Cast Steel Stop Check Valve

CRANE

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.

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.

Features

Valve designed for steam application that operate between 100 psi (9 bar) and 375 psi (26 bar).

The Stop Check feature of this valve requires a minimum of 50 psi (3.5 bar) pressure differential between the piping system and the boiler to operate correctly.

For installation between boilers suppling the same steam header, and positioned with pressure under the disc. Straightway is for horizontal or vertical line with upward flow. Angle valves are for "horizontal-downward" or "upward-horizontal" flow.

These valves will perform the four following important functions:

1. Act as an automatic-non return valve applied as a containment device to prevent gross backflow of steam from main header to boiler in case the boiler fails.
2. Assist in cutting out boiler, when ceasing to fire and boiler is blown down. In this case, valve disc automatically closes to restrict backflow of steam to the boiler.
3. Assist in returning boiler after a shutdown.
4. Restricts backflow of steam from header into boiler which has been shut down and opened or suffered a pressure containment blowout. The check valve feature should not be relied upon for primary shut-off.

Cylindrical shaped disc is the only pressure-actuated part, light in weight with ample guiding surface. It is specially designed to produce a maximum lift at minimum velocities. There are no wing guides to cause "spinning" with resultant rapid wear.

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.

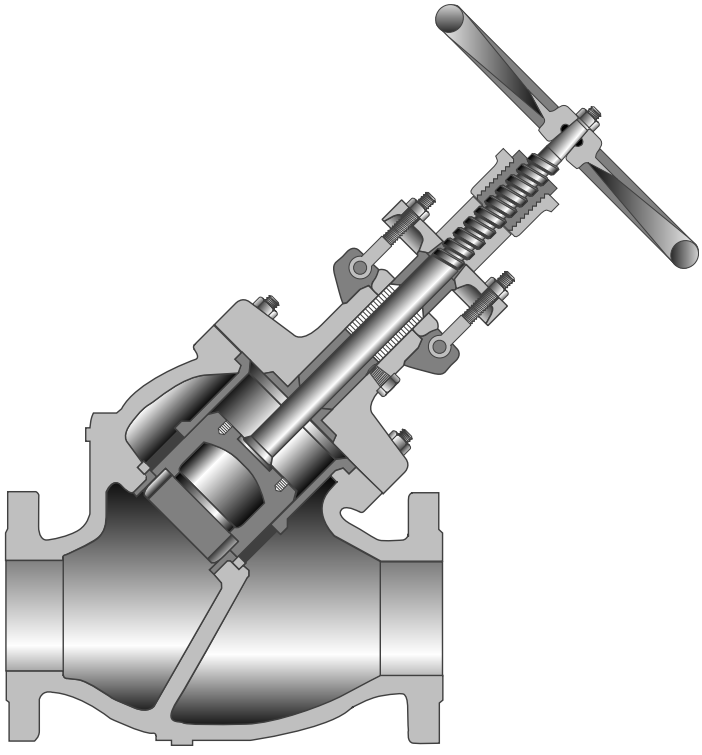
Long Throttling Lip on the disc retards flow when seating position is approached. Disc chattering is prevented, and wiredrawing of seating surfaces is reduced.

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

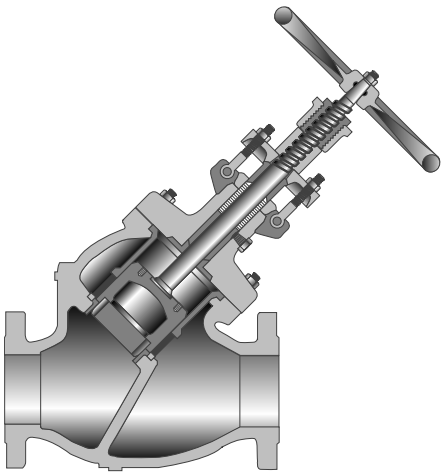


Figure 28
Flanged

Figure 28½
Butt Weld

Size Range:
3 through 10 inches
(80 - 250 mm)

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

Notes

- Butt weld ends on valves 10" (250 mm) 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 8" and 10" (200 mm & 250 mm), Class 300 are equipped with a hammer-blow handwheel.

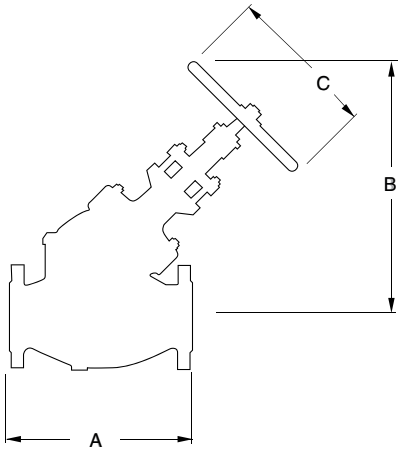
Material of Construction*

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

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

Industry Standards

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



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

Valves	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)
A	14.75 (374)	17.00 (431)	21.50 (546)	26.00 (660)	30.00 (762)
B	22 (558)	27 (685)	34 (863)	41 (1041)	48 (1219)
C	10 (254)	14 (355)	18 (457)	20 (508)	30 (762)
Wt. (28)	140 (63)	260 (117)	430 (195)	770 (349)	1320 (598)
Wt. (28½)	125 (56)	225 (102)	395 (179)	755 (342)	1265 (573)

