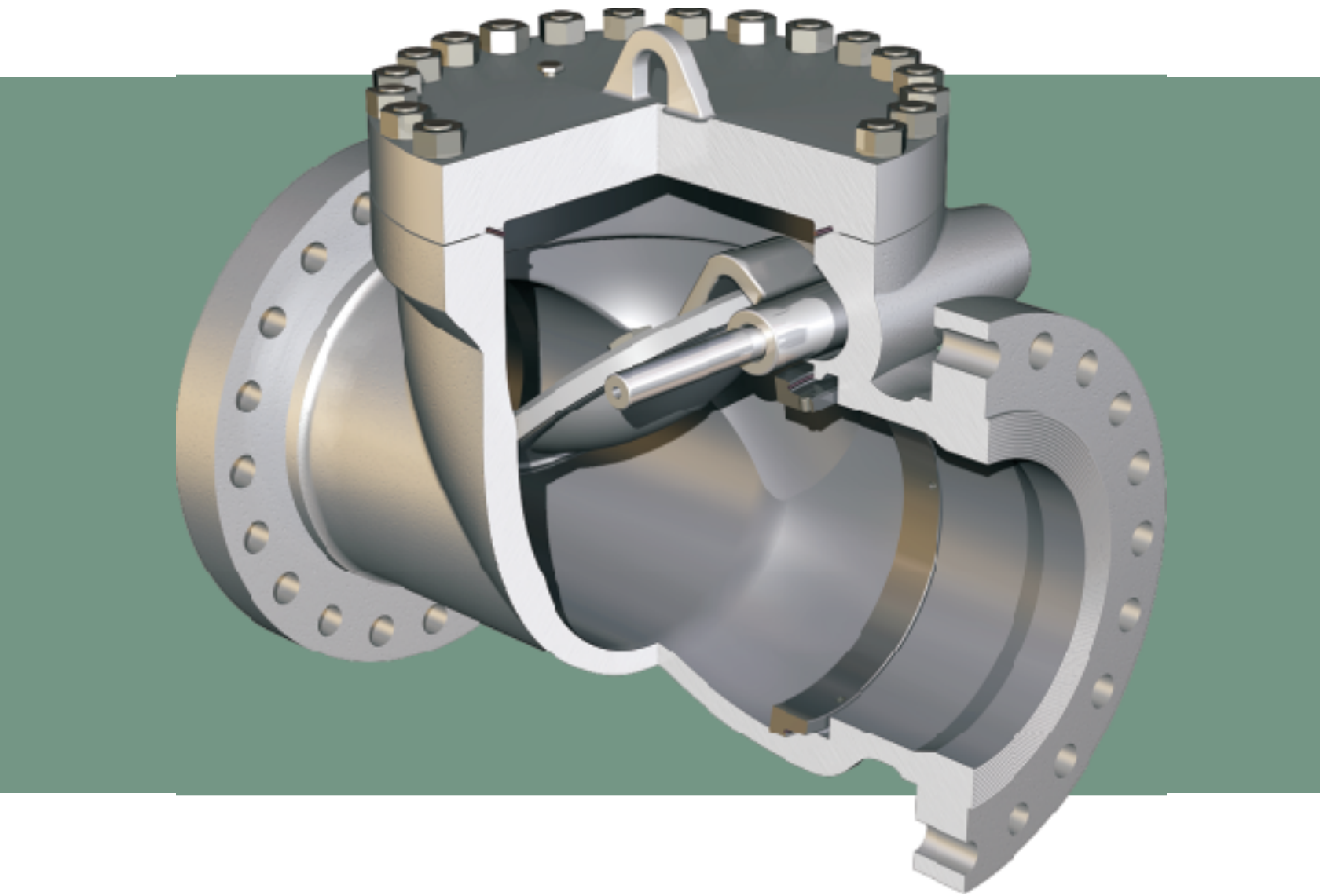
TOM WHEATLEY™
Swing Check Valves



TOM WHEATLEY™

TABLE OF CONTENTS

TOM WHEATLEY SWING CHECK VALVES

FEATURES AND BENEFITS

DIMENSIONS

SWING CHECK VALVES

APPLICATIONS

TOM WHEATLEY Swing Check Valves are commonly used by the hydrocarbon industry to:

- Prevent backflow in pipelines
- Prevent leakage to the environment in the event of a pipeline rupture
- Protect the integrity of upstream equipment

Check Valves are used primarily in oil and gas pipelines where backflow is to be prevented. Check Valves can be utilized in surface and subsea manifold production systems, or where a line requires isolation .

Low temperature LNG and LPG applications are also served by TOM WHEATLEY Swing Check Valves. These valves are also used in mining applications associated with the removal of metal ores.

The valves are available in a wide range of materials to suit the various different pressures, temperatures and service conditions encountered in the industries that are served .

From extreme temperature and pressure to subsea service, valves are available in virtually any size, pressure class, material, trim and design configuration to handle the industry's most demanding applications.

Above ground, below grade, offshore or subsea, there is a TOM WHEATLEY Swing Check Valve for your application.

DESIGN FEATURES

The secret of the TOM WHEATLEY Swing Check Valve success is simplicity. Without expensive actuation or reliance upon an outside power source, a TOM WHEATLEY Swing Check Valve prevents backflow in a fraction of a second.

The clapper is the only moving part which swings to allow flow. At the moment flow ceases, the clapper falls to the closed position, creating an instant barrier to reverse flow. It is very simple and very effective.

In addition, a swing check valve is easy to troubleshoot and easy to maintain with convenient top entry access to all valve internals.

The design of the valve complies with the requirements of API 6D / ISO 14313 and API 6D SS / ISO 14723. Unless otherwise agreed with the customer materials of construction are selected to comply with the requirements of these standards and NACE MR0175 / ISO 15156.

In its standard configuration these valves have a bolted cover and a free swinging clapper. The clapper is the closing member that responds to the prevailing flow conditions. All valves are full bore, full conduit design and will allow the passage of various pipeline inspection gauges and spheres. The full bore design ensures a low pressure drop across the valve and less turbulence than with reduced bore valves or alternative designs of swing check valves.

The valve ends can be tailored to meet almost any pipeline requirement. As a standard the valves are supplied with Raised Face or Ring Type Joint Flanges or Weld Ends. Raised Face and Ring Type Joint Flanges comply with the requirements of ASME B16.5 and ASME B16.47 as appropriate.

Flanges are back-faced to provide a smooth bolting surface to allow even bolt loading during installation in the pipeline. Weld End valves comply with ASME B16.25 unless otherwise agreed with the customer. Hub Ends and other specialty End Connections are available upon request.

Valves are available with either an integral seat or a renewable seat. A renewable seat extends the life of the valve by allowing all internal parts and seals to be replaced with the valve body still installed in the pipeline.

Sealing materials are selected for the valve service conditions. Pressure, temperature and flow media are all considered when selecting seals. Standard seal materials are Nitrile and Fluoroelastomer for the seat to clapper seal. Standard cover seal materials are also Nitrile and Fluoroelastomer but, spiral wound gaskets and ring joints can also be used for the cover to body seal.

Valves are suitable for installation in horizontal pipelines and can also be used in vertical pipelines when the flow is in an upwards direction. Customers are requested to specify if the valve is to be used in a vertical flow-up application.

The clapper seals against the seat. Upon flow reversal the clapper closes and creates a seal with the seat. As the pressure acting on the downstream face of the clapper increases, the force pushing the clapper against the seat increases. The higher the pressure acting on the downstream side of the clapper, the tighter the seal between the clapper and the seat will become.

SWING CHECK VALVES

DIMENSIONS AND WEIGHTS 2 in. - 48 in. (50 mm - 1200 mm)

This section provides dimensions and weights for 2 in. to 48 in. (50 mm - 1200 mm).

The majority of valve sizes detailed in this section can be engineered to accept the optional features detailed in this catalogue.

Sizes, Pressure Classes and End Connections not listed may be available upon request.

SIZES AND PRESSURE CLASSES AVAILABLE

SIZE		ASME CLASS					
in.	(mm)	150	300	600	900	1500	2500
2	(50)	●	●	●	●	●	●
3	(80)	●	●	●	●	●	●
4	(100)	●	●	●	●	●	●
6	(150)	●	●	●	●	●	●
8	(200)	●	●	●	●	●	●
10	(250)	●	●	●	●	●	●
12	(300)	●	●	●	●	●	●
14	(350)	●	●	●	●	●	
16	(400)	●	●	●	●	●	
18	(450)	●	●	●	●	●	
20	(500)	●	●	●	●	●	
22	(550)	●	●	●	●		
24	(600)	●	●	●	●	●	
26	(650)	●	●	●	●		
28	(700)	●	●	●			
30	(750)	●	●	●	●	●	
36	(900)	●	●	●	●		
42	(1050)	●	●	●			
48	(1200)	●	●	●			

● Flanged and Weld End Valves

STANDARD END CONFIGURATION

- **Integral Seat**
  Figure 54 - Flanged End RTJ x RTJ (Type R Ring joint)
  Figure 55 - Flanged End RF x RF
  Figure 66 - Weld End WE x WE
- **Renewable Seat**
  Figure 15XY where
  X represents the ASME Pressure Class
  Y represents the End Connection

Other valve end configurations are available and the Figure numbers are listed below.

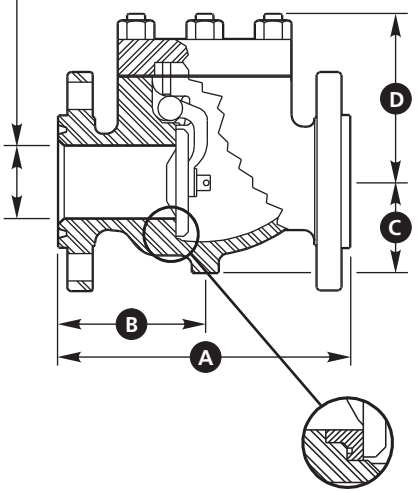
- **Integral Seat**
  Figure 52 - Hub End (Customer to specify the hub type)
  Figure 56 - Flanged End RTJ x RTJ (Type BX Ring Joint)
  Figure 57 - Flanged End (Upstream) x Weld End (Downstream)
  Figure 58 - Weld End (Upstream) x Flanged End (Downstream)

