

# S&W

High Performance **Check Valves**

**Dual Plate Check Valves**

**Single Plate Check Valves**

**Silent Check Valves**

*The enterprise which advance  
on the world with technique of best*



A man in a dark suit and tie is walking from right to left, carrying a black briefcase. He is smiling and looking towards the camera. The background is a large, colorful world map with various countries and oceans labeled. The map is slightly blurred, suggesting motion.

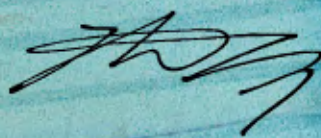
*S&W has made great progress with not only Korean customers but also many worldwide of customers for years. We have been always with customers.*

*Our first and final goal is to manufacture world best of check valves and supply to worldwide variety necessary as, power plants, sea water service, ultra low temperature plant, LNG, shipment buildings etc.*

*Check valves will be certainly with S&W in world market.*

*Thank you very much!*

CEO Min Kyu, Kim

A handwritten signature in black ink, appearing to be 'Min Kyu Kim', written over a light blue background.

**The enterprise which advance  
on the world with technique of best**



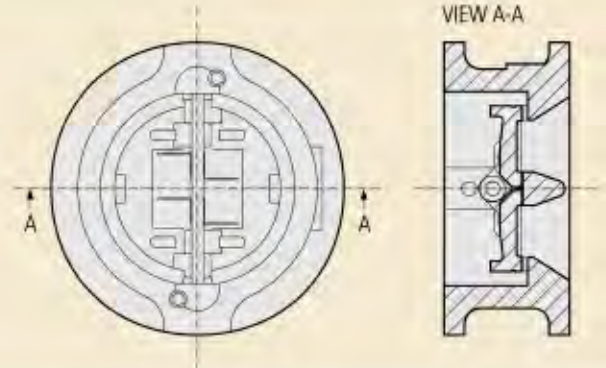
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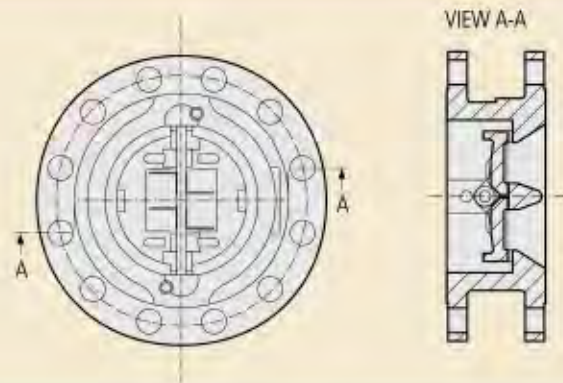
## **Note**

The material in this Catalogue is only for general information. For specific performance data and proper material selection, consult factory and your S&W's representative. Although every attempt has been made to ensure that the information contained in this catalogue is correct S&W reserves the right to change design, materials and specification without notice.

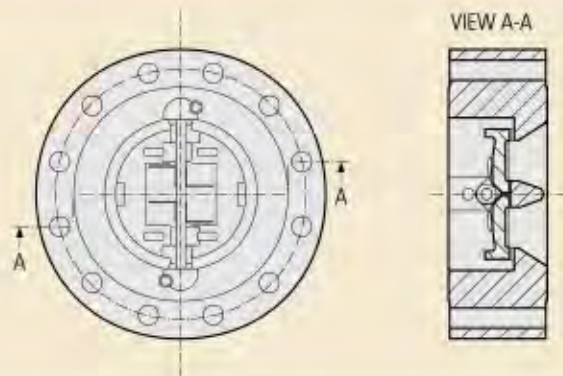
### Wafer Type (Code No. SW)



### Flange Type (Code No. SF)



### Lug Type (Code No. SL)



## ■ Design & Performance Standards

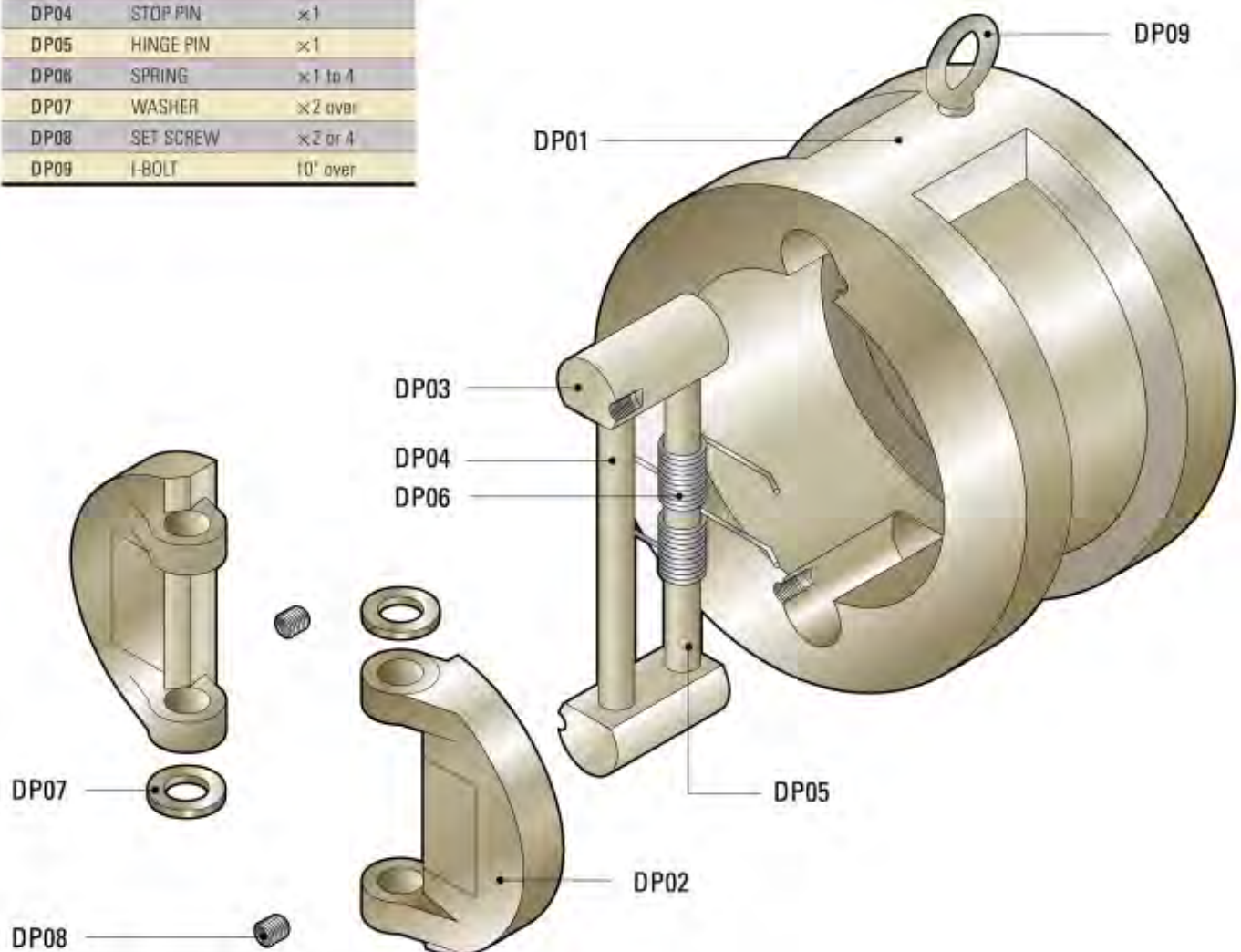
- \_ANSI B16.5 (1.5" up to 24") Flange Dimension
- \_ANSI B16.47 Series A (MSS SP44) (26" up to 60"), Flange Dimension
- \_API 594 - Materials, Design & Face to Face
- \_API 605(B16.47) - Flange Dimension
- \_JIS 2210 & KS B1511 - Flange Dimension
- \_API 6A - Flange Dimension & Face to Face
- \_API 6D - Materials, Testing Procedure
- \_API 598 - Testing, Allowable Leakage Rate
- \_ANSI B16.34 - Wall Thickness
- \_AWWA C207 - Flange Dimension (66" up to 140")

## ■ Design Features

S&W Patent Design (Korean Register No. 0276779) doesn't have any holes bored through to the body wall being different from many competitors. This unique design prohibits shell leakage originally and functions perfectly in large size of valves and high rating valve's application. S&W utilizes set screws to retain two pin guides that house both the hinge and stop pins. This allows for quick disassembly of the valve without the use of force or special tools other than wrench. This unique feature ensures that today's and future's valve fugitive emission requirements are met.

### Valve's components

|      |           |          |
|------|-----------|----------|
| DP01 | BODY      | ×1       |
| DP02 | DISC      | ×2       |
| DP03 | INSERT    | ×2       |
| DP04 | STOP PIN  | ×1       |
| DP05 | HINGE PIN | ×1       |
| DP06 | SPRING    | ×1 to 4  |
| DP07 | WASHER    | ×2 over  |
| DP08 | SET SCREW | ×2 or 4  |
| DP09 | I-BOLT    | 10" over |



### ■ Lapped Body / Disc seats (Metal to Metal)



This valve is tested API 598 which has a metal to metal seat permitted leakage of 3cc/inch of bore/min. This small but significant arises because it is more difficulty to obtain a perfect seal on a shaped seat compared to a circular seat.

The S&W disc has been specially designed to overcome this problem and to be better at sealing than another, such that near zero leakage can be economically achieved on metal to metal seats. This characteristic enables S&W to provide dual plate check valves with substantially lower leakage rates than specified in API 598.

### ■ Shock Bumpers

The plates that has bump in edge or shulder is accepted fact that there will be occasions when the plates don't arrive fully open at the same instance. Clearance on the bumper allow and ensure the plates to hit each other rather than the stop pin. This helps prevent large forces being exerted on the stop pin which coule couse damage.

The stop pin has only one purpose, to stop a plate going over top dead center when reverse flow occurs. If this did occur both plates would be on the same side of the valve leaving one port open. Therby stopping the valve performing its sole function of preventing reverse flow.



### ■ Seat Life

Increased seat life is obtained by eliminating the problem of the dragging on the seat when opening.

The soften seat has molded the seat to the body by suitable heating temperature in accordance to the materials.



### ■ Minimal Seat Wear

The S&W Dual Disc Check Valve was designed to eliminate the possibility of seat wear caused by friction at the heel of the dual discs while maintaining low back pressure sealing capabilities. The clearance between the body, disc and hinge pin results in the discs cracking open at the heel location First (Fig.5). When the valve opens the heel does not drag across the seating surface and cause wear (Fig.6). As the valve closes, the spring will take the toe of the disc into the seating surface first, while the line back pressure will force the heels and hinge pin back to the seat to complete the seal (Fig.7).

