Tilting Disc Check Valve

Class 150 • Bolted Cap

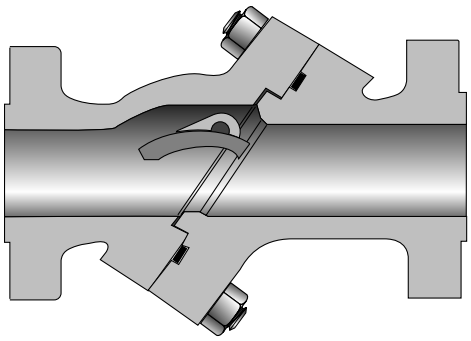


Figure 123
Flanged

Figure 123½
Butt Weld

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

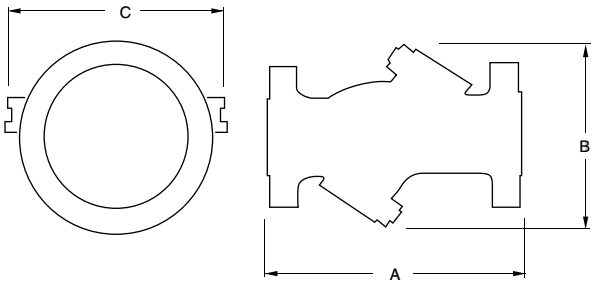
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
285 psi @ -20°F to 100°F
(20 bar @ -28°C to 37°C)

Material of Construction*

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

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

Industry Standards
All materials comply with ASME B16.34



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

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

Tilting Disc Check Valve

Figures 323
323½

CRANE

Class 300 • Bolted Cap

Material of Construction*

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

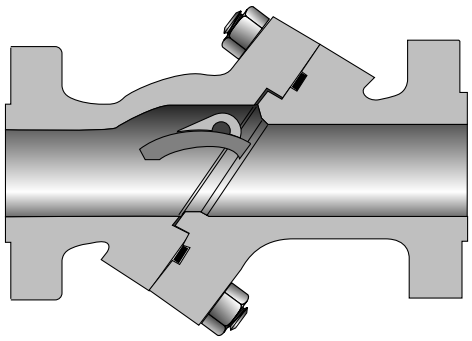
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

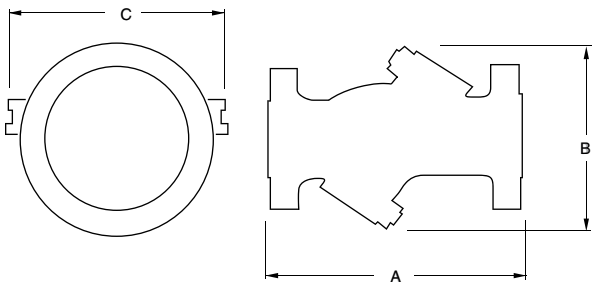
Figure 323
Flanged

Figure 323½
Butt Weld

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

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





Industry Standards
All materials comply with ASME B16.34

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

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

Class 600 • Bolted Cap

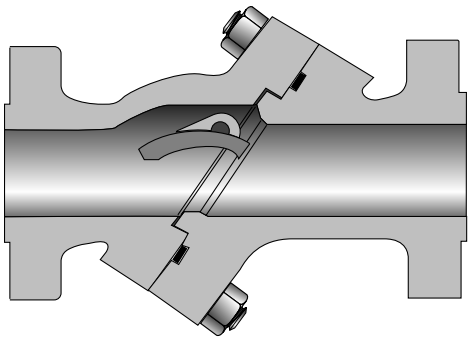


Figure 623
Flanged

Figure 623½
Butt Weld

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

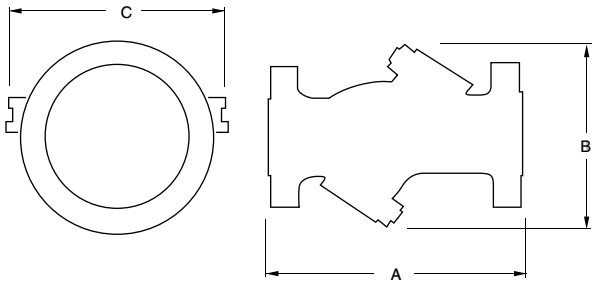
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
1480 psi @ -20°F to 100°F
(102 bar @ -28°C to 37°C)