PRESSURE ASME CLASS	X
150	1
300	3
400	4
600	6
900	7
1500	8
2500	9

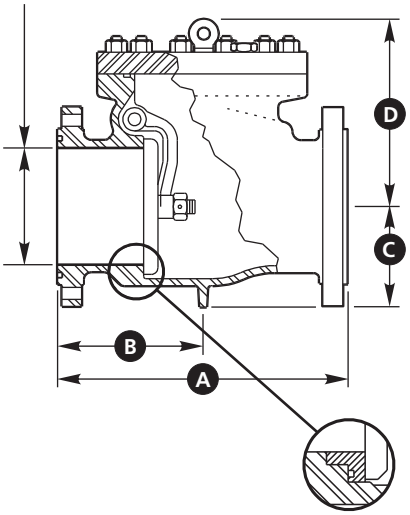
END CONNECTION	Y
RTJ	4
RF	5
WE	9

SWING CHECK VALVES DIMENSIONS
RING JOINT FLANGED ENDS - FIGURE 54

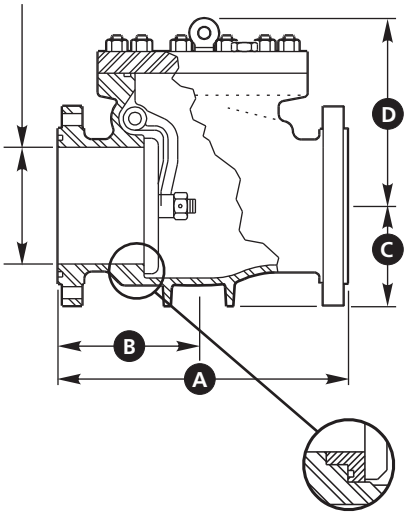
BORE = NOMINAL SIZE



BORE = NOMINAL SIZE



API STANDARD BORE



ASME CLASS 150

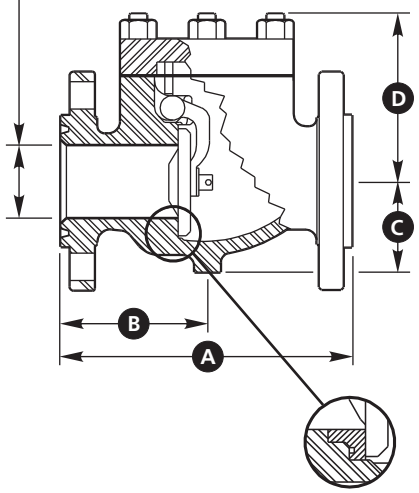
SIZE	in. (mm)	A	B	C	D
	2 (50)	8.50 (216)	4.25 (108)	2.50 (64)	4.25 (108)
	2 1/2 (65)	9.00 (229)	4.50 (114)	2.25 (57)	5.75 (146)
	3 (80)	10.00 (254)	5.00 (127)	2.50 (64)	5.00 (127)
	4 (100)	12.00 (305)	6.00 (152)	3.38 (86)	6.13 (156)
	6 (150)	14.50 (368)	7.25 (184)	5.75 (146)	10.25 (260)
	8 (200)	20.00 (508)	10.00 (254)	6.88 (175)	13.13 (333)
	10 (250)	25.00 (635)	12.50 (318)	8.50 (216)	14.50 (368)
	12 (300)	28.00 (711)	15.00 (381)	10.25 (260)	18.13 (460)
	14 (350)	31.50 (800)	15.75 (400)	10.75 (273)	18.13 (460)
	16 (400)	34.50 (876)	17.25 (438)	12.94 (329)	20.50 (521)
	18 (450)	39.00 (991)	20.50 (521)	14.25 (362)	24.38 (619)
	20 (500)	39.00 (991)	19.50 (495)	16.13 (410)	26.13 (664)
	24 (600)	51.50 (1308)	25.75 (654)	19.00 (483)	33.25 (845)

ASME CLASS 300

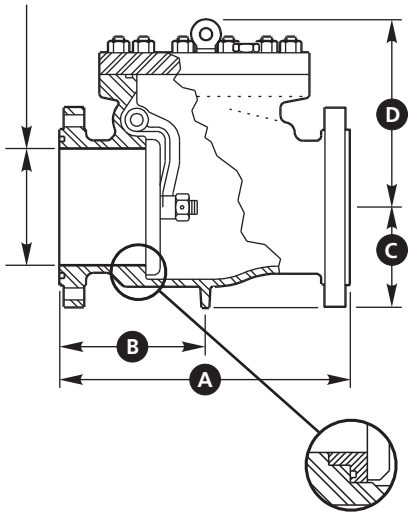
SIZE	in. (mm)	A	B	C	D
	2 (50)	11.13 (283)	5.56 (141)	2.50 (64)	4.50 (114)
	2 1/2 (65)	12.13 (308)	6.06 (154)	2.25 (57)	6.00 (152)
	3 (80)	13.13 (333)	6.56 (167)	2.50 (64)	5.63 (143)
	4 (100)	14.63 (371)	7.31 (186)	3.38 (86)	6.13 (156)
	6 (150)	18.13 (460)	9.06 (230)	6.25 (159)	11.50 (292)
	8 (200)	21.63 (549)	10.81 (275)	6.88 (175)	13.38 (340)
	10 (250)	25.13 (638)	12.56 (319)	8.50 (216)	15.00 (381)
	12 (300)	28.63 (727)	15.06 (383)	10.25 (260)	18.25 (464)
	14 (350)	33.63 (854)	16.81 (427)	10.75 (273)	18.88 (479)
	16 (400)	34.63 (879)	17.31 (440)	12.94 (329)	21.00 (533)
	18 (450)	39.13 (994)	20.81 (529)	14.25 (362)	24.38 (619)
	20 (500)	40.75 (1035)	19.63 (498)	16.13 (410)	26.63 (676)
	24 (600)	53.88 (1368)	26.94 (684)	19.00 (483)	33.25 (845)

SWING CHECK VALVES
RING JOINT FLANGED ENDS - FIGURE 54

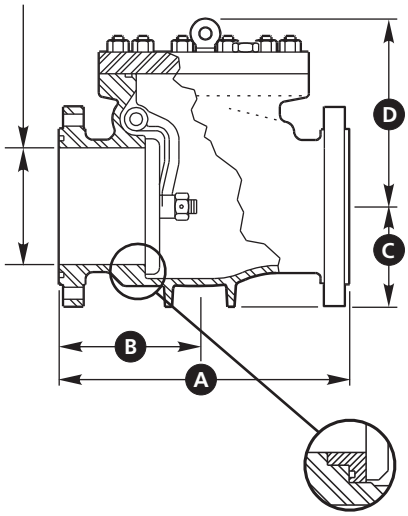
BORE = NOMINAL SIZE



BORE = NOMINAL SIZE



API STANDARD BORE



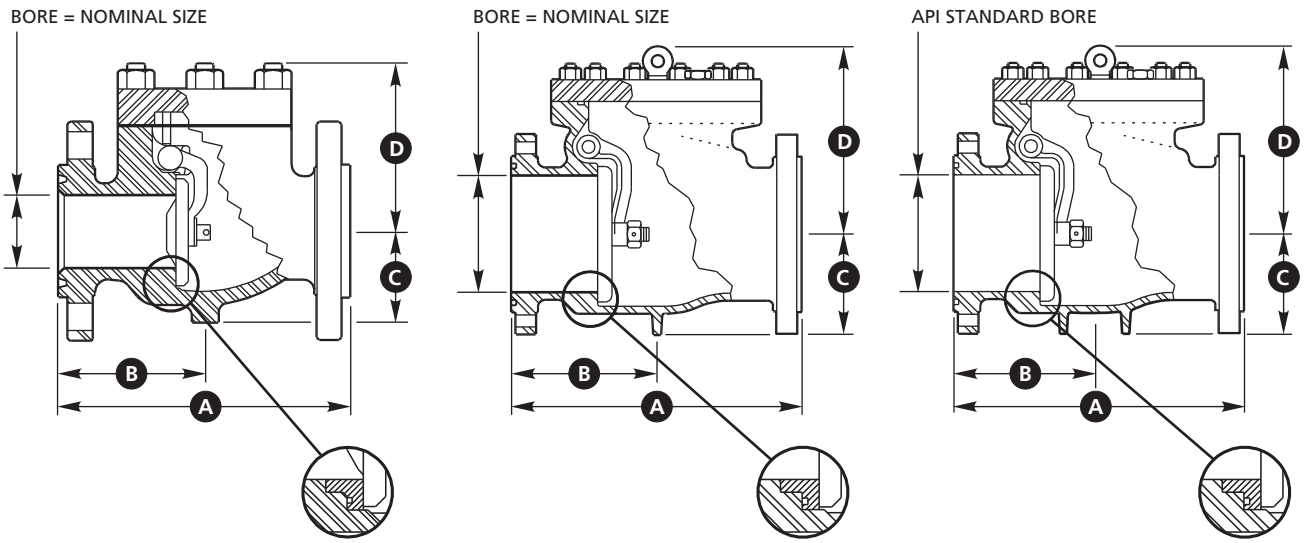
ASME CLASS 600

SIZE in. (mm)	A	B	C	D
2 (50)	11.63 (295)	5.81 (148)	2.50 (64)	4.88 (124)
2 1/2 (65)	13.13 (333)	6.56 (167)	2.25 (57)	6.13 (156)
3 (80)	14.13 (359)	7.06 (179)	2.50 (64)	5.63 (143)
4 (100)	17.13 (435)	8.56 (217)	3.38 (86)	7.63 (194)
6 (150)	22.13 (562)	11.06 (281)	6.25 (159)	11.50 (292)
8 (200)	26.13 (664)	13.06 (332)	8.25 (210)	14.38 (365)
10 (250)	31.13 (791)	15.56 (395)	8.50 (216)	16.63 (422)
12 (300)	33.13 (841)	16.56 (421)	10.25 (260)	19.75 (502)
14 (350)	35.13 (892)	17.56 (446)	10.75 (273)	19.63 (498)
16 (400)	39.13 (994)	19.56 (497)	12.94 (329)	21.50 (546)
18 (450)	43.13 (1095)	22.56 (573)	14.88 (378)	25.63 (651)
20 (500)	47.25 (1200)	23.63 (600)	16.13 (410)	28.25 (718)
24 (600)	55.38 (1407)	27.69 (703)	19.00 (483)	34.75 (883)

ASME CLASS 900

SIZE in. (mm)	A	B	C	D
2 (50)	14.63 (371)	7.31 (186)	4.25 (108)	7.13 (181)
3 (80)	15.13 (384)	7.56 (192)	2.50 (64)	6.63 (168)
4 (100)	18.13 (460)	9.06 (230)	4.06 (103)	8.00 (203)
6 (150)	24.13 (613)	12.06 (306)	7.25 (184)	13.50 (343)
8 (200)	29.13 (740)	14.56 (370)	8.25 (210)	14.88 (378)
10 (250)	33.13 (841)	16.19 (411)	10.00 (254)	20.75 (527)
12 (300)	38.13 (968)	19.56 (479)	10.25 (260)	19.75 (502)

SWING CHECK VALVES
RING JOINT FLANGED ENDS - FIGURE 54



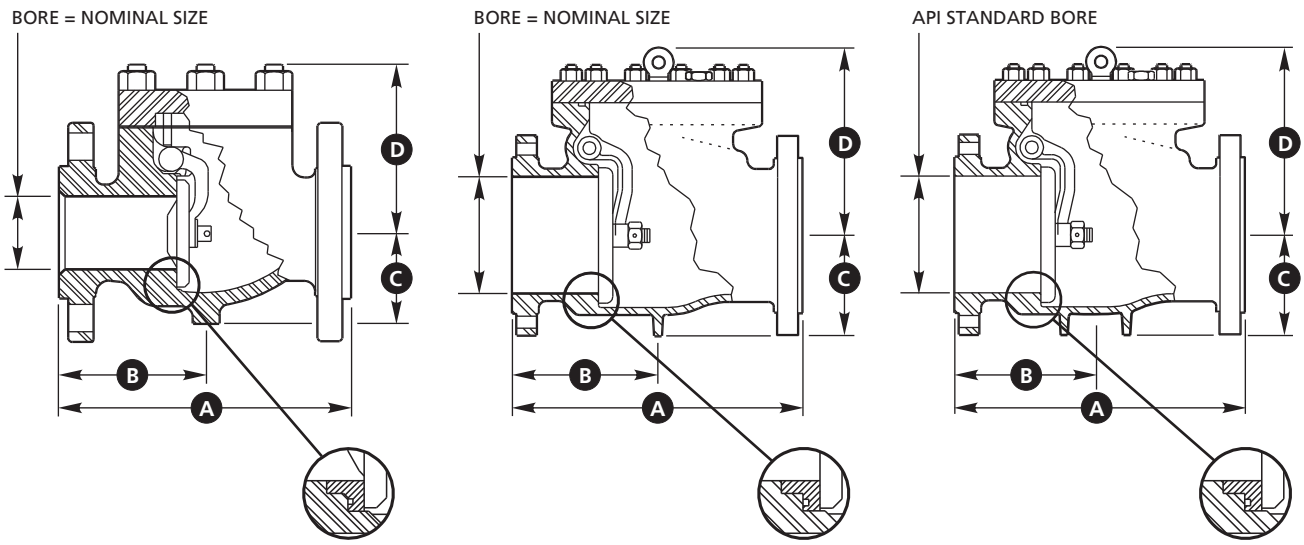
ASME CLASS 1500

SIZE	in. (mm)	A	B	C	D
	2 (50)	14.63 (371)	7.31 (186)	4.25 (108)	7.13 (181)
	3 (80)	18.63 (473)	9.31 (237)	4.94 (125)	10.63 (270)
	4 (100)	21.63 (549)	10.81 (275)	4.44 (113)	10.88 (276)
	6 (150)	28.00 (711)	14.00 (356)	7.25 (184)	13.75 (349)
	8 (200)	33.13 (841)	16.56 (421)	5.50 (140)	18.63 (473)
	10 (250)	39.38 (1000)	19.69 (500)	10.00 (254)	22.00 (559)
	12 (300)	45.13 (1146)	22.56 (573)	15.25 (387)	24.38 (619)