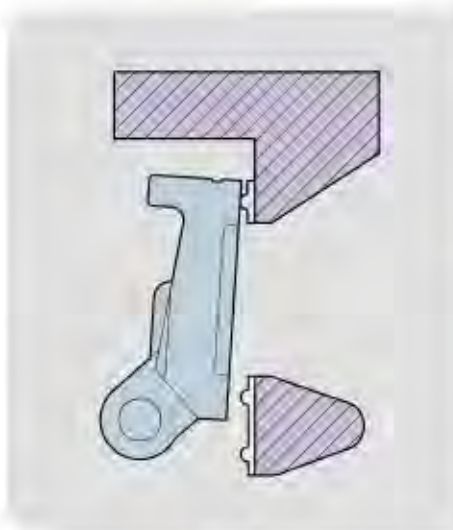


Fig. 5

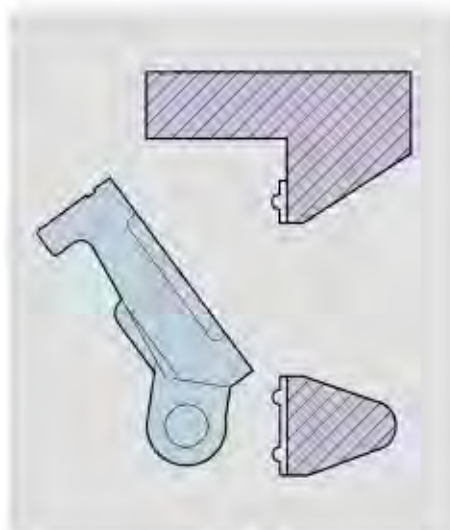


Fig. 6

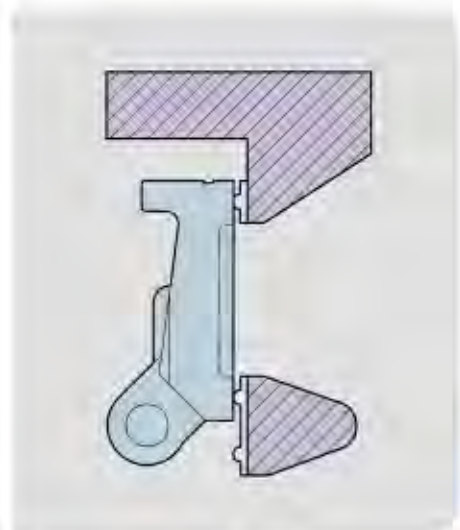


Fig. 7

### ■ Resilient Seat

The basic design of the S&W Dual Disc Check Valve is illustrated in Fig.2. This seal is chemically bonded using specially designed adhesives that provide rubber tearing bonds throughout the operating range of the seat material. In case of resilient seat failure, the S&W design permits the discs to float and make contact with the metal surface the seats were adhered to. This feature allows the valve to function even if the resilient seat is not present. S&W also has available a seat design illustrated in Fig. 3. This design results in a controlled seat squeeze and provides a metal-to-metal backup seal (Fig.4).

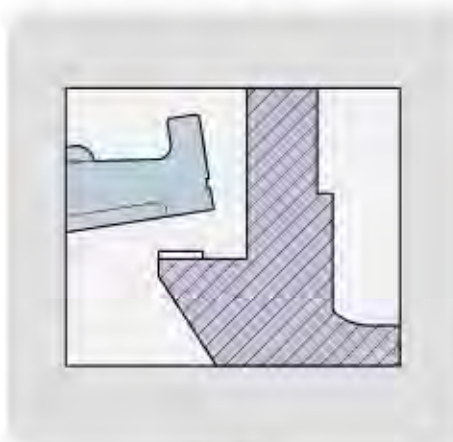


Fig. 2

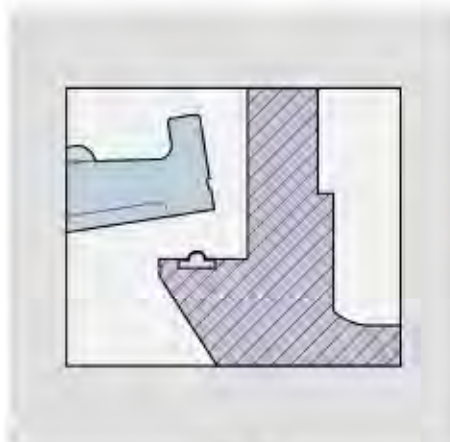


Fig. 3

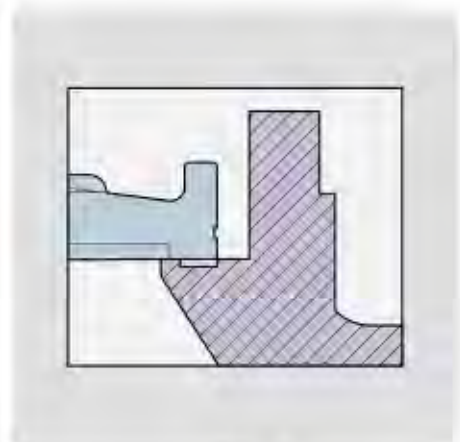


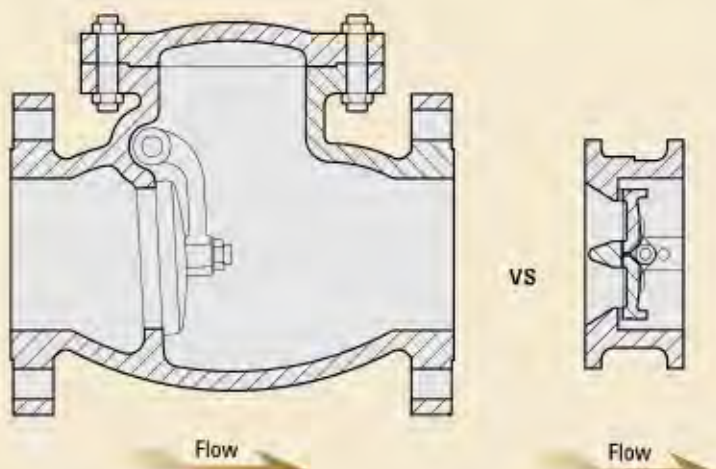
Fig. 4

### ■ Reduced Size - Weight - Cost

S&W check valves are recognized as being substantially lighter in weight than conventional swing check valves of the same size and pressure class

|    |                                         |         |
|----|-----------------------------------------|---------|
| ex | 6" class 150 swing check valve weight   | 175lbs  |
|    | 6" class 150 S&W check valve weight     | 30lbs   |
|    | 24" class 150 swing check valves weight | 1000lbs |
|    | 24" class 150 S&W check valves weight   | 780lbs  |

This weight advantage means that the whole pipe work system is lighter, consequently the pipe work support structure can also lighter and installation costs reduced.



### ■ Reduced Line Shock

To minimize/eliminate line shock, check valves must close as quickly as possible prior to the flow having an opportunity to reverse. As each of the flappers in the S&W check valve is only half the size of that of a full bodied check, they experience reduced fluid drag and can move more quickly to the closed position. Their swing radius is one half that of the conventional check valves. The leading edge distance from open to closed position is halved, in turn reducing the travel time by 50%.

The reduced weight of a dual disc valve flapper versus the full bodied swing check is a major factor in minimizing water hammer.

The heavier full bodied disc has greater momentum when swinging closed, causing it to slam into the valve seat resulting in severe damage (in large valve sizes the disc can weigh up to a ton)

For potentially severe applications, S&W offers a high torsion spring to ensure the valve closes as quickly as possible

### ■ Lower Pressure Drop (Reduced Energy Cost)

The two factors that affect pressure drop across any valve are:

- 1) The unobstructed flow area
- 2) The energy required to maintain the valve in the open position.

Specifically, full-bodied swing check valves have a disc which is hinged at the top with gravity working to keep it in the closed position. Flow must provide sufficient energy to overcome this force of gravity and lift the disc. This energy requirement increases dramatically in larger size. S&W valves are installed such that the flappers are hinged at their sides like a door. Thus, the effect of gravity is eliminated. Consequently, very little energy is needed to open the valve and maintain this position, resulting in lower energy costs.

### ■ Stronger

Lighter weight doesn't mean, however, that strength has been sacrificed. In fact a S&W check valve is actually stronger than the equivalent length of pipe. The wall thickness of body has been designed more than API specification.

## ■ Valve Location and Orientation in Piping

Check valve should be installed if possible a minimum of 6 pipe diameters from other line elements. i.e. elbow, pumps, valves, etc

### Horizontal lines

Valve installed in horizontal lines must be bolted in place with the hinge post the vertical position. I.e. in such a manner that the hinge pin retainers are at the top and bottom of installed valve, perpendicular to the flow.

### Vertical lines

In the upward position, no special attention needs to be given to the hinge position. The only exception being when mounted directly downstream of an elbow. In this case the hinge post should be mounted perpendicular to the outermost portion of an elbow.

## ■ Precautions

- Do not install S&W dual plate check valves directly against another valve whereby the check discharges downstream directly into the valve.
- Do not install the valve whereby it directly discharges downstream into tee or elbow fittings.
- S&W dual plate check valves should not be used in severe pulsating services such as reciprocating compressor discharges.
- It is recommended that the check valves be installed a minimum of three pipe diameters downstream of a pump or compressor.

## ■ Maintenance

S&W dual plate check valves are permanently lubricated and normally require no routine maintenance.