Stop Check Valve

Figures 30
30½

CRANE

Class 300 • Outside Screw & Yoke • Bolted Bonnet

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Bonnet	ASTM A216 WCB
Disc	Hardfaced
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Gland Flange	Carbon Steel
Handwheel	Ductile Iron
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NOTE:
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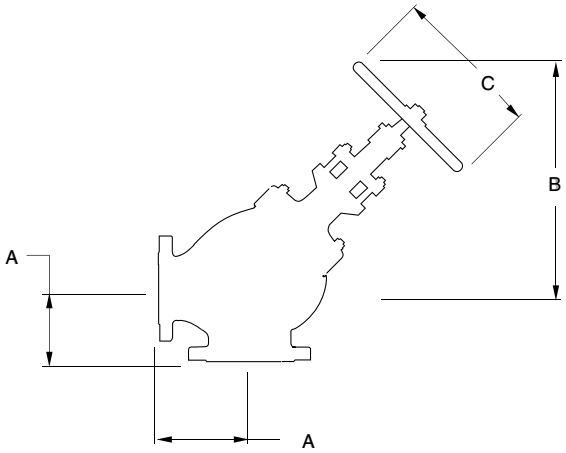

Figure 30
Flanged

Figure 30½
Butt Weld

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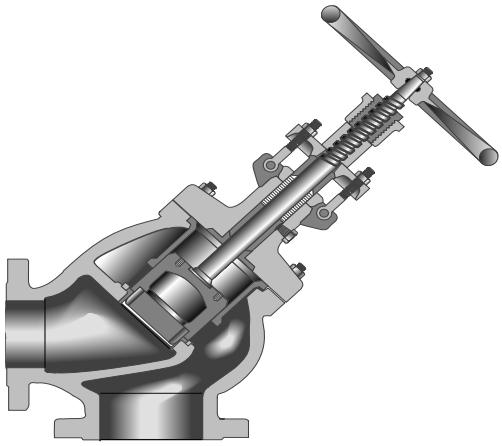

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Face-to-Face/End-to-End	ASME B16.10
Flange Dimensions	ASME B16.5
Weld End	ASME B.16.25
Testing	API 598

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

Valves	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)
A	6.25 (158)	7.00 (177)	8.75 (222)	10.50 (266)	12.25 (311)
B	17 (431)	21 (533)	27 (685)	32 (812)	38 (965)
C	10 (254)	14 (355)	18 (457)	20 (508)	30 (762)
Wt. (30)	120 (54)	200 (90)	370 (167)	680 (308)	1120 (508)
Wt. (30½)	90 (40)	160 (72)	320 (145)	570 (258)	970 (439)

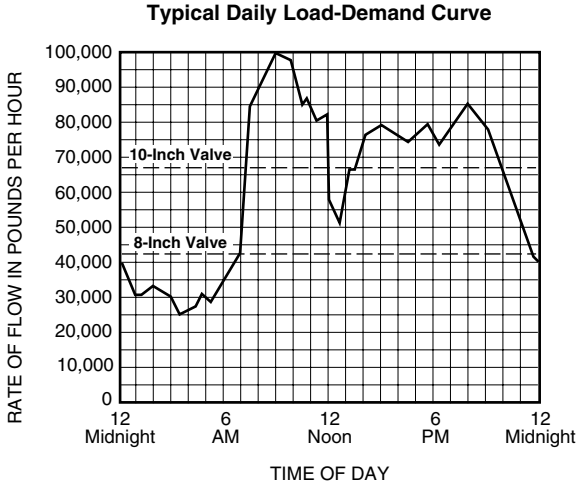
Technical Data

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



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

Solution: Reference to the pressure-temperature ratings on page 32 and 33 indicates a Class 300 valve will be required. Therefore, the following valves may be used:

Globe...No. 28 XU, Flanged or No. 28½ XU, Butt-Welding

Angle...No. 30 XU, Flanged or No. 30½ XU, Butt-Welding

1. Enter the Temperature chart at 750°F (399°C). Move vertically upward to the curved line for 300 psi (21 bar), 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 (200 mm) 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 (.62 bar) for the 8-inch (200 mm), Class 300 globe valve and 10 psi (.69 bar) for the 8-inch (200 mm), 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 (200 mm) 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 (.13 bar) for globe and 2.1 psi (.14 bar) 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 (bar)		Flow rate for wide open valve #/Hr.
	Globe	Angle	
6" (150 mm)	24.0 (1.65)	26.0 (1.79)	24,000
8" (200 mm)	9.0 (.62)	10.0 (.68)	42,000
10" (250 mm)	3.8 (.26)	4.2 (.28)	68,000
12" (300 mm)	2.1 (.14)	2.3 (.15)	95,000

Dotted lines on Demand Curve indicate minimum flow rates for wide open 8" and 10" (200 mm and 250 mm) valves.

5. The best choice for this example would be the 10" (250 mm) size because pressure drop is much lower and duration of partially lifted disc is only slightly greater than for the 8" (200 mm) size.

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