ASME CLASS 2500

SIZE	in. (mm)	A	B	C	D
	2 (50)	17.88 (454)	8.94 (227)	2.25 (57)	6.00 (152)
	3 (80)	23.00 (584)	11.50 (292)	6.00 (152)	10.63 (270)
	4 (100)	26.88 (683)	13.44 (341)	6.00 (152)	12.63 (321)
	6 (150)	36.50 (927)	18.25 (464)	5.38 (137)	14.88 (378)
	8 (200)	40.88 (1038)	20.44 (519)	9.38 (238)	18.38 (467)
	10 (250)	50.88 (1292)	25.44 (646)	-	-
	12 (300)	56.88 (1445)	28.44 (722)	15.25 (387)	24.88 (632)

SWING CHECK VALVES DIMENSIONS
RAISED FACE FLANGED ENDS - FIGURE 55



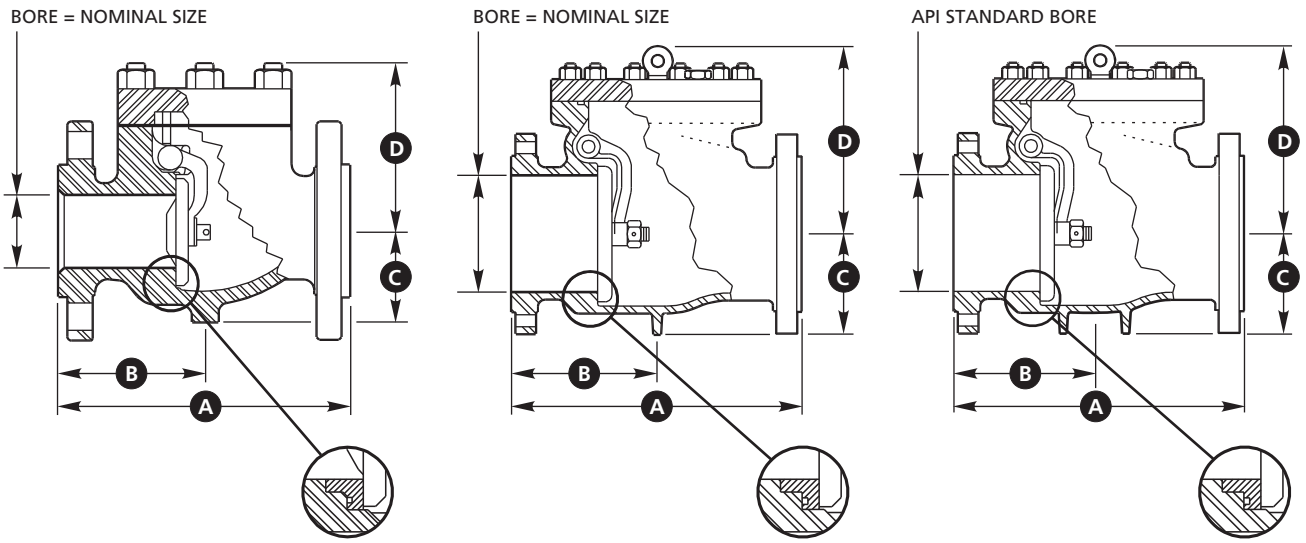
ASME CLASS 150

SIZE	in. (mm)	A	B	C	D
	2 (50)	8.00 (203)	4.00 (102)	2.50 (64)	4.25 (108)
	2 1/2 (65)	8.50 (216)	4.25 (108)	2.25 (57)	5.75 (146)
	3 (80)	9.50 (241)	4.75 (121)	2.50 (64)	5.00 (127)
	4 (100)	11.50 (292)	5.75 (146)	3.38 (86)	6.13 (156)
	6 (150)	14.00 (356)	7.00 (178)	5.75 (146)	10.25 (260)
	8 (200)	19.50 (495)	9.75 (248)	6.88 (175)	13.13 (333)
	10 (250)	24.50 (622)	12.25 (311)	8.50 (216)	14.50 (368)
	12 (300)	27.50 (699)	14.75 (375)	10.25 (260)	18.13 (460)
	14 (350)	31.00 (787)	15.50 (394)	10.75 (273)	18.13 (460)
	16 (400)	34.00 (864)	17.00 (432)	12.94 (329)	20.50 (521)
	18 (450)	38.50 (978)	20.25 (514)	14.25 (362)	24.38 (619)
	20 (500)	38.50 (978)	19.25 (489)	16.13 (410)	26.13 (664)
	24 (600)	51.00 (1295)	25.50 (648)	19.00 (483)	33.25 (845)

ASME CLASS 300

SIZE	in. (mm)	A	B	C	D
	2 (50)	10.50 (267)	5.25 (133)	2.50 (64)	4.50 (114)
	2 1/2 (65)	11.50 (292)	5.75 (146)	2.25 (57)	6.00 (152)
	3 (80)	12.50 (318)	6.25 (159)	2.50 (64)	5.63 (143)
	4 (100)	14.00 (356)	7.00 (178)	3.38 (86)	6.13 (156)
	6 (150)	17.50 (445)	8.75 (222)	6.25 (159)	11.50 (292)
	8 (200)	21.00 (533)	10.50 (267)	6.88 (175)	13.38 (340)
	10 (250)	24.50 (622)	12.25 (311)	8.50 (216)	15.00 (381)
	12 (300)	28.00 (711)	14.75 (375)	10.25 (260)	18.25 (464)
	14 (350)	33.00 (838)	16.50 (419)	10.75 (273)	18.88 (479)
	16 (400)	34.00 (864)	17.00 (432)	12.94 (329)	21.00 (533)
	18 (450)	38.50 (978)	20.50 (521)	14.25 (362)	24.38 (619)
	20 (500)	40.00 (1016)	20.00 (508)	16.13 (410)	26.63 (676)
	24 (600)	53.00 (1346)	26.50 (673)	19.00 (483)	33.25 (845)

SWING CHECK VALVES DIMENSIONS
RAISED FACE FLANGED ENDS - FIGURE 55



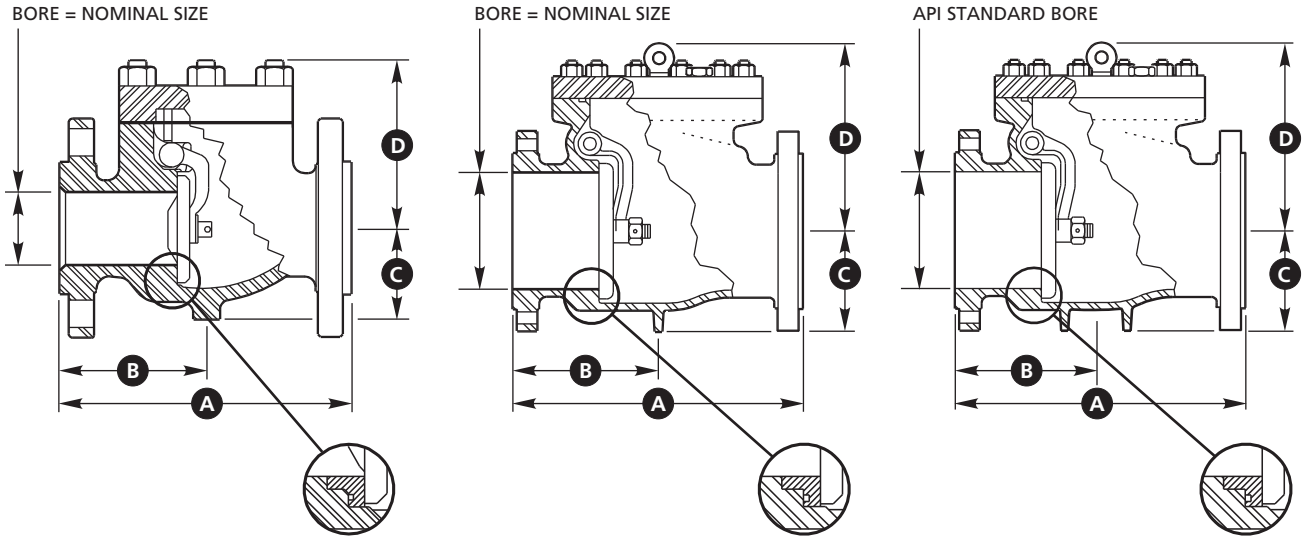
ASME CLASS 600

SIZE	in. (mm)	A	B	C	D
	2 (50)	11.50 (292)	5.75 (146)	2.50 (64)	4.88 (124)
	2 1/2 (65)	13.00 (330)	6.50 (165)	2.25 (57)	6.13 (156)
	3 (80)	14.00 (356)	7.00 (178)	2.50 (64)	5.63 (143)
	4 (100)	17.00 (432)	8.50 (216)	3.38 (86)	7.63 (194)
	6 (150)	22.00 (559)	11.00 (279)	6.25 (159)	11.50 (292)
	8 (200)	26.00 (660)	13.00 (330)	6.25 (210)	14.38 (365)
	10 (250)	31.00 (787)	15.50 (394)	8.50 (216)	16.63 (422)
	12 (300)	33.00 (838)	16.50 (419)	10.25 (260)	19.75 (502)
	14 (350)	35.00 (889)	17.50 (445)	10.75 (273)	19.63 (498)
	16 (400)	39.00 (991)	19.50 (495)	12.94 (329)	21.50 (546)
	18 (450)	43.00 (1092)	22.50 (572)	14.88 (378)	25.63 (651)
	20 (500)	47.00 (1194)	23.50 (597)	16.13 (410)	28.25 (718)
	24 (600)	55.00 (1397)	27.50 (699)	19.00 (483)	34.75 (883)

ASME CLASS 900

SIZE	in. (mm)	A	B	C	D
	2 (50)	14.50 (368)	7.25 (184)	4.25 (108)	7.13 (181)
	3 (80)	15.00 (381)	7.50 (191)	2.50 (64)	6.63 (168)
	4 (100)	18.00 (457)	9.00 (229)	4.06 (103)	8.00 (203)
	6 (150)	24.00 (610)	12.00 (305)	7.25 (184)	13.50 (343)
	8 (200)	29.00 (737)	14.50 (368)	8.25 (210)	14.88 (378)
	10 (250)	33.00 (838)	16.13 (410)	10.00 (254)	20.75 (527)
	12 (300)	38.00 (968)	19.50 (495)	10.25 (260)	19.75 (502)