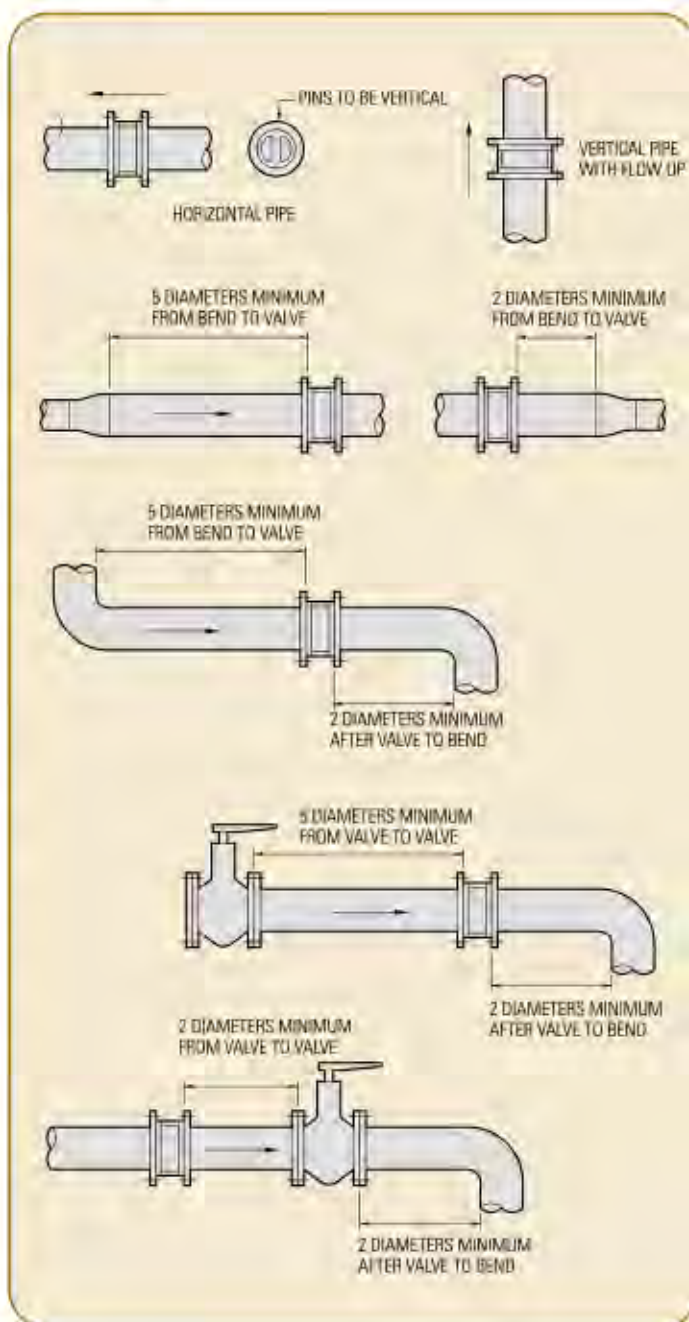
## ■ Reconditioning

### IMPORTANT

Prior to disassembly, valve must be firstly isolated from system pressure and flow.

### Caution

Before attempting the shaft extraction, be sure to pressure a hand over the disc spring. Failure to do this may "Launching" itself unexpectedly once the shaft is pulled free of it.



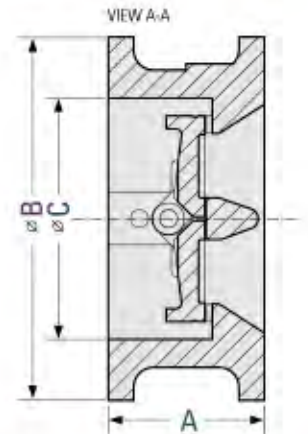
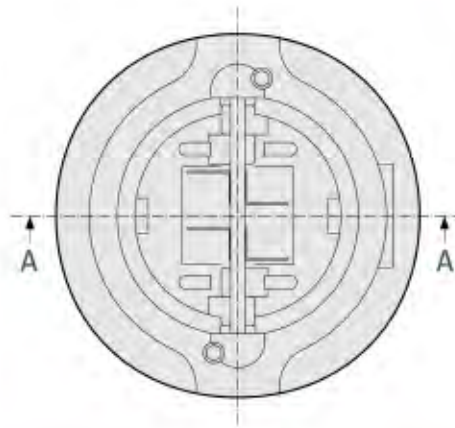
### Reassembly

Use new replacement parts, as required and a liberal amount of general purpose grease on seals and machined mating surfaces.

Reinsert the disc into the body cavity with the shaft holes inline with top and bottom shaft port. Slide the shaft into the body through the shaft opening on the side of the valve. Continue sliding the shaft through the disc, spring and remaining shaft port the opposite side of the body.

# Dual Plate Check Valves

## Type S&W Wafer Body Dimension



### Dimension Data (Class 125-2500)

### Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 125            | FF            | 2.13(54)     | 4.09(104)    | 2.38(60)     | 4    | 0.63(16)       | 5.75(146)         | 2            |
|                 | 150            | RF            | 2.38(60)     | 4.09(104)    | 2.38(60)     | 4    | 0.63(16)       | 6.00(152)         | 3.2          |
|                 | 300            | RF/RJ-23      | 2.38(60)     | 4.38(111)    | 2.38(60)     | 8    | 0.63(16)       | 6.88(175)         | 3.2          |
|                 | 600            | RF/RJ-23      | 2.38(60)     | 4.38(111)    | 2.38(60)     | 8    | 0.63(16)       | 6.88(175)         | 3.2          |
|                 | 900            | RF/RJ-24      | 2.75(70)     | 5.63(143)    | 2.38(60)     | 8    | 0.88(22)       | 8.75(222)         | 8.2          |
|                 | 1500           | RF/RJ-24      | 2.75(70)     | 5.63(143)    | 2.38(60)     | 8    | 0.88(22)       | 8.75(222)         | 8.2          |
|                 | 2500           | RF/RJ-26      | 2.75(70)     | 5.75(146)    | 2.38(60)     | 8    | 1.00(25)       | 10.00(254)        | 29           |
| 2.5(65)         | 125            | FF            | 2.13(54)     | 4.88(124)    | 2.95(75)     | 4    | 0.63(16)       | 6.00(152)         | 2.9          |
|                 | 150            | RF            | 2.38(60)     | 4.88(124)    | 2.95(75)     | 4    | 0.63(16)       | 6.38(162)         | 5            |
| 3(80)           | 125            | FF            | 2.24(57)     | 5.35(136)    | 3.74(95)     | 4    | 0.63(16)       | 6.25(159)         | 3.2          |
|                 | 150            | RF            | 2.83(72)     | 5.38(137)    | 3.74(95)     | 8    | 0.63(16)       | 7.00(178)         | 5.9          |
|                 | 300            | RF            | 2.83(72)     | 5.88(149)    | 3.74(95)     | 8    | 0.75(19)       | 8.13(207)         | 5.9          |
|                 | 600            | RF            | 2.83(72)     | 5.88(149)    | 3.74(95)     | 8    | 0.75(19)       | 8.13(207)         | 5.9          |
|                 | 900            | RF/RJ-31      | 3.27(83)     | 6.63(168)    | 3.74(95)     | 8    | 0.88(22)       | 9.50(241)         | 12           |
|                 | 1500           | RF/RJ-35      | 3.27(83)     | 6.88(175)    | 3.74(95)     | 8    | 1.13(29)       | 10.50(267)        | 12.7         |
|                 | 2500           | RF/RJ-32      | 3.39(86)     | 7.75(197)    | 3.74(95)     | 8    | 1.25(32)       | 12.25(311)        | 15.9         |
| 4(100)          | 125            | FF            | 2.50(64)     | 6.38(162)    | 4.57(116)    | 8    | 0.63(16)       | 6.25(159)         | 5            |
|                 | 150            | RF            | 2.84(72)     | 6.88(175)    | 4.57(116)    | 8    | 0.63(16)       | 7.00(178)         | 8.2          |
|                 | 300            | RF            | 2.84(72)     | 7.13(181)    | 4.57(116)    | 8    | 0.75(19)       | 8.13(207)         | 8.2          |
|                 | 600            | RF/RJ-37      | 3.11(79)     | 7.64(194)    | 4.57(116)    | 8    | 0.88(22)       | 9.50(241)         | 12.8         |
|                 | 900            | RF/RJ-37      | 4.00(102)    | 8.11(206)    | 4.57(116)    | 8    | 1.13(29)       | 11.00(279)        | 19.1         |
|                 | 1500           | RF/RJ-39      | 4.00(102)    | 8.27(210)    | 4.57(116)    | 8    | 1.25(32)       | 12.00(305)        | 20.5         |
|                 | 2500           | RF/RJ-38      | 4.13(105)    | 9.25(235)    | 4.57(116)    | 8    | 1.50(38)       | 14.63(371)        | 29.1         |
| 5(125)          | 125            | FF            | 3.23(70)     | 7.67(195)    | 5.71(145)    | 8    | 0.75(19)       | 6.8(172)          | 5.8          |
|                 | 150            | RF            | 3.23(82)     | 7.67(195)    | 5.71(145)    | 8    | 0.75(19)       | 7.48(190)         | 6.7          |

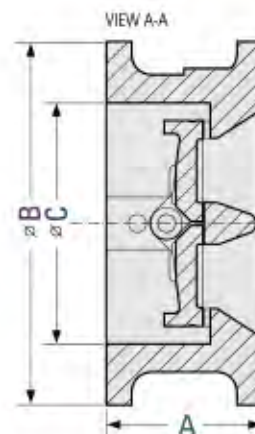
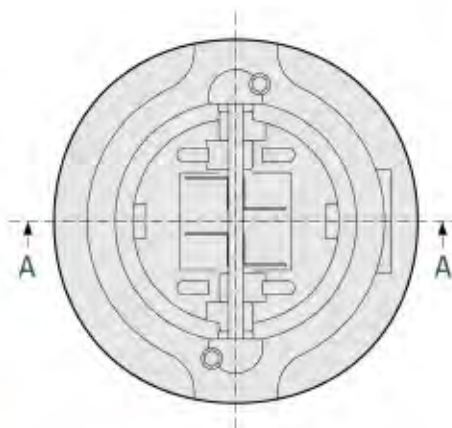
## Dimension Data (Class 125-2500)

## Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 6(150)          | 125            | FF            | 3.03(77)     | 8.66(220)    | 6.61(168)    | 8    | 0.75(19)       | 8.25(210)         | 9.5          |
|                 | 150            | RF            | 3.82(97)     | 8.75(222)    | 6.61(168)    | 8    | 0.75(19)       | 8.00(203)         | 12.3         |
|                 | 300            | RF            | 3.82(97)     | 9.84(250)    | 6.61(168)    | 12   | 0.75(19)       | 9.63(245)         | 15.9         |
|                 | 600            | RF/RJ-45      | 5.35(136)    | 10.50(267)   | 6.61(168)    | 12   | 1.00(25)       | 12.38(314)        | 20           |
|                 | 900            | RF/RJ-45      | 6.25(159)    | 11.38(289)   | 6.61(168)    | 12   | 1.13(28)       | 14.00(355)        | 36.4         |
|                 | 1500           | RF/RJ-46      | 6.25(159)    | 11.13(283)   | 6.61(168)    | 12   | 1.38(35)       | 16.75(425)        | 53           |
|                 | 2500           | RF/RJ-47      | 6.25(159)    | 12.50(318)   | 6.61(168)    | 8    | 2.00(51)       | 20.50(520)        | 70           |
| 8(200)          | 125            | FF            | 3.78(96)     | 10.90(277)   | 8.62(219)    | 8    | 0.75(19)       | 9.50(241)         | 22.8         |
|                 | 150            | RF            | 4.92(125)    | 11.00(279)   | 8.62(219)    | 8    | 0.75(19)       | 9.75(248)         | 28.6         |
|                 | 300            | RF            | 4.92(125)    | 12.13(308)   | 8.62(219)    | 12   | 0.88(22)       | 11.25(286)        | 34.5         |
|                 | 600            | RF/RJ-49      | 6.50(165)    | 12.63(321)   | 8.62(219)    | 12   | 1.13(29)       | 14.50(368)        | 72.7         |
|                 | 900            | RF/RJ-49      | 8.11(206)    | 14.13(359)   | 8.62(219)    | 12   | 1.37(35)       | 17.13(435)        | 123.2        |
|                 | 1500           | RF/RJ-50      | 8.11(206)    | 13.88(353)   | 8.62(219)    | 12   | 1.63(41)       | 20.25(514)        | 116.8        |
|                 | 2500           | RF/RJ-51      | 8.11(206)    | 15.25(387)   | 8.62(219)    | 12   | 2.00(51)       | 24.00(610)        | 133.2        |
| 10(250)         | 125            | FF            | 4.25(108)    | 13.30(338)   | 10.75(273)   | 12   | 0.88(22)       | 10.50(267)        | 31.8         |
|                 | 150            | RF            | 5.75(146)    | 13.38(340)   | 10.75(273)   | 12   | 0.87(22)       | 11.00(279)        | 48.2         |
|                 | 300            | RF            | 5.75(146)    | 14.25(362)   | 10.75(273)   | 16   | 1.00(25)       | 12.75(324)        | 57.3         |
|                 | 600            | RF/RJ-53      | 8.38(213)    | 15.75(400)   | 10.75(273)   | 16   | 1.25(32)       | 17.13(435)        | 118.2        |
|                 | 900            | RF/RJ-53      | 9.50(241)    | 17.13(435)   | 10.75(273)   | 16   | 1.38(35)       | 19.00(483)        | 197.3        |
|                 | 1500           | RF/RJ-54      | 9.75(248)    | 17.13(435)   | 10.75(273)   | 12   | 1.88(48)       | 23.50(597)        | 204.1        |
|                 | 2500           | RF/RJ-55      | 10.00(254)   | 18.75(476)   | 10.75(273)   | 12   | 2.50(64)       | 30.50(775)        | 218.2        |
| 12(300)         | 125            | FF            | 5.63(143)    | 16.02(407)   | 12.68(322)   | 12   | 0.88(22)       | 10.75(273)        | 50           |
|                 | 150            | RF            | 7.13(181)    | 16.13(410)   | 12.68(322)   | 12   | 0.88(22)       | 12.25(311)        | 81.8         |
|                 | 300            | RF            | 7.13(181)    | 16.63(422)   | 12.68(322)   | 16   | 1.13(29)       | 14.63(372)        | 90.9         |
|                 | 600            | RF/RJ-57      | 9.00(229)    | 18.00(457)   | 12.68(322)   | 20   | 1.25(32)       | 18.00(457)        | 163.6        |
|                 | 900            | RF/RJ-57      | 11.50(292)   | 19.60(498)   | 12.68(322)   | 20   | 1.38(35)       | 21.75(552)        | 292.7        |
|                 | 1500           | RF/RJ-58      | 12.00(305)   | 20.50(521)   | 12.68(322)   | 16   | 2.00(51)       | 27.50(699)        | 374.5        |
|                 | 2500           | RF/RJ-60      | 12.00(305)   | 21.63(549)   | 12.68(322)   | 12   | 2.75(70)       | 34.50(876)        | 395          |
| 14(350)         | 125            | FF            | 7.25(184)    | 16.65(423)   | 13.70(348)   | 12   | 1.00(25)       | 13.00(330)        | 77.3         |
|                 | 150            | RF            | 7.25(184)    | 17.75(451)   | 13.70(348)   | 12   | 1.00(25)       | 13.00(330)        | 122.7        |
|                 | 300            | RF            | 8.75(222)    | 19.13(486)   | 13.70(348)   | 20   | 1.13(29)       | 16.50(419)        | 177.3        |
|                 | 600            | RF/RJ-61      | 10.75(273)   | 19.37(492)   | 13.70(348)   | 20   | 1.38(35)       | 20.25(514)        | 186.4        |
|                 | 900            | RF/RJ-62      | 14.00(356)   | 20.50(521)   | 13.70(348)   | 20   | 1.50(38)       | 25.50(648)        | 396.4        |
|                 | 1500           | RF/RJ-63      | 14.00(356)   | 22.75(578)   | 13.70(348)   | 16   | 2.25(57)       | 31.50(800)        | 485.5        |
| 16(400)         | 125            | FF            | 7.50(191)    | 20.11(511)   | 16.69(424)   | 16   | 1.00(25)       | 13.50(343)        | 102.3        |
|                 | 150            | RF            | 7.50(191)    | 20.25(514)   | 16.69(424)   | 16   | 1.00(25)       | 13.50(343)        | 134.1        |
|                 | 300            | RF            | 9.13(232)    | 21.25(540)   | 16.69(424)   | 20   | 1.25(32)       | 17.38(441)        | 208.2        |
|                 | 600            | RF/RJ-65      | 12.00(305)   | 22.25(565)   | 16.69(424)   | 20   | 1.50(38)       | 22.25(565)        | 330.9        |
|                 | 900            | RF/RJ-66      | 15.13(384)   | 22.63(575)   | 16.69(424)   | 20   | 1.63(38)       | 27.13(689)        | 533.6        |
|                 | 1500           | RF/RJ-67      | 15.13(384)   | 25.25(641)   | 16.69(424)   | 16   | 2.50(64)       | 34.25(870)        | 588.6        |

# Dual Plate Check Valves

## Type S&W Wafer Body Dimension



### Dimension Data (Class 125-2500)

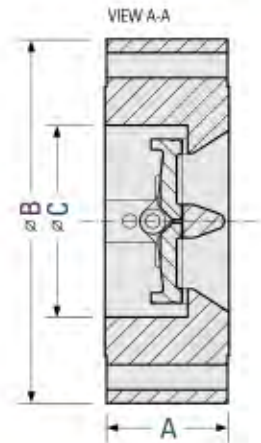
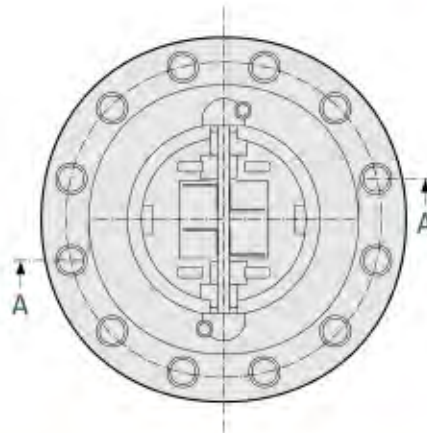
### Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 18(450)         | 125            | FF            | 8.00(203)    | 21.61(549)   | 18.00(457)   | 16   | 1.13(29)       | 14.50(368)        | 127.3        |
|                 | 150            | RF            | 8.00(203)    | 21.61(549)   | 18.00(457)   | 16   | 1.13(29)       | 14.50(368)        | 141.8        |
|                 | 300            | RF            | 10.38(264)   | 23.50(597)   | 18.00(457)   | 24   | 1.25(32)       | 18.88(480)        | 295.5        |
|                 | 600            | RF/RJ-69      | 14.25(362)   | 24.13(613)   | 18.00(457)   | 20   | 1.63(41)       | 25.25(641)        | 395.5        |
|                 | 900            | RF/RJ-70      | 17.75(451)   | 25.13(638)   | 18.00(457)   | 20   | 1.88(48)       | 34.50(876)        | 610.9        |
|                 | 1500           | RF/RJ-71      | 18.44(468)   | 27.75(705)   | 18.00(457)   | 16   | 2.75(70)       | 39.75(1010)       | 793.2        |
| 20(500)         | 125            | FF            | 8.38(213)    | 23.86(606)   | 20.16(512)   | 20   | 1.13(29)       | 15.25(387)        | 177.3        |
|                 | 150            | RF            | 8.38(213)    | 23.86(606)   | 20.16(512)   | 20   | 1.13(29)       | 15.13(384)        | 214.5        |
|                 | 300            | RF            | 11.50(292)   | 25.51(648)   | 20.16(512)   | 24   | 1.25(32)       | 20.50(521)        | 364.1        |
|                 | 600            | RF/RJ-73      | 14.50(368)   | 26.88(683)   | 20.16(512)   | 24   | 1.63(41)       | 26.25(667)        | 543.6        |
|                 | 900            | RF/RJ-74      | 17.75(451)   | 27.50(699)   | 20.16(512)   | 20   | 2.00(51)       | 32.50(826)        | 639.1        |
|                 | 1500           | RF/RJ-75      | 20.98(559)   | 29.76(902)   | 20.16(512)   | 16   | 3.00(76)       | 44.25(1124)       | 1278.2       |
| 24(600)         | 125            | FF            | 8.75(222)    | 28.28(718)   | 23.75(603)   | 20   | 1.25(32)       | 16.25(413)        | 268.2        |
|                 | 150            | RF            | 8.75(222)    | 28.25(718)   | 23.75(603)   | 20   | 1.25(32)       | 16.25(413)        | 358.2        |
|                 | 300            | RF            | 12.50(318)   | 30.50(775)   | 23.75(603)   | 24   | 1.50(38)       | 22.75(578)        | 526.4        |
|                 | 600            | RF/RJ-77      | 17.25(438)   | 31.13(791)   | 23.75(603)   | 24   | 1.88(48)       | 30.75(781)        | 819.1        |
|                 | 900            | RF/RJ-78      | 19.50(495)   | 33.00(838)   | 23.75(603)   | 20   | 2.50(64)       | 38.00(965)        | 1233.2       |
|                 | 1500           | RF/RJ-79      | 22.00(559)   | 35.50(902)   | 23.75(603)   | 16   | 3.50(89)       | 48.50(1232)       | 2712.7       |
| 26(650)         | 125            | FF            | 11.26(286)   | 30.51(775)   | 24.78(629)   | 24   | 1.25(32)       | 20.39(518)        | 455          |
|                 | 150            | RF            | 11.26(286)   | 30.51(775)   | 24.78(629)   | 24   | 1.25(32)       | 20.39(518)        | 455          |
|                 | 300            | RF            | 14.01(356)   | 32.87(835)   | 24.78(629)   | 28   | 1.63(41)       | 24.75(628)        | 620          |
|                 | 600            | RF/RJ-73      | 17.99(457)   | 34.13(867)   | 24.78(629)   | 28   | 1.87(47)       | 31.50(800)        | 978          |
|                 | 900            | RF/RJ-100     | 20.98(533)   | 34.76(883)   | 24.78(629)   | 20   | 2.75(69)       | 38.75(984)        | 144.6        |

