
	Globe	Angle	
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

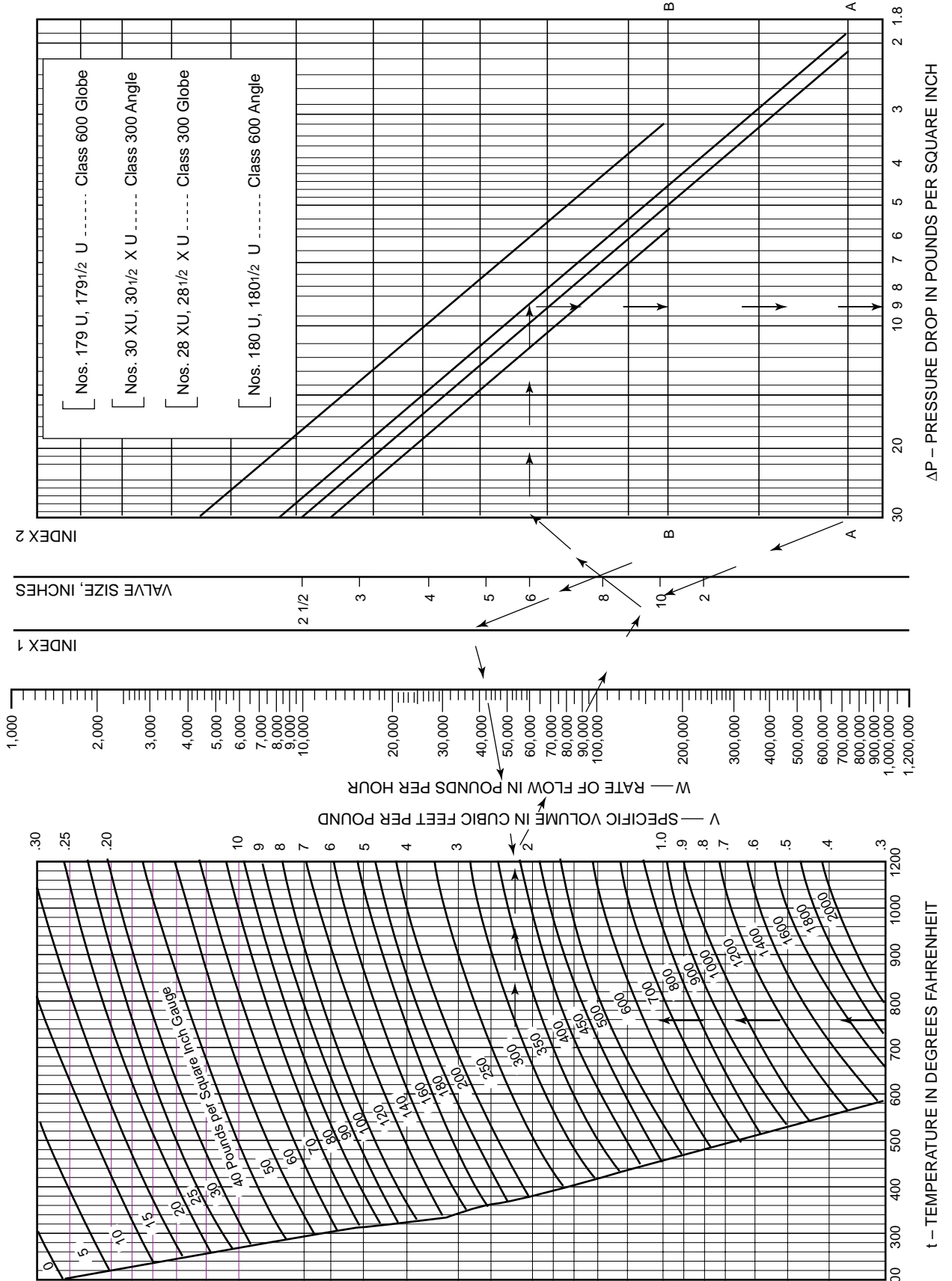
Dotted lines on Demand Curve indicate minimum flow rates for wide open 8" and 10" valves.

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.