SWING CHECK VALVES DIMENSIONS
RAISED FACE FLANGED ENDS - FIGURE 55



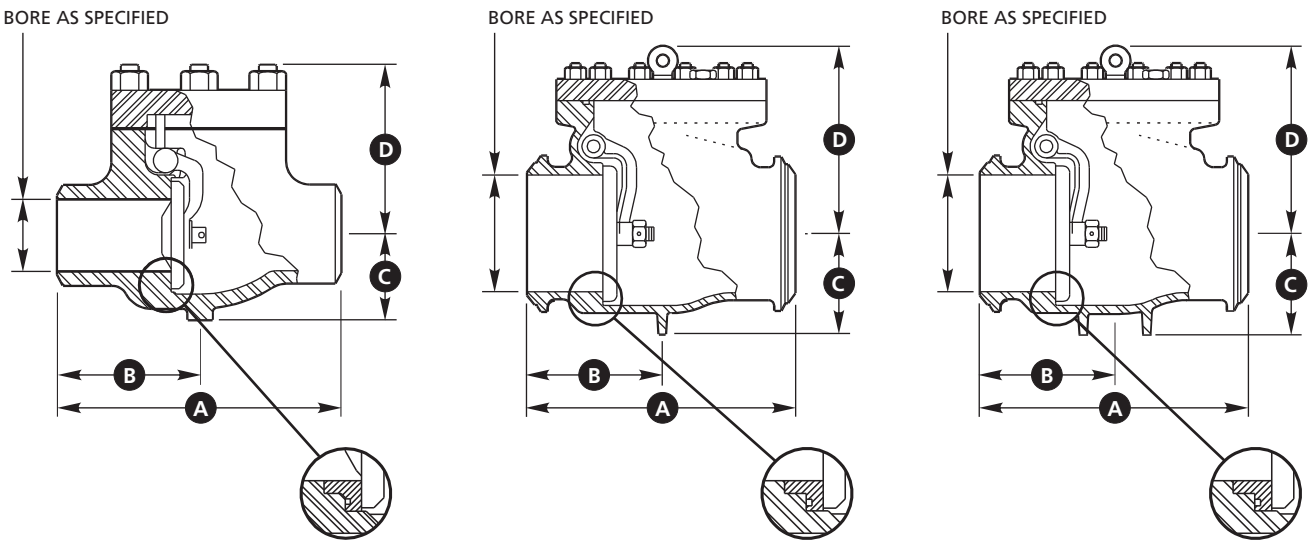
ASME CLASS 1500

SIZE	in. (mm)	A	B	C	D
	2 (50)	14.50 (368)	7.25 (184)	4.25 (108)	7.13 (181)
	3 (80)	18.50 (470)	9.25 (235)	4.94 (125)	10.63 (270)
	4 (100)	21.50 (546)	10.75 (273)	4.44 (113)	10.88 (276)
	6 (150)	27.75 (705)	13.88 (352)	7.25 (184)	13.75 (349)
	8 (200)	32.75 (832)	16.38 (416)	5.50 (140)	18.63 (473)
	10 (250)	39.00 (991)	19.50 (495)	10.00 (254)	22.00 (559)
	12 (300)	44.50 (1130)	22.25 (565)	15.25 (387)	24.38 (619)

ASME CLASS 2500

SIZE	in. (mm)	A	B	C	D
	2 (50)	17.75 (451)	8.88 (225)	2.25 (57)	6.00 (152)
	3 (80)	22.75 (578)	11.38 (289)	6.00 (152)	10.63 (270)
	4 (100)	26.50 (673)	13.25 (337)	6.00 (152)	12.63 (321)
	6 (150)	36.00 (914)	18.00 (457)	5.38 (137)	14.88 (378)
	8 (200)	40.25 (1022)	20.44 (519)	9.38 (238)	18.38 (467)
	10 (250)	50.00 (1270)	25.00 (635)	-	-
	12 (300)	56.00 (1422)	28.00 (711)	15.25 (387)	24.88 (632)

SWING CHECK VALVES DIMENSIONS
WELD ENDS - FIGURE 66



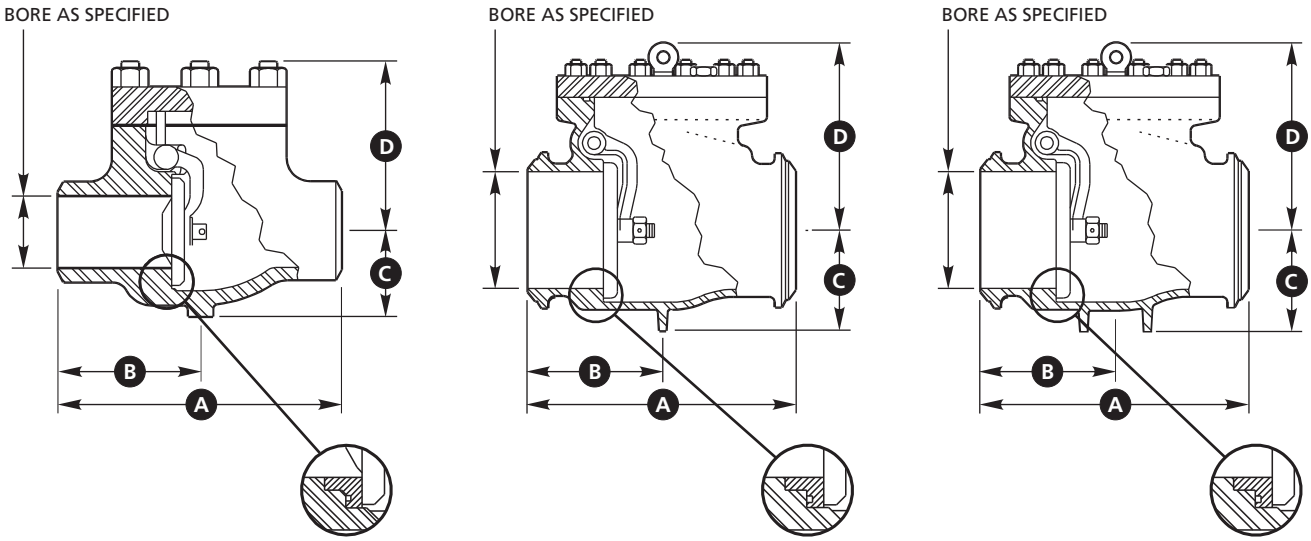
ASME CLASS 150

SIZE	in. (mm)	A	B	C	D
	2 (50)	8.00 (203)	4.00 (102)	2.50 (64)	4.25 (108)
	2 1/2 (65)	8.50 (216)	4.25 (108)	2.25 (57)	5.75 (146)
	3 (80)	9.50 (241)	4.75 (121)	2.50 (64)	5.00 (127)
	4 (100)	11.50 (292)	5.75 (146)	3.38 (86)	6.13 (156)
	6 (150)	14.00 (356)	7.00 (178)	5.75 (146)	10.25 (260)
	8 (200)	19.50 (495)	9.75 (248)	6.88 (175)	13.13 (333)
	10 (250)	24.50 (622)	12.25 (311)	8.50 (216)	14.50 (368)
	12 (300)	27.50 (699)	14.75 (375)	10.25 (260)	18.13 (460)
	14 (350)	31.00 (787)	15.50 (394)	10.75 (273)	18.13 (460)
	16 (400)	34.00 (864)	17.00 (432)	12.94 (329)	20.50 (521)
	18 (450)	38.50 (978)	20.25 (514)	14.25 (362)	24.38 (619)
	20 (500)	38.50 (978)	19.25 (489)	16.13 (410)	26.13 (664)
	24 (600)	51.00 (1295)	25.50 (648)	19.00 (483)	33.25 (845)

ASME CLASS 300

SIZE	in. (mm)	A	B	C	D
	2 (50)	10.50 (267)	5.25 (133)	2.50 (64)	4.50 (114)
	2 1/2 (65)	11.50 (292)	5.75 (146)	2.25 (57)	6.00 (152)
	3 (80)	12.50 (318)	6.25 (159)	2.50 (64)	5.63 (143)
	4 (100)	14.00 (356)	7.00 (178)	3.38 (86)	6.13 (156)
	6 (150)	17.50 (445)	8.75 (222)	6.25 (159)	11.50 (292)
	8 (200)	21.00 (533)	10.50 (267)	6.88 (175)	13.38 (340)
	10 (250)	24.50 (622)	12.25 (311)	8.50 (216)	15.00 (381)
	12 (300)	28.00 (711)	14.75 (375)	10.25 (260)	18.25 (464)
	14 (350)	33.00 (838)	16.50 (419)	10.75 (273)	18.88 (479)
	16 (400)	34.00 (864)	17.00 (432)	12.94 (329)	21.00 (533)
	18 (450)	38.50 (978)	20.50 (521)	14.25 (362)	24.38 (619)
	20 (500)	40.00 (1016)	20.00 (508)	16.13 (410)	26.63 (676)
	24 (600)	53.00 (1346)	26.50 (673)	19.00 (483)	33.25 (845)

SWING CHECK VALVES DIMENSIONS
WELD ENDS - FIGURE 66



ASME CLASS 600

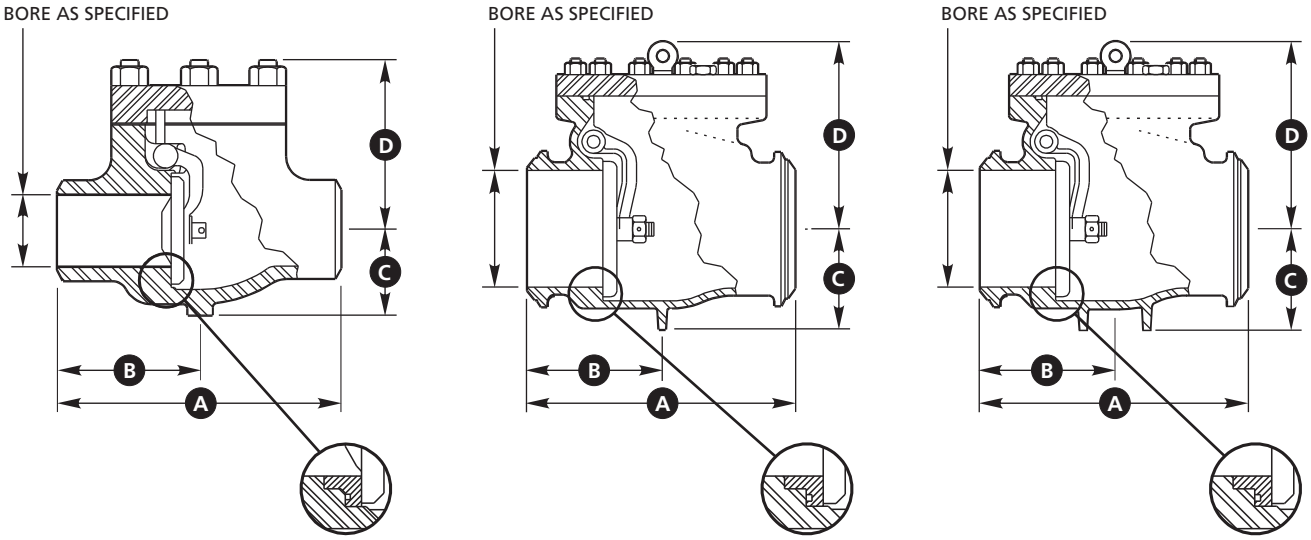
SIZE	in. (mm)	A	B	C	D
	2 (50)	11.50 (292)	5.75 (146)	2.50 (64)	4.88 (124)
	2 1/2 (65)	13.00 (330)	6.50 (165)	2.25 (57)	6.13 (156)
	3 (80)	14.00 (356)	7.00 (178)	2.50 (64)	5.63 (143)
	4 (100)	17.00 (432)	8.50 (216)	3.38 (86)	7.63 (194)
	6 (150)	22.00 (559)	11.00 (279)	6.25 (159)	11.50 (292)
	8 (200)	26.00 (660)	13.00 (330)	8.25 (210)	14.38 (365)
	10 (250)	31.00 (787)	15.50 (394)	8.50 (216)	16.63 (422)
	12 (300)	33.00 (838)	16.50 (419)	10.25 (260)	19.75 (502)
	14 (350)	35.00 (889)	17.50 (445)	10.75 (273)	19.63 (498)
	16 (400)	39.00 (991)	19.50 (495)	12.94 (329)	21.50 (546)
	18 (450)	43.00 (1092)	22.50 (572)	14.88 (378)	25.63 (651)
	20 (500)	47.00 (1194)	23.50 (597)	16.13 (410)	28.25 (718)
	24 (600)	55.00 (1397)	27.50 (699)	19.00 (483)	34.75 (883)