| Dimension Data (Class 125-2500) |                |               |              |              |              | Stud Selection |                |                   |              |
|---------------------------------|----------------|---------------|--------------|--------------|--------------|----------------|----------------|-------------------|--------------|
| SIZE<br>in (mm)                 | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty           | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
| 28(700)                         | 125            | FF            | 12.64(321)   | 32.76(832)   | 27.64(702)   | 28             | 1.25(32)       | 22.01(559)        | 511          |
|                                 | 150            | RF            | 12.64(321)   | 32.76(832)   | 27.64(702)   | 28             | 1.25(32)       | 22.01(559)        | 511          |
|                                 | 300            | RF            | 15.00(381)   | 35.39(899)   | 27.64(702)   | 28             | 1.62(41)       | 26.25(666)        | 769          |
|                                 | 600            | RF/RJ-94      | 19.00(483)   | 35.98(914)   | 27.64(702)   | 28             | 2.00(51)       | 33.00(838)        | 1073         |
|                                 | 900            | RF/RJ-101     | 22.52(572)   | 37.24(946)   | 27.64(702)   | 20             | 3.00(76)       | 41.00(1041)       | 1795         |
| 30(750)                         | 125            | FF            | 12.00(305)   | 34.84(885)   | 30.12(765)   | 28             | 1.25(32)       | 21.00(533)        | 536          |
|                                 | 150            | RF            | 12.00(305)   | 34.84(885)   | 30.12(765)   | 28             | 1.25(32)       | 21.00(533)        | 536          |
|                                 | 300            | RF            | 14.49(368)   | 37.52(953)   | 30.12(765)   | 28             | 1.75(44)       | 26.50(673)        | 835          |
|                                 | 600            | RF/RJ-95      | 19.88(505)   | 38.27(972)   | 30.12(765)   | 28             | 2.00(51)       | 34.13(867)        | 1269         |
|                                 | 900            | RF/RJ-102     | 25.00(635)   | 39.72(1009)  | 30.12(765)   | 20             | 3.00(76)       | 44.00(1117)       | 2217         |
| 32(800)                         | 125            | FF            | 14.01(356)   | 37.00(940)   | 30.87(784)   | 28             | 1.50(38)       | 24.63(626)        | 690          |
|                                 | 150            | RF            | 14.01(356)   | 37.00(940)   | 30.87(784)   | 28             | 1.50(38)       | 24.63(626)        | 690          |
|                                 | 300            | RF            | 15.98(406)   | 39.60(1006)  | 30.87(784)   | 28             | 1.88(48)       | 28.75(730)        | 1027         |
|                                 | 600            | RF/RJ-96      | 20.98(533)   | 40.23(1022)  | 30.87(784)   | 28             | 2.25(57)       | 36.00(914)        | 1418         |
|                                 | 900            | RF/RJ-105     | 25.98(660)   | 42.24(1073)  | 30.87(784)   | 28             | 3.25(83)       | 46.25(1175)       | 2620         |
| 36(900)                         | 125            | FF            | 14.50(368)   | 41.25(1048)  | 34.00(864)   | 32             | 1.50(38)       | 25.88(657)        | 840          |
|                                 | 150            | RF            | 14.50(368)   | 41.25(1048)  | 34.00(864)   | 32             | 1.50(38)       | 25.88(657)        | 840          |
|                                 | 300            | RF            | 19(483)      | 44(1118)     | 34.00(864)   | 32             | 2(51)          | 32.5(826)         | 1269         |
|                                 | 600            | RF            | 25(635)      | 44.5(1130)   | 34.00(864)   | 28             | 2.5(64)        | 45(1143)          | 2120         |
|                                 | 900            | RF            | 28.25(718)   | 47.25(1200)  | 34.00(864)   | 20             | 3.5(89)        | 50.75(1289)       | 3259         |
| 40(1000)                        | 125            | FF            | 15.98(406)   | 45.75(1162)  | 38.86(987)   | 36             | 1.50(38)       | 26.36(669)        | 1190         |
|                                 | 150            | RF            | 17.00(432)   | 45.75(1162)  | 38.86(987)   | 36             | 1.50(38)       | 27.38(695)        | 1190         |
|                                 | 300            | RF            | 21.5(546)    | 43.88(1114)  | 38.86(987)   | 32             | 1.625(41)      | 35(889)           | 1825         |
|                                 | 600            | RF            | 26(660)      | 45.5(1156)   | 38.86(987)   | 32             | 2.25(57)       | 44.25(1124)       | 3750         |
|                                 | 900            | RF            | 30(762)      | 49.25(1251)  | 38.86(987)   | 24             | 3.5(89)        | 53.75(1365)       | 3972         |
| 42(1050)                        | 125            | FF            | 17.00(432)   | 47.99(1219)  | 39.21(996)   | 36             | 1.50(38)       | 28.88(734)        | 1500         |
|                                 | 150            | RF            | 17.00(432)   | 47.99(1219)  | 39.21(996)   | 36             | 1.50(38)       | 28.88(734)        | 1500         |
|                                 | 300            | RF            | 22.28(568)   | 46(1262)     | 39.21(996)   | 32             | 1.63(41)       | 37(340)           | 2630         |
|                                 | 600            | RF            | 27.63(702)   | 48(1219)     | 39.21(996)   | 28             | 2.5(64)        | 47.13(1197)       | 3135         |
|                                 | 900            | RF            | 31(787)      | 51.25(1302)  | 39.21(996)   | 24             | 3.5(89)        | 59.25(1505)       | 3670         |
| 48(1200)                        | 125            | FF            | 20.63(524)   | 54.49(1384)  | 46.97(1193)  | 44             | 1.50(38)       | 33.38(848)        | 2200         |
|                                 | 150            | RF            | 20.63(524)   | 54.49(1384)  | 46.97(1193)  | 44             | 1.50(38)       | 33.38(848)        | 2200         |
|                                 | 300            | RF            | 24.75(629)   | 52.13(1324)  | 46.97(1193)  | 32             | 1.88(48)       | 40.5(1029)        | 3909         |
|                                 | 600            | RF            | 31(787)      | 54.75(1391)  | 46.97(1193)  | 32             | 2.75(70)       | 54(1372)          | 4416         |
| 54(1350)                        | 125            | FF            | 21.26(540)   | 60.86(1546)  | 47.95(1218)  | 44             | 1.75(44)       | 38.25(972)        | 2700         |
|                                 | 150            | RF            | 21.25(540)   | 60.86(1546)  | 47.95(1218)  | 44             | 1.75(44)       | 38.25(972)        | 2700         |
|                                 | 300            | RF            | 28.25(718)   | 58.75(1492)  | 47.95(1218)  | 28             | 2.25(57)       | 47.25(1200)       | 3878         |

# Dual Plate Check Valves (2"-10")

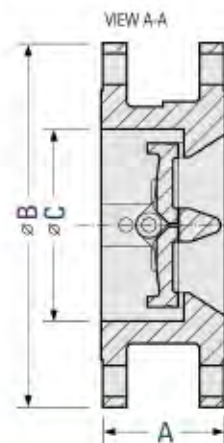
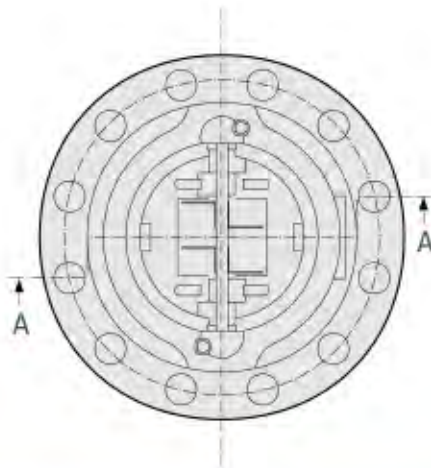
Type S&W  
Lug Body  
Dimension