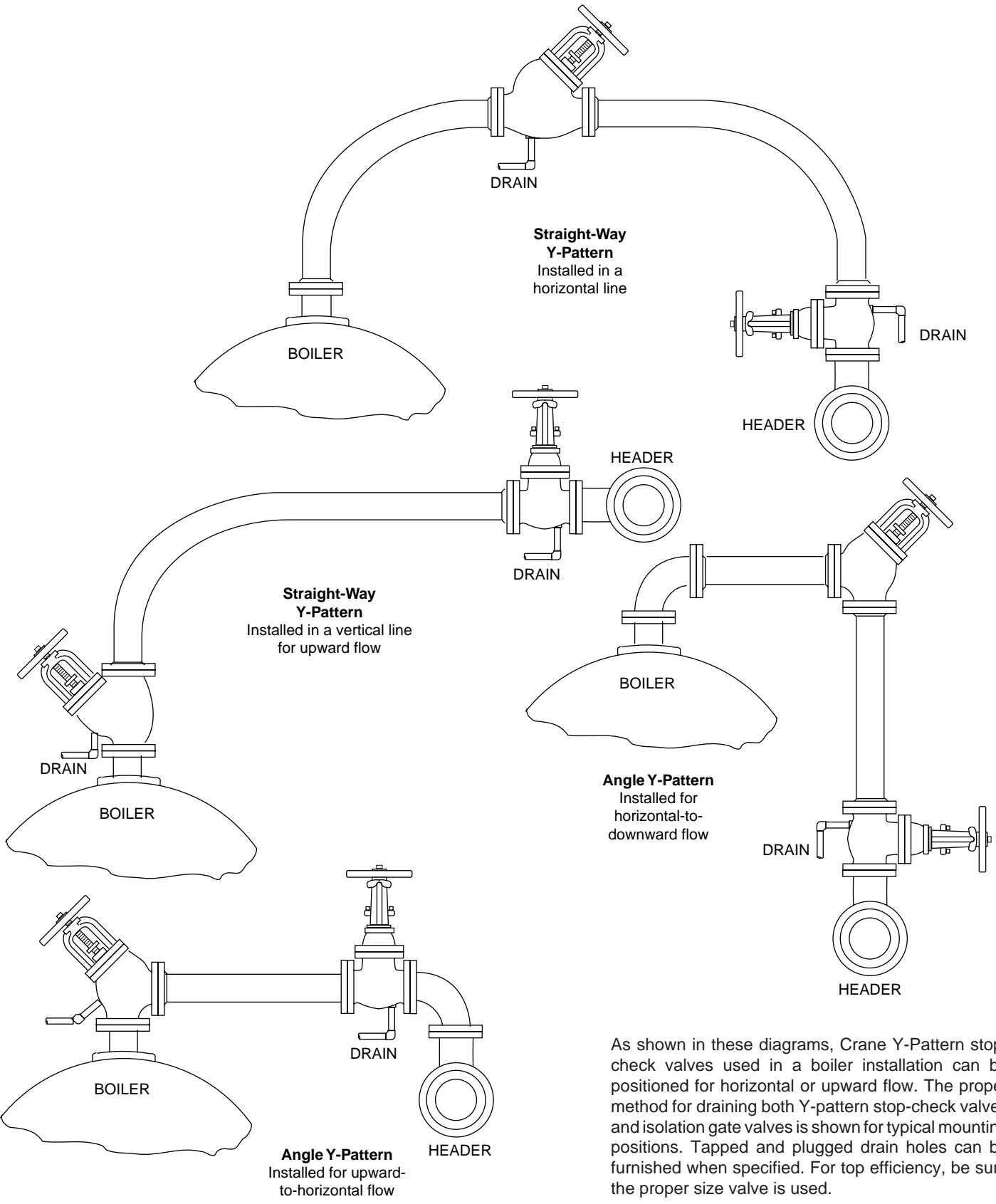
6. Pressure drop for any intermediate flow condition can be determined as outlined in Steps 1 and 2.

Technical Data

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



Y-Pattern Stop-Check and Isolation Gate Valves



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.