ASME CLASS 900

SIZE	in. (mm)	A	B	C	D
	2 (50)	11.50 (292)*	5.75 (146)	2.50 (64)	5.13 (130)
	3 (80)	15.00 (381)	7.50 (191)	2.50 (64)	6.63 (168)
	4 (100)	17.00 (432)*	8.50 (216)	4.06 (103)	8.00 (203)
	6 (150)	22.00 (559)*	11.00 (279)	7.25 (184)	13.50 (343)
	8 (200)	26.00 (660)*	13.00 (330)	8.25 (210)	14.88 (378)
	10 (250)	33.00 (838)	16.13 (410)	10.00 (254)	20.75 (527)
	12 (300)	33.00 (838)*	16.50 (419)	10.25 (260)	19.75 (502)

* = API 6D4 Length

SWING CHECK VALVES DIMENSIONS
WELD ENDS - FIGURE 66



ASME CLASS 1500

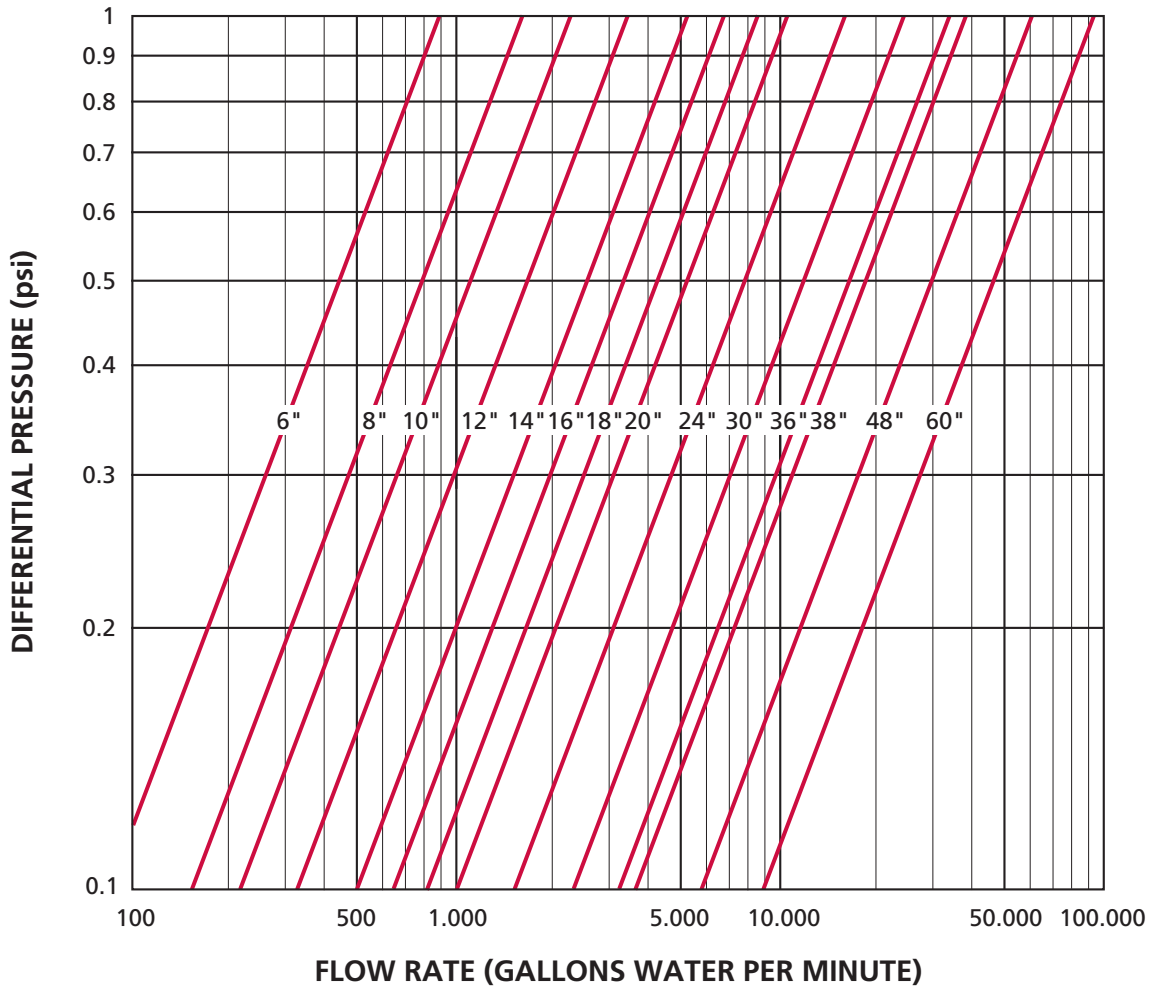
SIZE	in. (mm)	A	B	C	D
	2 (50)	14.50 (368)	7.25 (184)	4.25 (108)	7.13 (181)
	3 (80)	18.50 (470)	9.25 (235)	4.94 (125)	10.63 (270)
	4 (100)	21.50 (546)	10.75 (273)	4.44 (113)	10.88 (276)
	6 (150)	17.75 (451)*	8.88 (225)	7.25 (184)	13.75 (349)
	8 (200)	32.75 (832)	16.38 (416)	9.38 (238)	18.38 (467)
	10 (250)	33.00 (838)*	16.13 (410)	10.00 (254)	22.00 (559)
	12 (300)	44.50 (1130)	22.25 (565)	15.25 (387)	24.38 (619)

ASME CLASS 2500

SIZE	in. (mm)	A	B	C	D
	2 (50)	17.75 (451)	8.88 (225)	2.25 (57)	6.00 (152)
	3 (80)	22.75 (578)	11.38 (289)	6.00 (152)	10.63 (270)
	4 (100)	26.50 (673)	13.25 (337)	6.00 (152)	12.63 (321)
	6 (150)	36.00 (914)	18.00 (457)	5.38 (137)	14.88 (378)
	8 (200)	40.25 (1022)	20.44 (519)	9.38 (238)	18.38 (467)
	10 (250)	50.00 (1270)	25.00 (635)	-	-
	12 (300)	56.00 (1422)*	22.25 (565)	15.25 (387)	24.88 (632)

* = API 6D4 Length

PRESSURE LOSS CURVES FOR SWING CHECK VALVES



FLOW COEFFICIENTS (C_v) FULL OPEN VALVES

Size in. (mm)	C_v
6 (160)	878
8 (200)	1562
10 (250)	2440
12 (300)	3514
14 (350)	5159
16 (400)	6738
18 (450)	8528
20 (500)	10528
24 (600)	15160
30 (750)	23688
36 (900)	34111
38 (950)	38007
48 (1200)	60643
60 (1500)	94755

The equations listed below are the basis for the above nomogram. The nomogram is a method for solving the equations below quickly and simply when the service fluid is water

LIQUID (INCOMPRESSIBLE FLOW)

$$C_v = Q\sqrt{\frac{G}{\Delta P}} \qquad Q = C_v\sqrt{\frac{\Delta P}{G}} \qquad \Delta P = \left[\frac{Q}{C_v}\right]$$

GAS (COMPRESSIBLE FLOW)

$$C_v = \frac{Q}{963}\sqrt{\frac{GT}{P_1^2 - P_2^2}} \qquad Q = C_v\,963\sqrt{\frac{P_1^2 - P_2^2}{GT}}$$

Where:

Q = Flow (GPM for Liquids, SCFH for Gases).
C_V = Flow Coefficient.
P_1 = Inlet Pressure (psia)
P_2 = Outlet Pressure (psia)
ΔP = Pressure Drop ($P_1 - P_2$)
T = Absolute Temperature (°F = 460)
G = Specific Gravity (Water = 1)

SWING CHECK VALVES APPLICATIONS
OPTIONAL FEATURES EXTENDED SHAFTS

TOM WHEATLEY Swing Check Valves are available in a wide variety of materials to meet your particular requirements. High and low temperature, corrosion resistant and other special designs for critical service are also an integral part of TOM WHEATLEY'S Swing Check Valve product portfolio.

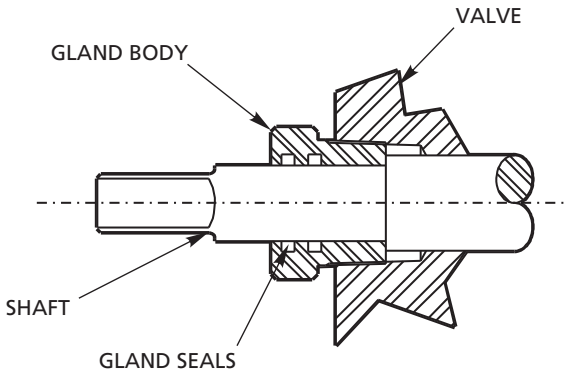
Accessories such as slam retarders, spring loaded clappers, counter-weights, dead-weights, conduit clappers and various gland options that can be used in combination with manual or actuated lock open devices are available.

Any swing check valve that has an external accessory connected to the shaft has a gland. The gland houses the seals preventing release of pipeline media to the environment.

TOM WHEATLEY Swing Check Valves have a number of different gland styles suitable for various applications. Some of these glands and accessory applications are described below.

TYPE A-GLAND

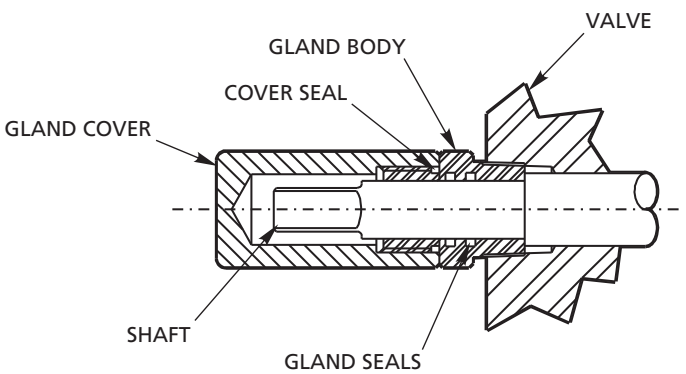
- The Type A-Gland is a standard extended shaft seal
- It features a dual seal within the gland body
- It is suitable for above ground use in clean service conditions
- This gland can be used in conjunction with a lever to lock open the clapper or with a counter-weight or dead-weight



Available for sizes 3 in. - 12 in. (80 mm - 300 mm)

TYPE B-GLAND

- The Type B-Gland is a standard covered shaft seal for extended shafts
- Its features are identical to those of type A-Gland with the addition of a sealed protective cover
- The Type B-Gland is a simple, proven design for protected extended shaft application

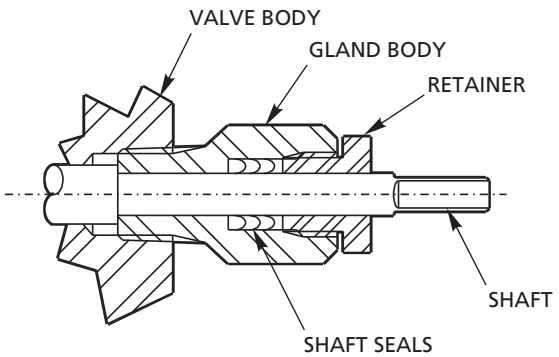


Available for sizes 3 in. - 12 in. (80 mm - 300 mm)

SWING CHECK VALVES APPLICATIONS
EXTENDED SHAFTS

TYPE SA-GLAND

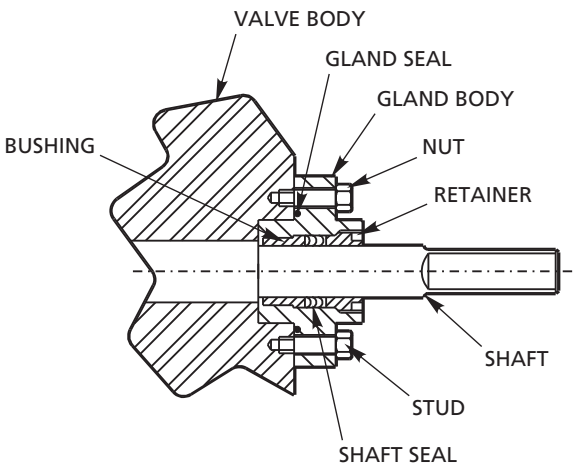
- The Type SA-Gland is a standard adjustable shaft seal for extended shafts
- It features an externally, adjustable packing gland with TFE/Chevron Packing
- The Type SA-Gland is a simple, proven design for special extended shaft applications