## Dimension Data (Class 150-2500)

## Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 150            | RF            | 2.38(60)     | 5.98(152)    | 2.38(60)     | 4    | 0.63(16)       | 6.00(152)         | 7            |
|                 | 300            | RF/RJ-23      | 2.38(60)     | 6.49(165)    | 2.38(60)     | 8    | 0.63(16)       | 6.88(175)         | 8            |
|                 | 600            | RF/RJ-23      | 2.38(60)     | 6.49(165)    | 2.38(60)     | 8    | 0.63(16)       | 6.88(175)         | 8            |
|                 | 900            | RF/RJ-24      | 2.75(70)     | 8.50(216)    | 2.38(60)     | 8    | 0.88(22)       | 8.75(222)         | 16           |
|                 | 1500           | RF/RJ-24      | 2.75(70)     | 8.50(216)    | 2.38(60)     | 8    | 0.88(22)       | 8.75(222)         | 16           |
|                 | 2500           | RF/RJ-26      | 2.75(70)     | 9.25(235)    | 2.38(60)     | 8    | 1.00(25)       | 10.00(254)        | 19           |
| 2.5(65)         | 150            | RF            | 2.38(60)     | 7.00(178)    | 2.95(75)     | 4    | 0.63(16)       | 6.38(162)         | 12           |
|                 | 150            | RF            | 2.83(72)     | 7.52(191)    | 3.74(95)     | 8    | 0.63(16)       | 7.00(178)         | 12           |
|                 | 300            | RF            | 2.83(72)     | 8.26(210)    | 3.74(95)     | 8    | 0.75(19)       | 8.13(207)         | 14           |
|                 | 600            | RF            | 2.83(72)     | 8.26(210)    | 3.74(95)     | 8    | 0.75(19)       | 8.13(207)         | 14           |
|                 | 900            | RF/RJ-31      | 3.27(83)     | 9.48(241)    | 3.74(95)     | 8    | 0.88(22)       | 9.50(241)         | 25           |
|                 | 1500           | RF/RJ-35      | 3.27(83)     | 10.51(267)   | 3.74(95)     | 8    | 1.13(29)       | 10.50(267)        | 29           |
| 3(80)           | 2500           | RF/RJ-32      | 3.39(86)     | 12.00(305)   | 3.74(95)     | 8    | 1.25(32)       | 12.25(311)        | 38           |
|                 | 150            | RF            | 2.84(72)     | 9.01(229)    | 4.57(116)    | 8    | 0.63(16)       | 7.00(178)         | 19           |
|                 | 300            | RF            | 2.84(72)     | 10.00(254)   | 4.57(116)    | 8    | 0.75(19)       | 8.13(207)         | 23           |
|                 | 600            | RF/RJ-37      | 3.11(79)     | 10.75(273)   | 4.57(116)    | 8    | 0.88(22)       | 9.50(241)         | 30           |
|                 | 900            | RF/RJ-37      | 4.00(102)    | 11.49(292)   | 4.57(116)    | 8    | 1.13(29)       | 11.00(279)        | 45           |
|                 | 1500           | RF/RJ-39      | 4.00(102)    | 12.24(311)   | 4.57(116)    | 8    | 1.25(32)       | 12.00(305)        | 51           |
| 4(100)          | 2500           | RF/RJ-38      | 4.13(105)    | 14.01(356)   | 4.57(116)    | 8    | 1.50(38)       | 14.63(371)        | 69           |
|                 | 150            | RF            | 3.23(82)     | 10.00(254)   | 5.71(145)    | 8    | 0.75(19)       | 7.48(190)         |              |
|                 | 150            | RF            | 3.82(97)     | 10.98(279)   | 6.61(168)    | 8    | 0.75(19)       | 8.00(203)         | 32           |
|                 | 300            | RF            | 3.82(97)     | 12.52(318)   | 6.61(168)    | 12   | 0.75(19)       | 9.63(245)         | 45           |
|                 | 600            | RF/RJ-45      | 5.35(136)    | 14.01(356)   | 6.61(168)    | 12   | 1.00(25)       | 12.38(314)        | 81           |
|                 | 900            | RF/RJ-45      | 6.25(159)    | 15.00(381)   | 6.61(168)    | 12   | 1.13(28)       | 14.00(355)        | 115          |
| 6(150)          | 1500           | RF/RJ-46      | 6.25(159)    | 15.51(394)   | 6.61(168)    | 12   | 1.38(35)       | 16.75(425)        | 119          |
|                 | 2500           | RF/RJ-47      | 6.25(159)    | 19.01(483)   | 6.61(168)    | 8    | 2.00(51)       | 20.50(520)        | 184          |
|                 | 150            | RF            | 4.92(125)    | 13.50(343)   | 8.62(219)    | 8    | 0.75(19)       | 9.75(248)         | 49           |
|                 | 300            | RF            | 4.92(125)    | 15.00(381)   | 8.62(219)    | 12   | 0.88(22)       | 11.25(286)        | 78           |
|                 | 600            | RF/RJ-49      | 6.50(165)    | 16.49(419)   | 8.62(219)    | 12   | 1.13(29)       | 14.50(368)        | 134          |
|                 | 900            | RF/RJ-49      | 8.11(206)    | 18.50(470)   | 8.62(219)    | 12   | 1.37(35)       | 17.13(435)        | 217          |
| 8(200)          | 1500           | RF/RJ-50      | 8.11(206)    | 19.01(483)   | 8.62(219)    | 12   | 1.63(41)       | 20.25(514)        | 283          |
|                 | 2500           | RF/RJ-51      | 8.11(206)    | 21.73(552)   | 8.62(219)    | 12   | 2.00(51)       | 24.00(610)        | 283          |
|                 | 150            | RF            | 5.75(146)    | 15.98(406)   | 10.75(273)   | 12   | 0.87(22)       | 11.00(279)        | 82           |
|                 | 300            | RF            | 5.75(146)    | 17.52(445)   | 10.75(273)   | 16   | 1.00(25)       | 12.75(324)        | 115          |
|                 | 600            | RF/RJ-53      | 8.38(213)    | 20.00(508)   | 10.75(273)   | 16   | 1.25(32)       | 17.13(435)        | 183          |
|                 | 900            | RF/RJ-53      | 9.50(241)    | 21.49(546)   | 10.75(273)   | 16   | 1.38(35)       | 19.00(483)        | 330          |
| 10(250)         | 1500           | RF/RJ-54      | 9.75(248)    | 22.99(584)   | 10.75(273)   | 12   | 1.88(48)       | 23.50(597)        | 361          |
|                 | 2500           | RF/RJ-55      | 10.00(254)   | 26.49(673)   | 10.75(273)   | 12   | 2.50(64)       | 30.50(775)        | 489          |



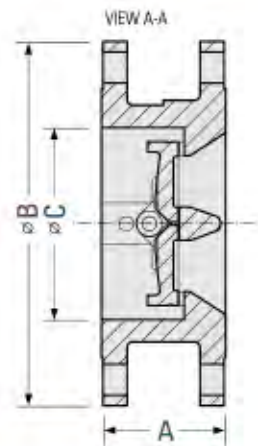
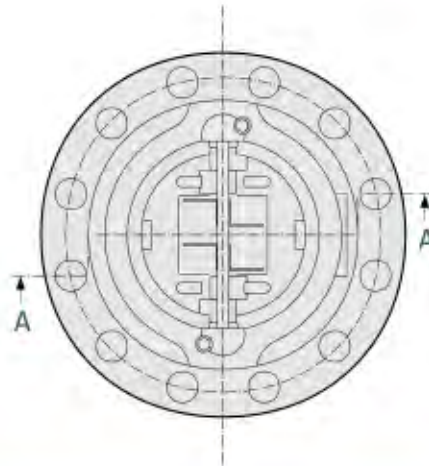
## Dimension Data (Class 150-2500)

## Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 12(300)         | 150            | RF            | 7.13(181)    | 19.01(483)   | 12.68(322)   | 12   | 0.88(22)       | 5.5(140)          | 125          |
|                 | 300            | RF            | 7.13(181)    | 20.51(521)   | 12.68(322)   | 16   | 1.13(29)       | 7.5(191)          | 153          |
|                 | 600            | RF/RJ-57      | 9.00(229)    | 22.00(559)   | 12.68(322)   | 20   | 1.25(32)       | 9(229)            | 239          |
|                 | 900            | RF/RJ-57      | 11.50(292)   | 24.01(610)   | 12.68(322)   | 20   | 1.38(35)       | 10.25(260)        | 347          |
|                 | 1500           | RF/RJ-58      | 12.00(305)   | 26.49(673)   | 12.68(322)   | 16   | 2.00(51)       | 23.5(600)         | 637          |
|                 | 2500           | RF/RJ-60      | 12.00(305)   | 30.00(762)   | 12.68(322)   | 12   | 2.75(70)       | 34.5(876)         | 747          |
| 14(350)         | 150            | RF            | 7.25(184)    | 20.98(533)   | 13.70(348)   | 12   | 1.00(25)       | 6(152)            | 144          |
|                 | 300            | RF            | 8.75(222)    | 22.99(584)   | 13.70(348)   | 20   | 1.13(29)       | 7.75(197)         | 207          |
|                 | 600            | RF/RJ-61      | 10.75(273)   | 23.74(603)   | 13.70(348)   | 20   | 1.38(35)       | 9.5(241)          | 378          |
|                 | 900            | RF/RJ-62      | 14.00(356)   | 25.23(641)   | 13.70(348)   | 20   | 1.50(38)       | 11.25(286)        | 560          |
|                 | 1500           | RF/RJ-63      | 14.00(356)   | 29.48(749)   | 13.70(348)   | 16   | 2.25(57)       | 31.5(800)         | 1097         |
| 16(400)         | 150            | RF            | 7.50(191)    | 23.50(597)   | 16.69(424)   | 16   | 1.00(25)       | 6(152)            | 176          |
|                 | 300            | RF            | 9.13(232)    | 25.51(648)   | 16.69(424)   | 20   | 1.25(32)       | 8.25(210)         | 301          |
|                 | 600            | RF/RJ-65      | 12.00(305)   | 27.00(686)   | 16.69(424)   | 20   | 1.50(38)       | 10.25(260)        | 451          |
|                 | 900            | RF/RJ-66      | 15.13(384)   | 27.75(705)   | 16.69(424)   | 20   | 1.63(38)       | 11.75(298)        | 547          |
|                 | 1500           | RF/RJ-67      | 15.13(384)   | 32.52(826)   | 16.69(424)   | 16   | 2.50(64)       | 34.25(870)        | 1152         |
| 18(450)         | 150            | RF            | 8.00(203)    | 25.00(635)   | 18.00(457)   | 16   | 1.13(29)       | 6.5(165)          | 210          |
|                 | 300            | RF            | 10.38(264)   | 27.99(711)   | 18.00(457)   | 24   | 1.25(32)       | 8.5(216)          | 392          |
|                 | 600            | RF/RJ-69      | 14.25(362)   | 29.25(743)   | 18.00(457)   | 20   | 1.63(41)       | 11(279)           | 598          |
|                 | 900            | RF/RJ-70      | 17.75(451)   | 30.98(787)   | 18.00(457)   | 20   | 1.88(48)       | 13.5(343)         | 835          |
|                 | 1500           | RF/RJ-71      | 18.44(468)   | 35.98(914)   | 18.00(457)   | 16   | 2.75(70)       | 39.75(1010)       | 1775         |
| 20(500)         | 150            | RF            | 8.38(213)    | 27.52(699)   | 20.16(512)   | 20   | 1.13(29)       | 7(178)            | 270          |
|                 | 300            | RF            | 11.50(292)   | 30.51(775)   | 20.16(512)   | 24   | 1.25(32)       | 9(229)            | 489          |
|                 | 600            | RF/RJ-73      | 14.50(368)   | 32.00(813)   | 20.16(512)   | 24   | 1.63(41)       | 11.75(298)        | 762          |
|                 | 900            | RF/RJ-74      | 17.75(451)   | 33.74(857)   | 20.16(512)   | 20   | 2.00(51)       | 14.5(368)         | 1783         |
|                 | 1500           | RF/RJ-75      | 20.98(533)   | 38.74(984)   | 20.16(512)   | 16   | 3.00(76)       | 44.25(1124)       | 2675         |
| 24(600)         | 150            | RF            | 8.75(222)    | 32.00(813)   | 23.75(603)   | 20   | 1.25(32)       | 7.5(191)          | 520          |
|                 | 300            | RF            | 12.50(318)   | 35.98(914)   | 23.75(603)   | 24   | 1.50(38)       | 10.25(260)        | 756          |
|                 | 600            | RF/RJ-77      | 17.25(438)   | 37.00(940)   | 23.75(603)   | 24   | 1.88(48)       | 13.5(343)         | 1143         |
|                 | 900            | RF/RJ-78      | 19.50(495)   | 40.98(1041)  | 23.75(603)   | 20   | 2.50(64)       | 18.25(464)        | 1888         |
|                 | 1500           | RF/RJ-79      | 22.00(559)   | 45.98(1168)  | 23.75(603)   | 16   | 3.50(89)       | 48.5(1232)        | 3280         |