Material of Construction*

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

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

Industry Standards
All materials comply with ASME B16.34



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

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

Tilting Disc Check Valve

Figures 923
923½

CRANE

Class 900 • Bolted Cap

Material of Construction*

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

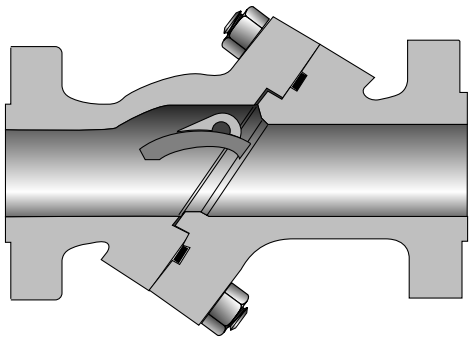
NOTE:
*Standard construction: WCB-Trim 8, other options are available.

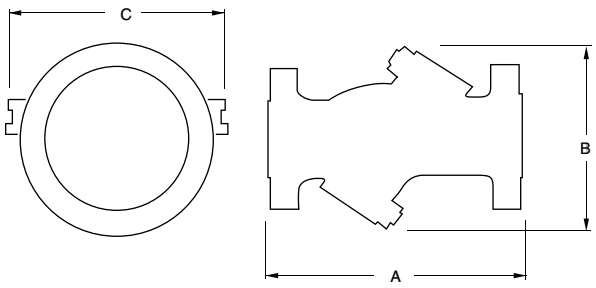
Figure 923
Flanged

Figure 923½
Butt Weld

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

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





Industry Standards
All materials comply with ASME B16.34

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

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

Class 1500 • Bolted Cap

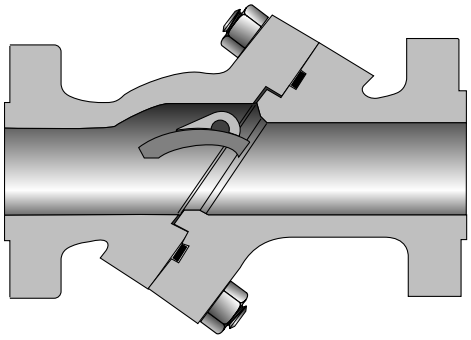


Figure 1523
Flanged
Figure 1523½
Butt Weld

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

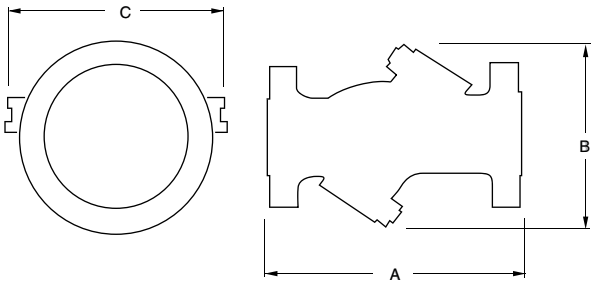
Pressure Temp. Rating
Carbon Steel
ASTM A216 Grade WCB
3705 psi @ -20°F to 100°F
(256 bar @ -28°C to 37°C)

Material of Construction*

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

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

Industry Standards
All materials comply with ASME B16.34



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

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

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:

- ASME B16.34
- ASME B16.10
- ASME B16.5

Notes

- Valves under 4" (100 mm) are typically supplied with “X” trim.
- Valves 4" (100 mm) and larger are supplied with “XU” trim.
- Butt weld end dimensions shall be in accordance with ASME B16.25 Figure 2a or Figure 3a (without backing ring) for standard pipe schedules, unless otherwise specified in the purchase order. Butt weld ends shall not be produced from flanged end castings unless specifically authorized in writing by CRANE Energy Flow Solutions.

Class	Schedule
150/300	Standard
600	Extra Strong
900/1500	Schedule 160

Cast Steel Tilting Disc Check Valve

CRANE

Typical Tilting Disc Check Valve

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

Features

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

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

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

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

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

Standard body design configurations

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

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