Available for sizes 2 in. - 12 in. (50 mm - 300 mm)

TYPE S-GLAND

- The Type S-Gland is a premium adjustable shaft seal for extended shaft applications
- It features a bolted on gland body with an externally adjustable packing gland with TFE/Chevron Packing
- The Type S-Gland is a proven design for special extended shaft applications

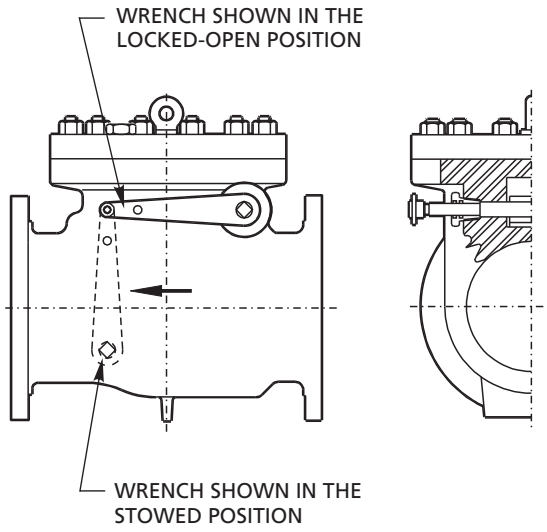


Available for sizes 14 in. (350 mm) and Larger

SWING CHECK VALVES APPLICATIONS

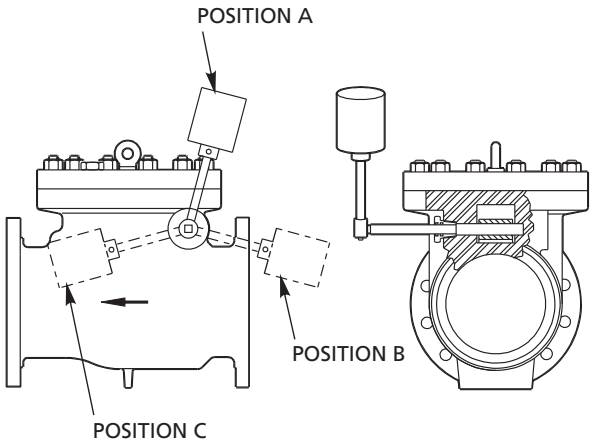
LOCK OPEN DEVICE

- The TOM WHEATLEY Swing Check Valve with lock-open device is designed to provide years of trouble-free service
- The lock-open device allows easy opening of the check valve clapper and locks the clapper in the full-open position
- The clapper shaft is extended through the valve body. The clapper arm is keyed to the shaft and the extended shaft is squared to accept the lock-open wrench
- The lock-open device is intended for applications requiring the occasional override of the normal check valve function. These applications may include locking open for test, line drainage, reverse pigging or other reverse flow conditions
- Use of the lock-open device requires zero pressure differential (balanced pressure) across the closed clapper to manually open the clapper. Excess force used to open the clapper can cause internal damage to the check valve and prevent use of the lock-open device
- The shaft may be sealed with an O-ring type seal or with Chevron type packing. A cover can be provided to protect the extended shaft when the lock-open device is not in use. The shaft may also be fitted with a counterweight to control pressure drop or to aid in opening on larger valves. Other extended shaft accessories such as switches and retarders are available. A wide variety of materials are available for all components, seating surfaces and seals
- The TOM WHEATLEY Swing Check Valve with lock-open device provides reliable service for most flow conditions



CLAPPER COUNTERWEIGHT

- The TOM WHEATLEY Swing Check Valve with clapper counterweight is designed to provide years of trouble-free service
- The counterweight assembly is attached to the extended shaft of the swing check valve and may be used with any type gland
- The counterweight assembly can be used to counterbalance the weight of the clapper to provide lower pressure drop which decreases energy loss through the valve. The counterweight assembly is attached in POSITION A as shown with the valve in the closed position
- The counterweight assembly must be used on swing check valves installed in VERTICAL FLOW DOWN applications to counterbalance the weight of the clapper and ensure closing. The counterweight assembly is attached in POSITION B as shown with the valve in the closed position
- The counterweight assembly is also used to increase the closing speed of the valve by increasing the weight of the clapper. This arrangement ensures the closure of the valve prior to the reversal. A disadvantage of this arrangement is increased pressure loss. The counterweight assembly is attached in POSITION C as shown with the valve in the closed position
- The counterweight assembly is available for 2 in. (50 mm) and larger swing check valves



SWING CHECK VALVES APPLICATIONS

ROTARY SLAM RETARDER

- The TOM WHEATLEY Swing Check Valve can be furnished with the rotary slam retarder shown in Figure 1
- This unit is designed to allow quick opening of the check valve clapper and to prevent the clapper from "slamming" closed under reverse flow conditions
- The TOM WHEATLEY Swing Check Valve with rotary slam retarder is a reliable and economical alternative for compressor discharge service or any flow conditions where surging is a problem
- The TOM WHEATLEY rotary slam retarder is basically a rotary actuator that has been modified to act as a dampener
- A flow control valve is piped between the inlet and outlet ports in such a manner that the unit allows quick opening but can be adjusted to control closure time
- These units are engineered to provide years of trouble-free service and little, if any, periodic maintenance is required
- A relief valve is included to prevent damage to the unit or to the check valve components should the design load be exceeded

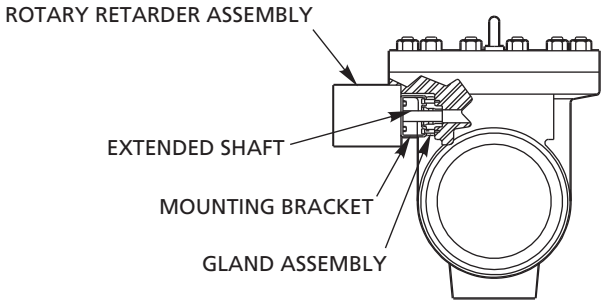
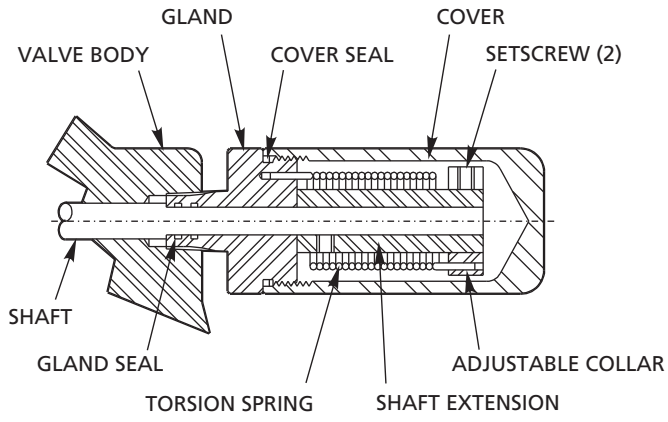


FIGURE 1

NOTE: MOUNTING BRACKET SHOWN IS FOR ABOVE GROUND APPLICATIONS. A SPOOL-TYPE BRACKET WILL BE PROVIDED FOR BURIED OR SUBSEA SERVICE.

EXTENDED SHAFT SPRING RETURN CLAPPER

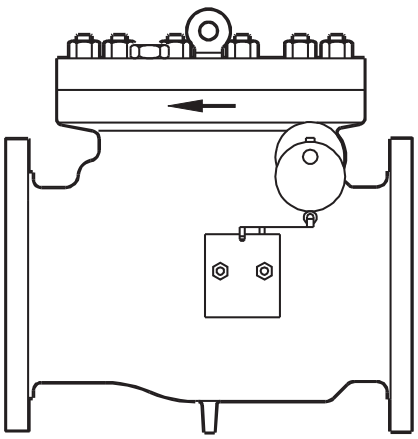
- The TOM WHEATLEY Swing Check Valve with the spring return clapper (available for 4 in. (100 mm) and larger) is designed to provide years of trouble-free service
- The spring return clapper device provides positive closure of the clapper under all conditions. Valves having this accessory may be installed in vertical flow lines with flow up or flow down
- The spring force applied to the clapper is adjustable by loosening the setscrew in the adjusting collar turning the collar to either increase or decrease the torque on the clapper shaft and re-tightening the setscrews
- The spring return mechanism is protected by a sealed cover
- For positive, reliable spring closing, specify the TOM WHEATLEY Swing Check Valve with the spring return clapper



SWING CHECK VALVES - OPTIONAL FEATURES

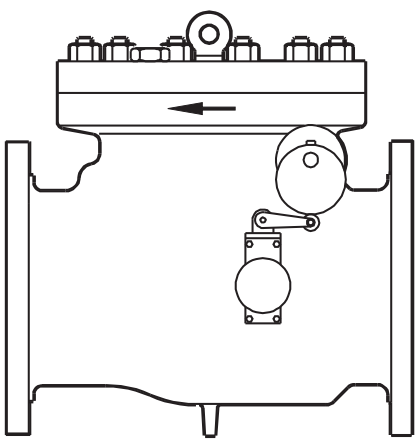
MICROVALVE

- Any TOM WHEATLEY Swing Check Valve 4 in. (100 mm) and larger can be equipped with a microvalve to provide a pneumatic signal at a present clapper position
- The operation cam is adjustable for all operating positions of the clapper



MICROSWITCH

- Any TOM WHEATLEY Swing Check Valve 2 in. (50 mm) and larger can be equipped with a microswitch to provide an electric signal at a designated clapper position



MINI SLAM II - CHECK VALVE DAMPENING SYSTEM

The Mini Slam II will protect your check valve better, with fewer service problems, than any other check valve dampening system you can buy.

HERE'S WHY:

- The Mini Slam II was designed specifically to dampen check valves. It is not an ad hoc shock absorber, gear or spring
- The Mini Slam II is completely self-contained in a compact unit. All control functions are internal, protected from the environment. There is no external piping which can bend, leak or break
- There are only two moving parts. The Mini Slam II should never need maintenance
- The Mini Slam II mounts directly on the clapper shaft. There are no connecting rods to bend or break or to work loose allowing undampened clapper action. Plunger and piston-style dampeners encounter side loads which cause early bushing and seal failure. The Mini Slam II rotates about the clapper shaft eliminating this maintenance problem
- The Mini Slam II uses O-ring seals which are subject to the rotating movement of the clapper shaft - not the scraping action inherent with a plunger or piston design. The O-ring seals in the Mini Slam II last longer reducing the possibility of leakage
- The Mini Slam II has only one dampening adjustment which cannot be completely closed
- The Mini Slam II does not obstruct the valve bore. The valve remains fully open for passage of pigs and spheres
- A built-in over-pressure valve, preset at the factory, neutralizes dampening action in the event of flow reversal. The clapper is allowed to close immediately - on demand
- Only one Mini Slam II is required to effectively dampen the check valve.* This leaves the other side of the valve available for levers, clapper position indicators or numerous other extended pin options available from TOM WHEATLEY

* 48 inch requires two

HERE'S HOW IT WORKS

The Mini Slam II mounts directly on and is keyed to the valve clapper shaft. Clapper action causes the rotor vanes to rotate in the direction indicated by the bold black arrows in Figure 2.

The rotor vanes in Figure 2 cause the dampening fluid (Dow Corning® 200 silicone fluid) to flow through the opening established by the dampening rate adjustment. A smaller opening produces more dampening. A larger opening produces less dampening. As a safety feature the dampening rate adjustment cannot be completely closed.