# Dual Plate Check Valves (12"-larger)

## Type S&W Flange Body Dimension



### Dimension Data (Class 150-2500)

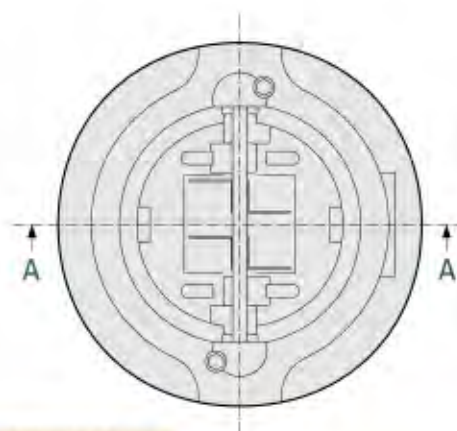
### Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 26(650)         | 150            | RF            | 11.26(286)   | 34.25(870)   | 24.78(629)   | 24   | 1.25(32)       | 9(229)            | 1007         |
|                 | 300            | RF            | 14.01(356)   | 38.25(972)   | 24.78(629)   | 28   | 1.63(41)       | 11(279)           | 1238         |
|                 | 600            | RF/RJ-73      | 17.99(457)   | 40(1016)     | 24.78(629)   | 28   | 1.87(47)       | 14.63(372)        | 1418         |
|                 | 900            | RF/RJ-100     | 20.98(533)   | 42.75(1086)  | 24.78(629)   | 20   | 2.75(69)       | 19.13(486)        | 1991         |
| 28(700)         | 150            | RF            | 12.64(321)   | 36.5(927)    | 27.64(702)   | 28   | 1.25(32)       | 9.25(235)         | 1025         |
|                 | 300            | RF            | 15.00(381)   | 40.75(1035)  | 27.64(702)   | 28   | 1.62(41)       | 11.5(292)         | 1120         |
|                 | 600            | RF/RJ-94      | 19.00(483)   | 42.25(1073)  | 27.64(702)   | 28   | 2.00(51)       | 15.38(391)        | 1467         |
|                 | 900            | RF/RJ-101     | 22.52(572)   | 46(1168)     | 27.64(702)   | 20   | 3.00(76)       | 20.5(521)         | 2426         |
| 30(750)         | 150            | RF            | 12.00(305)   | 38.75(984)   | 30.12(765)   | 28   | 1.25(32)       | 9.5(241)          | 793          |
|                 | 300            | RF            | 14.49(368)   | 43(1092)     | 30.12(765)   | 28   | 1.75(44)       | 12(305)           | 1603         |
|                 | 600            | RF/RJ-95      | 19.88(505)   | 44.5(1130)   | 30.12(765)   | 28   | 2.00(51)       | 16(406)           | 2445         |
|                 | 900            | RF/RJ-102     | 25.00(635)   | 48.5(1232)   | 30.12(765)   | 20   | 3.00(76)       | 21.38(543)        | 3080         |
| 32(800)         | 150            | RF            | 14.01(356)   | 41.75(1060)  | 30.87(784)   | 28   | 1.50(38)       | 10.5(268)         | 844          |
|                 | 300            | RF            | 15.98(406)   | 45.25(1149)  | 30.87(784)   | 28   | 1.88(48)       | 12.63(321)        | 1331         |
|                 | 600            | RF/RJ-96      | 20.98(533)   | 47(1194)     | 30.87(784)   | 28   | 2.25(57)       | 17.13(435)        | 1747         |
|                 | 900            | RF/RJ-105     | 25.98(660)   | 51.75(1314)  | 30.87(784)   | 28   | 3.25(83)       | 22.75(578)        | 2620         |
| 36(900)         | 150            | RF            | 14.50(368)   | 46(1168)     | 34.00(864)   | 32   | 1.50(38)       | 11.25(286)        | 1060         |
|                 | 300            | RF            | 19(483)      | 50(1270)     | 34.00(864)   | 32   | 2(51)          | 13.75(349)        | 2137         |
|                 | 600            | RF/RJ-98      | 25(635)      | 51.75(1314)  | 34.00(864)   | 28   | 2.5(64)        | 18.75(476)        | 4735         |
|                 | 900            | RF/RJ-105     | 28.25(718)   | 57.5(1461)   | 34.00(864)   | 20   | 3.5(89)        | 24.88(632)        | 6120         |
| 40(1000)        | 150            | RF            | 17.00(432)   | 50.75(1289)  | 38.86(987)   | 36   | 1.50(38)       | 11.25(286)        | 1423         |
|                 | 300            | RF            | 21.5(546)    | 48.75(1238)  | 38.86(987)   | 32   | 1.625(41)      | 13.25(337)        | 3073         |
|                 | 600            | RF            | 28(660)      | 52(1321)     | 38.86(987)   | 32   | 2.25(57)       | 18.25(464)        | 6314         |
|                 | 900            | RF            | 30(762)      | 59.5(1511)   | 38.86(987)   | 24   | 3.5(89)        | 25.63(651)        | 6688         |
| 42(1050)        | 150            | RF            | 17.00(432)   | 53(1346)     | 39.21(996)   | 36   | 1.50(38)       | 11.63(295)        | 1651         |
|                 | 300            | RF            | 22.28(568)   | 50.75(1289)  | 39.21(996)   | 32   | 1.63(41)       | 13.63(346)        | 4429         |
|                 | 600            | RF            | 27.63(702)   | 55.25(1403)  | 39.21(996)   | 28   | 2.5(64)        | 19.5(495)         | 5278         |
|                 | 900            | RF            | 31(787)      | 61.5(1562)   | 39.21(996)   | 24   | 3.5(89)        | 26.25(667)        | 6317         |
| 48(1200)        | 150            | RF            | 20.63(524)   | 59.8(1511)   | 46.97(1193)  | 44   | 1.50(38)       | 12.5(318)         | 2524         |
|                 | 300            | RF            | 24.75(629)   | 57.75(1467)  | 46.97(1193)  | 32   | 1.88(48)       | 15.25(387)        | 5010         |
|                 | 600            | RF            | 31(787)      | 62.75(1594)  | 46.97(1193)  | 32   | 2.75(70)       | 22(559)           | 6029         |
| 54(1350)        | 150            | RF            | 21.25(540)   | 66.25(1683)  | 47.95(1218)  | 44   | 1.75(44)       | 14(356)           | 3227         |
|                 | 300            | RF            | 28.25(718)   | 65.25(1581)  | 47.95(1218)  | 28   | 2.25(57)       | 17.5(446)         | 4217         |

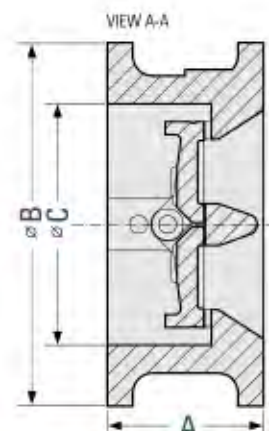
Type S&W  
Wafer Body (Type A)  
Dimension