Pressure-Temperature Ratings

Pressure-Temperature Ratings

(comply with ANSI B16.34-1981 – Standard Class)

Bolted Bonnet Valves

Class	Temp. F	Working Pressures, psig						Class	Temp. F	Working Pressures, psig					
		A216 WCB	A217 C5W	A217 C6	A217 WC9	A352 LCB	A352 LC3			A216 WCB	A217 C5W	A217 C6	A217 WC9	A362 LCB	A362 LC3
Class 150	-20 to 100°	285	290	290	290	265	290	Class 600	-20 to 100°	1480	1500	1500	1500	1390	1500
	200	260	260	260	260	250	260		200	1350	1500	1425	1430	1315	1500
	300	230	230	230	230	230	230		300	1315	1455	1345	1355	1275	1465
	400	200	200	200	200	200	200		400	1270	1410	1315	1295	1235	1410
	500	170	170	170	170	170	170		500	1200	1330	1285	1280	1165	1330
	600	140	140	140	140	140	140		600	1095	1210	1210	1210	1065	1210
	650	125	125	125	125	125	125		650	1075	1210	1210	1210	1065	1210
	700	110	110	110	110	-	-		700	1065	1135	1135	1135	-	-
	800	80	80	80	80	-	-		800	825	995	1015	1015	-	-
	850	65	65	65	65	-	-		850	535	880	975	975	-	-
	900	50	50	50	50	-	-		900	345	705	900	900	-	-
	950	35	35	35	35	-	-		950	205	520	755	755	-	-
	1000	20	20	20	20	-	-		1000	105	365	445	535	-	-
	1050	-	20	20	20	-	-		1050	-	280	275	400	-	-
1100	-	20	-	-	-	-	1150	-	205	190	225	-	-		
1150	-	20	-	-	-	-	1150	-	140	-	-	-	-		
1200	-	20	-	-	-	-	1200	-	90	-	-	-	-		
Class 300	-20 to 100°	740	750	750	750	695	750	Class 900	-20 to 100°	2220	2250	2250	2250	2085	2250
	200	675	750	710	715	655	750		200	2025	2250	2135	2150	1970	2250
	300	655	730	675	675	640	730		300	1970	2185	2020	2030	1915	2185
	400	635	705	660	650	620	705		400	1900	2115	1975	1945	1850	2115
	500	600	665	640	640	585	665		500	1795	1995	1925	1920	1745	1995
	600	550	605	605	605	535	605		600	1640	1815	1815	1815	1600	1815
	650	535	590	590	590	525	590		650	1610	1765	1765	1765	1570	1765
	700	535	570	570	570	-	-		700	1600	1705	1705	1705	-	-
	750	505	530	530	530	-	-		750	1510	1595	1595	1595	-	-
	800	410	500	510	510	-	-		800	1235	1490	1525	1525	-	-
	850	270	440	485	485	-	-		850	805	1315	1460	1460	-	-
	900	170	355	450	450	-	-		900	515	1060	1350	1350	-	-
	950	105	260	380	380	-	-		950	310	780	1130	1130	-	-
	1000	50	190	225	270	-	-		1000	155	575	670	805	-	-
1050	-	140	140	200	-	-	1050	-	420	410	595	-	-		
1100	-	105	95	115	-	-	1100	-	310	290	340	-	-		
1150	-	70	-	-	-	-	1150	-	205	-	-	-	-		
1200	-	45	-	-	-	-	1200	-	135	-	-	-	-		
Class 400	-20 to 100°	990	1000	1000	1000	925	1000	Class 1500	-20 to 100°	3705	3750	3750	3750	3470	3750
	200	900	1000	950	955	875	1000		200	3375	3750	3560	3580	3280	3750
	300	875	970	895	905	850	970		300	3280	3640	3365	3385	3190	3640
	400	845	940	880	865	825	940		400	3170	3530	3290	3240	3085	3530
	500	800	885	855	855	775	885		500	2995	3325	3210	3200	2910	3325
	600	730	805	805	805	710	805		600	2735	3025	3025	3025	2665	3025
	650	715	785	785	785	695	785		650	2685	2940	2940	2940	2615	2940
	700	710	755	755	755	-	-		700	2665	2840	2840	2840	-	-
	750	670	710	710	710	-	-		750	2520	2660	2660	2660	-	-
	800	550	665	675	675	-	-		800	2060	2485	2540	2540	-	-
	850	355	585	650	650	-	-		850	1340	2195	2435	2435	-	-
	900	230	470	600	600	-	-		900	860	1765	2245	2245	-	-
	950	140	350	505	505	-	-		950	515	1305	1885	1885	-	-
	1000	70	255	300	355	-	-		1000	260	960	1115	1340	-	-
1050	-	190	185	265	-	-	1050	-	705	685	995	-	-		
1100	-	140	130	150	-	-	1100	-	515	480	565	-	-		
1150	-	90	-	-	-	-	1150	-	345	-	-	-	-		
1200	-	60	-	-	-	-	1200	-	225	-	-	-	-		