The dampening fluid flows from the high pressure areas created by the clapper action to the low pressure areas. In the event of a pressure spike, the dampener torque relief valve in Figure 1 activates to reduce the dampening effect on the check valve.

The Mini Slam II is protected and the valve clapper is allowed to close immediately, thereby protecting the installation.

OPERATING TERMINOLOGY

Dampening Rate Adjustment (Figure 1)
Adjustment valve which uncovers an opening in the lower stator (Figure 2). As the opening is uncovered, it becomes larger, reducing the dampening effect on the check valve. A smaller opening causes more dampening. An internal stop limits the travel of the valve.

Crossover Ports (Figure 1 & 2)
Ports which allow the dampening fluid to remain balanced in the high and low pressure areas created by clapper movement.

Dampening Torque Relief Valve (Figure 1)
Safety relief valve which controls the maximum rotor vane (Figure 2) pressure of torque. Excessive torque caused by unusual clapper movement will activate the dampener torque relief valve (Figure 1). This connects the crossover ports allowing fluid to bypass from the high pressure to the low pressure areas. The Mini Slam II is protected in the event of unusual line pressure spikes.

Shuttle Valve (Figure 2)
Relief valve which remains open to the low pressure area at all times. In the event of fluid expansion due to heat, the shuttle valve will let fluid bypass to the thermal expansion reservoir. At the same time, the shuttle valve prevents bypass of the fluid into the reservoir from the high pressure area. The shuttle valve and reservoir are not needed on units smaller than 10 inch.

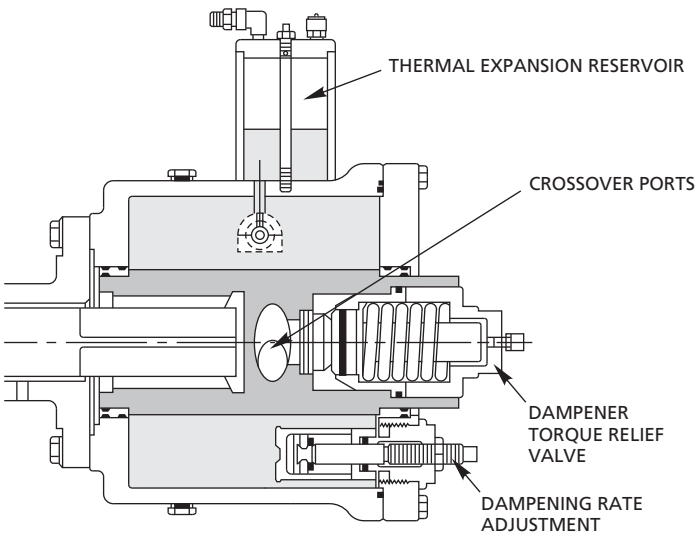


FIGURE 1

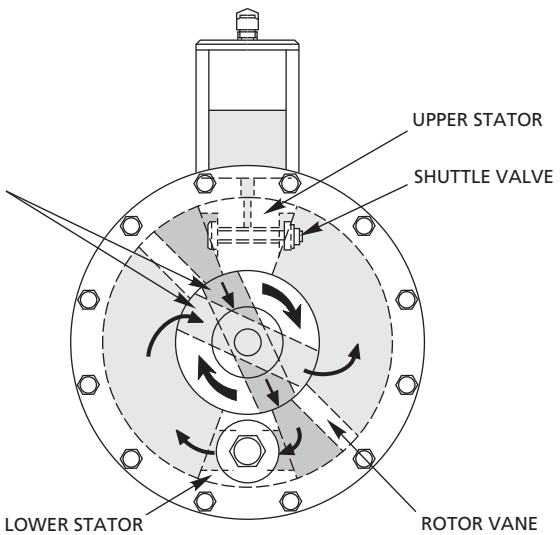


FIGURE 2

THE MINI SLAM II AND TOM WHEATLEY CHECK VALVE MATCHED TO PROVIDE THE ULTIMATE PROTECTION FOR YOUR INSTALLATION

You buy a check valve to protect your compressor installation from the destructive forces caused by line pressure. But the check valve needs protection too.

Conventional dampeners are designed to protect the check valve from normal compressor pulsation.

A sudden increase in flow can cause a conventional dampener to lockup, preventing free movement of the valve clapper, if this happens the check valve can be severely damaged or worse yet, your compressor station might not be protected.

Only the Mini Slam II is designed to protect the check valve from rapid changes in flow.

First, the Mini Slam II is perfectly matched to the performance characteristics of the TOM WHEATLEY Check Valve.

Clapper swing, pin and bearing loads are all considered in the design of the Mini Slam II.

Second, the dampening torque relief valve acts instantly to neutralize the dampener in the event of a line surge. The check valve is allowed to do its job.
Your compressor is protected.

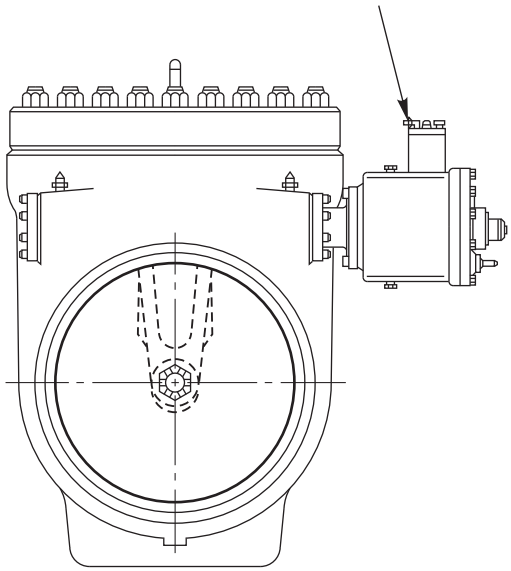
The Mini Slam II is available for the full size and pressure range of TOM WHEATLEY Check Valves.

If you are considering a new installation, simply specify the Mini Slam II.

If you are retrofitting an existing installation which uses TOM WHEATLEY Check Valves, you're in luck.

Most TOM WHEATLEY Check Valves can be retrofitted with the Mini Slam II.

2 in. through 12 in. equipped with a spring loaded shaft to assist opening



SWING CHECK VALVES
STANDARD MATERIALS OF CONSTRUCTION

CHECK VALVE TRIM TERMINOLOGY

STELLITE TRIM

The seating faces of the clapper and the seat (either integral or renewable) are weld overlayed with Stellite #6 to produce corrosion-resistant, hard-faced sealing surfaces. This trim can be furnished with either Metal-to-Metal or elastomer seals. Base metal can be either carbon or stainless steel.

STAINLESS STEEL

The seating surfaces of the clapper and seat (either integral or renewable) are weld overlaid with Austenitic stainless steel to produce corrosion-resistant sealing surfaces. This trim can be furnished with either Metal-to-Metal or elastomer seals .

METAL-TO-METAL TRIM

Generally used for higher temperatures (those exceeding the capabilities of elastomers and plastics). The seating faces of the clapper and seat (either integral or renewable) are Metal-to-Metal. This trim can be furnished in carbon steel, stainless steel, or Stellite trims. The leakage rate will not exceed that specified by ISO 5208 Rate D.

RENEWABLE SEAT RING

A renewable seat ring can be furnished in any trim for 2 in. (50 mm) and larger bolted cover check valves. The Seat is threaded for valve sizes 12 in. (300 mm) and smaller and uses retainer screws for valve sizes 14 in. (350 mm) and larger.

RTJ COVER GASKET

Almost all sizes and pressure ratings can be furnished with Ring Joint Cover Gaskets. This seal is normally used for subsea and for the higher working pressures.

EXTENDED SHAFTS

The standard material for extended shafts is high strength Martensitic or Ferritic-Austenitic Stainless Steels.

The trims described herein represent the TOM WHEATLEY Swing Check Valves standard product offering. Other materials/combinations are available on request.

CAMERON reserves the right to substitute equivalent or superior materials to those defined herein unless expressly prohibited from doing so by customer specifications.

SWING CHECK VALVES - STANDARD MATERIALS OF CONSTRUCTION SIZES 4 in. (100 mm) AND SMALLER

BOLTED COVER/INTEGRAL SEAT

TRIM	STANDARD	STAINLESS SEATS	FULL STAINLESS	METAL-TO-METAL	STELLITE SEATS
Body	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Cover	A36	A36	A240-316	A36	A36
Cover Seal	ASB.**	ASB.**	ASB.**	ASB.*	ASB.**
Bolting	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H
Arm	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M
Clapper	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M	#6 Overlay A351 CF8M
Clapper Seal	Buna-N	Buna-N	Buna-N	N/A	Buna-N
Seat	A216 WCC	Renewable A276-316	A351 CF8M	A216 WCC	Renewable #6 O/L 316

Other Material Available upon Request.

BOLTED COVER/RENEWABLE SEAT

TRIM	STANDARD	STAINLESS SEATS	FULL STAINLESS	METAL-TO-METAL	STELLITE SEATS
Body	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Cover	A36	A36	A240-316	A36	A36
Cover Seal	ASB.**	ASB.**	ASB.**	ASB.*	ASB.**
Bolting	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H
Arm	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M
Clapper	A351 CF8M	A351 CF8M	A351 CF8M	A351 CF8M	#6 Overlay A351 CF8M
Clapper Seal	Buna-N	Buna-N	Buna-N	N/A	Buna-N
Seat	Renewable A29-1018	Renewable A276-316	Renewable A276-316	Renewable A29-1018	Renewable #6 O/L 316

* RTJ Cover Seal furnished on ASME Class 900 and higher as standard.
** Buna-N Cover Seal furnished on ASME Class 900 and higher as standard.

SWING CHECK VALVES - STANDARD MATERIALS OF CONSTRUCTION SIZES 6 in. (150 mm) AND LARGER

BOLTED COVER/INTEGRAL SEAT

TRIM	STANDARD	STAINLESS SEATS	FULL STAINLESS	METAL-TO-METAL	STELLITE SEATS
Body	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Cover	A36	A36	A240-316	A36	A36
Cover Seal	Buna-N	Buna-N	Buna-N	ASB.*	Buna-N
Bolting	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H
Shaft	A276 316	A276 316	A276 316	A276 316	A276 316
Arm	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Clapper	A216 WCC	316L O/L, A216 WCC	A351 CF8M	A216 WCC	#6 Overlay A216 WCC
Clapper Seal	Buna-N	Buna-N	Buna-N	N/A	Buna-N
Seat	A216 WCC	316L O/L, A216 WCC	A351 CF8M	A216 WCC	#6 Overlay A216 WCC

BOLTED COVER/RENEWABLE SEAT

TRIM	STANDARD	STAINLESS SEATS	FULL STAINLESS	METAL-TO-METAL	STELLITE SEATS
Body	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Cover	A36	A36	A240-316	A36	A36
Cover Seal	Buna-N	Buna-N	Buna-N	ASB.*	Buna-N
Bolting	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H	A193 B7, A194 2H
Shaft	A276 316	A276 316	A276 316	A276 316	A276 316
Arm	A216 WCC	A216 WCC	A351 CF8M	A216 WCC	A216 WCC
Clapper	A216 WCC	316L O/L, A216 WCC	A351 CF8M	A216 WCC	#6 Overlay A216 WCC
Clapper Seal	Buna-N	Buna-N	Buna-N	N/A	Buna-N
Seat	Renewable A29-1018	Renewable 316L O/L	Renewable A276-316	Renewable A29-1018	Renewable #6 O/L 316

* RTJ Cover Seal furnished on ASME Class 900 and higher as standard.

SUBSEA SWING CHECK VALVES

The precise control of the flow of liquids and gases in the offshore environment is essential to both safety and reliability.

CAMERON leads the industry in the development of specialty check valve designs to meet critical applications .

Work on the requirements of the TOM WHEATLEY Subsea Check Valve dates back over 25 years, when customers first became interested in large diameter, long distance pipelines in the Gulf of Mexico.

Over the years, continued and close cooperation between the users (major oil companies, transmission companies, engineering contractors and fabricators) and Design Engineers of the TOM WHEATLEY Check Valve has resulted in the development of a subsea check valve line that is recognized as setting the standard for the industry .

TOM WHEATLEY'S Subsea Check Valves are designed for maximum safety and versatility and are suited for use as:

- Backflow preventers in the event of system shutdown or subsea pipeline rupture
- Isolation valves to allow maintenance or service to a section of the subsea pipeline
- Emergency back flow preventer below the production platform

Although designed for a long life of maintenance free service, some maintenance may be required. To allow maintenance with a minimum of downtime, a subsea maintenance procedure allowing all internal parts to be replaced through an opening in the top of the valve has been developed. This eliminates the need to remove the valve from the system for maintenance and/or repairs.

Installations range from 2 in. (50 mm) to 30 in. (750 mm) valves, rated from ASME Classes 150 to 1500, in water depths up to 7000 feet, (2134 m).

TOM WHEATLEY Subsea Check Valves are designed and manufactured to meet the customer's unique requirements while assuring long, uninterrupted service, with a minimum of maintenance.

QUALITY

There is total commitment to providing a product that meets the customer's requirements and performs well in critical underwater applications. This commitment to excellence extends from the Computer Aided Design (CAD) stage, through the selection and qualification of materials, the manufacturing process and the individual attention given in assembly and testing of each valve to ensure compliance with the specification and a long operating life .

OPTIONS

A number of accessories have been developed to meet applications for subsea valves. Some of the more commonly used are outlined below .

GLANDS

A variety of different types of clapper shaft gland arrangements are available. All glands are covered to protect them from the environment and incorporate a lock open device so the clapper can be locked in the full open position. This allows reverse pigging of the system without damage to the pig/sphere or the valve.

CONDUIT CLAPPER

The TOM WHEATLEY Check Valve is designed to eliminate the possibility of a sphere hanging in the body during pigging operations. A patented "conduit clapper" allows for the use of conventional pipeline spheres and for control of condensate or for pipeline inspection and cleaning.

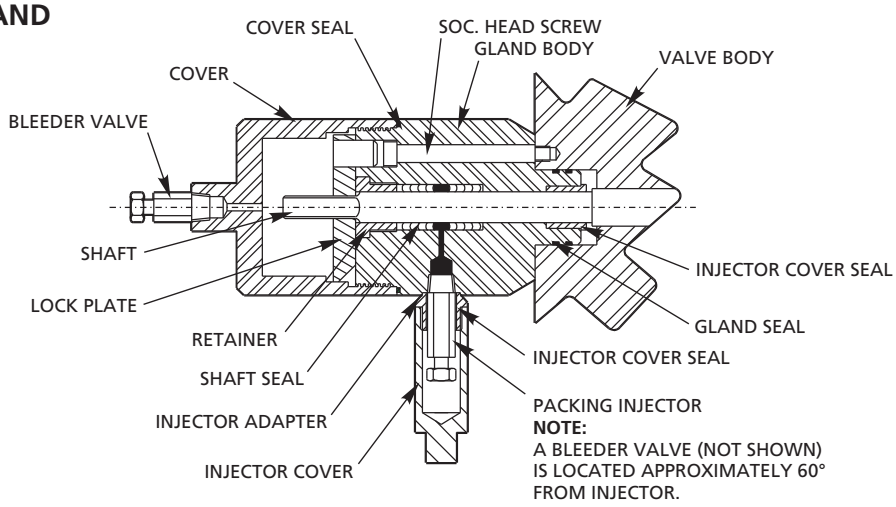
OTHER OPTIONS AVAILABLE ARE:

- Coated Studs and Nuts
- Ring Joint Bonnet Gaskets
- Special Coatings
- 45° Clapper Seating Surface

CAMERON will design a TOM WHEATLEY Check Valve for project specific subsea requirements to meet specifications.

SUBSEA SWING CHECK VALVES

EXTENDED SHAFT TYPE T-GLAND



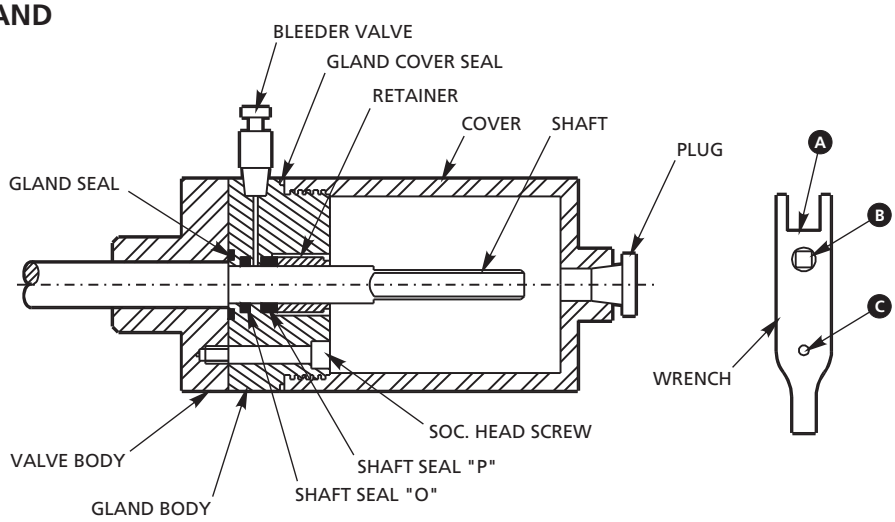
1. Bleed and remove cover.
2. Invert lock plate so that pins point toward gland body.
3. Using wrench, turn shaft clockwise to stop.
4. Push lock plate towards gland body to engage pins in holes in gland body.
5. Valve is now locked open.
6. To place valve back in service perform reverse of above.

The Type T-Gland is a premium gland for extended shafts on subsea valves. Its' many desirable features include:

1. Closed Box, internally and externally energized Chevron packing shaft seals or Lip seals.
2. Dual seals between the valve body and the gland body.
3. Shaft bushing.
4. Self-containing lock plate allowing use of conventional tools to perform lock-open procedure.
5. Internal lift collar which allows shaft to remain stationary while valve is in normal service.
6. Shaft is protected by a sealed, screw-on cover.
7. Injectable packing feature allows renewal of the shaft seal while the valves are in service.

The Type "T" Gland is a durable, proven, full feature design for subsea applications.

EXTENDED SHAFT TYPE C-GLAND



WRENCH OPERATION:

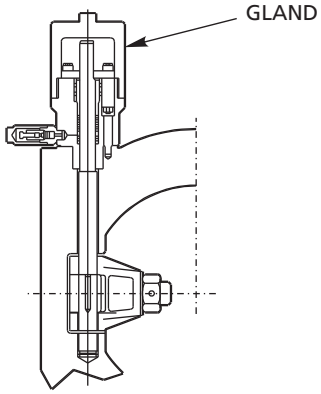
1. Open end "A" is used to remove Gland Cover.
2. Closed square "B" is used to open clapper by placing it over the end of the shaft.
3. The clapper is then locked open by placing the pin (attached to valve body by chain) through hole "C" and into the hole in boss.

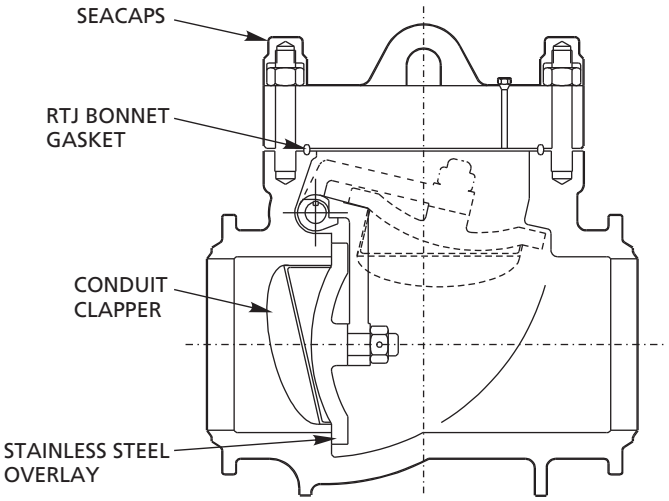
The Type C-Gland is a standard gland for extended shafts on subsea valves. It features a dual seal on the shaft for long trouble-free operation. The shaft is protected by a sealed, screw-on cover. Integrity of the inner shaft seal can be verified using the bleeder valve between the shaft seals. The outer shaft seal can be replaced without disassembly of the valve by removal of the retainer.

The Type C-Gland is a durable, proven design for subsea applications.

SUBSEA SWING CHECK VALVES OPERATION AND MAINTENANCE INSTRUCTIONS

TYPICAL SUBSEA VALVE





SUBSEA THROUGH CONDUIT SWING CHECK VALVE WITH "T" GLAND

This Subsea Check Valve is equipped with the unique, free swing clapper feature that permits the shaft to remain stationary during normal valve operation. When a reverse flow or critical pigging operation is desired, a lift collar keyed to the arm shaft can be rotated, lifting the arm and clapper to the full open position where it can be locked open .

OPERATION OF LOCK OPEN DEVICE:

1. Open the bleeder valve located in the end of the gland cover with a suitable wrench to alleviate any gas pressure that may have built up in the cover. Turn screw counterclockwise to open. With a suitable wrench on the square head protruding from the gland cover, rotate counterclockwise to remove the gland cover. This will expose the shaft and lock open device.
2. Remove the lock open device from the square shaft. The lock open device is a circular plate with two pins attached. These pins will be pointing outwards.
3. Reinstall the lock open device on the squared shaft with the pins pointing inward. Be sure the ping marks or round indentations on the shaft and lock open device line up.
4. Position the wrench on the squared shaft and rotate in a clockwise direction until you feel the clapper hit the recess in the body or until the shaft will not rotate any further.
5. Slide the lock open device with the pins pointed inwards towards the gland body. The pins will line up and travel into the drilled holes of the gland body. Remove the wrench from the shaft. The clapper is now locked in the open position.
6. The gland cover can be reinstalled.

OPERATION OF CLAPPER IN NORMAL POSITION:

1. Reverse the above procedure to position the lock open device on the shaft with the pins pointed outwards. A screwdriver or small pry bar may be necessary to move the lock open device away from the gland body while a wrench on the squared shaft is used to counterbalance the weight of the clapper and the arm.
2. Reinstall the gland cover onto the gland and rotate it in a clockwise direction until the cover makes up snugly against the O-ring located in the gland body. Now tighten the bleeder valve in a clockwise direction until tight.

RE-PACKING VALVE GLAND WITH VALVE UNDER PRESSURE: (Do not use this procedure unless there is shaft seal leakage.)

1. Remove packing injector covers from packing injectors by rotating in a counterclockwise direction.
2. Back out packing injector bolt with a wrench in a counterclockwise direction.
3. Insert one piece of packing material into each injector and replace packing injector bolt. Tighten bolt in a clockwise direction to force packing into the gland. Continue to do this until there is no leakage at gland seal around shaft.
4. Replace the packing gland covers and tighten until they are snug against the O-ring seal.

TRADEMARK INFORMATION

TOM WHEATLEY™ is a registered trademark which is owned by Cameron.

This document contains references to registered trademarks or product designations, which are not owned by Cameron.

Trademark	Owner
Inconel	INCO Nickel Sales, Inc.
Stellite	Deloro Stellite Company, Inc.
Teflon	E.I. DuPont De Nemours & Company
Viton	E.I. DuPont De Nemours & Company

NOTES

CAMERON
VALVES & MEASUREMENT
3250 Briarpark Drive, Suite 300
Houston, Texas 77042
USA Toll Free 800 323 9160

For the most current contact and location information go to: www.c-a-m.com/valvesandmeasurement

Printed in Canada 01/09-ION-5M Rev. 0 01/09 CT-TOM-SCV