# Dual Plate Check Valves

Carbon Steel  
Stainless Steel



JIS 2210 & KS B1511



## Dimension Data (JIS 10K-20K)

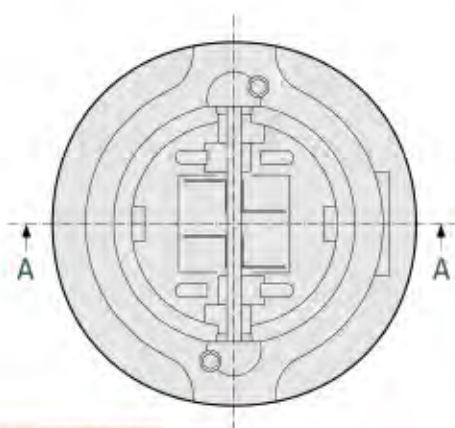
## Stud Selection

| SIZE<br>in (mm) | Series | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|--------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 10K    | RF            | 60           | 104          | 60           | 4    | M16            | 150               | 2.3          |
|                 | 20K    | RF            | 60           | 104          | 60           | 8    | M16            | 150               | 2.4          |
| 2.5(65)         | 10K    | RF            | 60           | 124          | 75           | 4    | M16            | 160               | 3.2          |
|                 | 20K    | RF            | 60           | 124          | 75           | 8    | M16            | 160               | 3.9          |
| 3(80)           | 10K    | RF            | 72           | 134          | 95           | 4    | M16            | 168               | 4.1          |
|                 | 20K    | RF            | 72           | 134          | 95           | 8    | M20            | 180               | 4.3          |
| 4(100)          | 10K    | RF            | 72           | 159          | 116          | 8    | M16            | 165               | 6.1          |
|                 | 20K    | RF            | 72           | 162          | 116          | 8    | M20            | 185               | 8.2          |
| 5(125)          | 10K    | RF            | 82           | 190          | 145          | 8    | M20            | 190               | 9.1          |
|                 | 20K    | RF            | 82           | 200          | 145          | 8    | M22            | 200               | 12.1         |
| 6(150)          | 10K    | RF            | 97           | 220          | 168          | 8    | M20            | 205               | 13           |
|                 | 20K    | RF            | 97           | 238          | 168          | 12   | M22            | 215               | 13.3         |
| 8(200)          | 10K    | RF            | 125          | 270          | 219          | 12   | M20            | 235               | 22           |
|                 | 20K    | RF            | 125          | 282          | 219          | 12   | M22            | 250               | 29.2         |
| 10(250)         | 10K    | RF            | 146          | 333          | 273          | 12   | M22            | 265               | 43           |
|                 | 20K    | RF            | 146          | 356          | 273          | 12   | M24            | 275               | 44           |
| 12(300)         | 10K    | RF            | 181          | 378          | 322          | 16   | M22            | 300               | 67           |
|                 | 20K    | RF            | 181          | 406          | 322          | 16   | M24            | 315               | 70           |
| 14(350)         | 10K    | RF            | 184          | 423          | 348          | 16   | M22            | 305               | 81           |
|                 | 20K    | RF            | 222          | 447          | 348          | 16   | M30            | 375               | 83           |
| 16(400)         | 10K    | RF            | 191          | 486          | 424          | 16   | M24            | 320               | 104          |
|                 | 20K    | RF            | 232          | 510          | 424          | 16   | M30            | 395               | 135          |
| 18(450)         | 10K    | RF            | 203          | 539          | 457          | 20   | M24            | 335               | 132          |
|                 | 20K    | RF            | 264          | 575          | 457          | 20   | M30            | 435               | 183          |
| 20(500)         | 10K    | RF            | 213          | 596          | 512          | 20   | M24            | 350               | 170          |
|                 | 20K    | RF            | 292          | 630          | 512          | 20   | M30            | 465               | 246          |
| 24(600)         | 10K    | RF            | 222          | 697          | 603          | 24   | M30            | 370               | 230          |
|                 | 20K    | RF            | 318          | 734          | 603          | 24   | M36            | 510               | 423          |
| 28(700)         | 10K    | RF            | 321          | 807          | 702          | 24   | M30            | 460               | 510          |
|                 | 20K    | RF            | 381          | 852          | 702          | 24   | M45            | 625               | 576          |
| 30(750)         | 10K    | RF            | 305          | 867          | 765          | 24   | M30            | 465               | 536          |
|                 | 20K    | RF            | 368          | 914          | 765          | 24   | M52            | 634               | 718          |
| 32(800)         | 10K    | RF            | 356          | 917          | 784          | 28   | M30            | 515               | 690          |
|                 | 20K    | RF            | 406          | 974          | 784          | 24   | M52            | 680               | 900          |
| 36(900)         | 10K    | RF            | 368          | 1017         | 864          | 28   | M30            | 530               | 840          |
|                 | 20K    | RF            | 483          | 1084         | 864          | 28   | M52            | 765               | 1300         |
| 40(1000)        | 10K    | RF            | 432          | 1121         | 987          | 28   | M36            | 585               | 1190         |
| 48(1200)        | 10K    | RF            | 524          | 1341         | 1193         | 32   | M36            | 710               | 2200         |
| 54(1350)        | 10K    | RF            | 540          | 1495         | 1281         | 36   | M42            | 800               | 2700         |

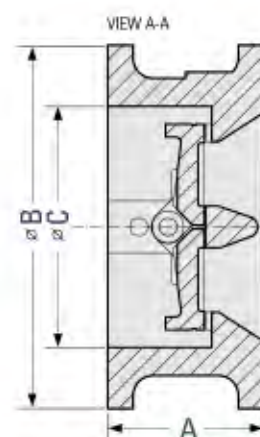
# Dual Plate Check Valves

Cast Iron  
Ductile Iron

Type S&W  
Wafer Body (Type B)  
Dimension



JIS 2210 & KS B1511



## Dimension Data (JIS 10K-20K)

### Stud Selection

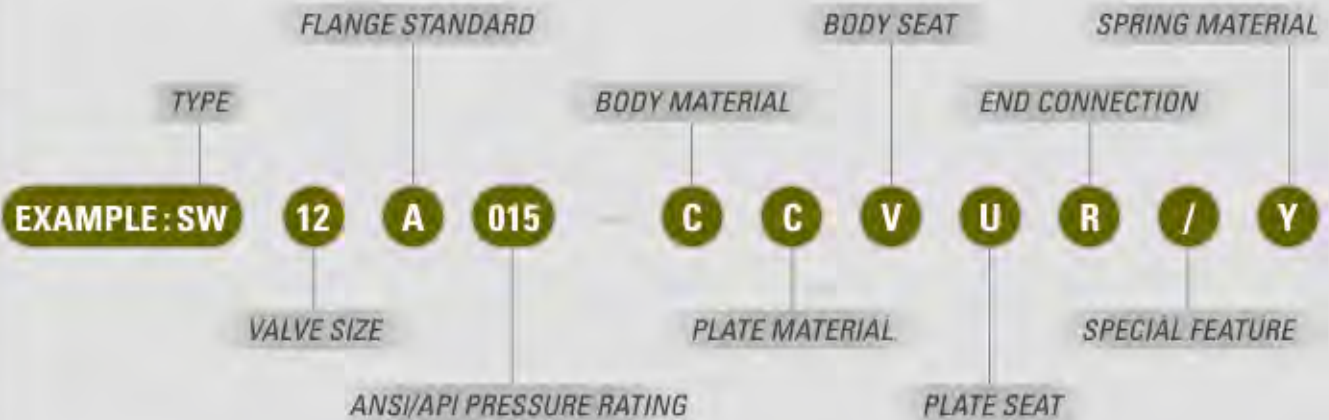
| SIZE<br>in (mm) | KS/JIS<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|------------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 10K              | RF/FF         | 54           | 104          | 60           | 4    | 0.625          | 145               | 2            |
| 2.5(65)         | 10K              | RF/FF         | 54           | 124          | 75           | 4    | 0.625          | 155               | 2.9          |
| 3(80)           | 10K              | RF/FF         | 57           | 134          | 95           | 4    | 0.625          | 153               | 3.2          |
| 4(100)          | 10K              | RF/FF         | 64           | 159          | 116          | 8    | 0.625          | 157               | 5            |
| 5(125)          | 10K              | RF/FF         | 70           | 190          | 145          | 8    | 0.75           | 178               | 6.7          |
| 6(150)          | 10K              | RF/FF         | 77           | 220          | 168          | 8    | 0.75           | 185               | 9.5          |
| 8(200)          | 10K              | RF/FF         | 96           | 270          | 219          | 8    | 0.75           | 205               | 16.6         |
| 10(250)         | 10K              | RF/FF         | 108          | 333          | 273          | 12   | 0.875          | 228               | 28.3         |
| 12(300)         | 10K              | RF/FF         | 143          | 378          | 322          | 12   | 0.875          | 264               | 46           |
| 14(350)         | 10K              | RF/FF         | 184          | 423          | 348          | 12   | 1.00           | 305               | 72           |
| 16(400)         | 10K              | RF/FF         | 191          | 486          | 424          | 16   | 1.00           | 320               | 96           |
| 18(450)         | 10K              | RF/FF         | 203          | 539          | 457          | 26   | 1.125          | 335               | 132          |
| 20(500)         | 10K              | RF/FF         | 213          | 596          | 512          | 20   | 1.125          | 350               | 170          |
| 24(600)         | 10K              | RF/FF         | 222          | 697          | 603          | 20   | 1.125          | 370               | 230          |
| 28(700)         | 10K              | RF/FF         | 321          | 807          | 702          | 28   | 1.25           | 560               | 511          |
| 30(750)         | 10K              | RF/FF         | 305          | 867          | 765          | 28   | 1.25           | 465               | 536          |
| 32(800)         | 10K              | RF/FF         | 356          | 917          | 784          | 28   | 1.50           | 515               | 690          |
| 36(900)         | 10K              | RF/FF         | 368          | 1017         | 864          | 32   | 1.50           | 530               | 840          |
| 40(1000)        | 10K              | RF/FF         | 406          | 1121         | 987          | 36   | 1.50           | 585               | 1190         |
| 48(1200)        | 10K              | RF/FF         | 524          | 1314         | 1193         | 44   | 1.50           | 710               | 2200         |
| 54(1350)        | 10K              | RF/FF         | 540          | 1495         | 1281         | 44   | 1.75           | 800               | 2700         |

DIN 2501

| Dimension Data (DIN PN10-PN40) |                    |               |              |              |              | Stud Selection |                |                   |              |
|--------------------------------|--------------------|---------------|--------------|--------------|--------------|----------------|----------------|-------------------|--------------|
| SIZE<br>in (mm)                | Pressure<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty           | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
| 2(50)                          | PN10               |               | 60.3         | 109          | 60           | 4              | M16            |                   | 3.2          |
|                                | PN16               |               | 60.3         | 109          | 60           | 4              | M16            |                   | 3.2          |
|                                | PN25               |               | 60.3         | 109          | 60           | 4              | M16            |                   | 3.2          |
|                                | PN40               |               | 60.3         | 109          | 60           | 4              | M16            |                   | 3.2          |
| 3(80)                          | PN10               |               | 73.0         | 144          | 95           | 8              | M16            |                   | 7.7          |
|                                | PN16               |               | 73.0         | 144          | 95           | 8              | M16            |                   | 7.7          |
|                                | PN25               |               | 73.0         | 144          | 95           | 8              | M16            |                   | 7.7          |
|                                | PN40               |               | 73.0         | 144          | 95           | 8              | M16            |                   | 7.7          |
| 4(100)                         | PN10               |               | 73.0         | 164          | 116          | 8              | M16            |                   | 9            |
|                                | PN16               |               | 73.0         | 164          | 116          | 8              | M16            |                   | 9.5          |
|                                | PN25               |               | 73.0         | 170          | 116          | 8              | M20            |                   | 10           |
|                                | PN40               |               | 73.0         | 170          | 116          | 8              | M20            |                   | 10.5         |
| 6(150)                         | PN10               |               | 98.4         | 220          | 168          | 8              | M20            |                   | 15.5         |
|                                | PN16               |               | 98.4         | 220          | 168          | 8              | M20            |                   | 16           |
|                                | PN25               |               | 98.4         | 226          | 168          | 8              | M24            |                   | 19.4         |
|                                | PN40               |               | 98.4         | 226          | 168          | 8              | M24            |                   | 20           |
| 8(200)                         | PN10               |               | 127.0        | 275          | 219          | 8              | M20            |                   | 35           |
|                                | PN16               |               | 127.0        | 275          | 219          | 12             | M20            |                   | 36           |
|                                | PN25               |               | 127.0        | 286          | 219          | 12             | M24            |                   | 38           |
|                                | PN40               |               | 127.0        | 293          | 219          | 12             | M27            |                   | 40           |
| 10(250)                        | PN10               |               | 146.1        | 330          | 273          | 12             | M20            |                   | 51           |
|                                | PN16               |               | 146.1        | 331          | 273          | 12             | M24            |                   | 52           |
|                                | PN25               |               | 146.1        | 343          | 273          | 12             | M27            |                   | 54           |
|                                | PN40               |               | 146.1        | 355          | 273          | 12             | M30            |                   | 56           |
| 12(300)                        | PN10               |               | 181.0        | 380          | 322          | 12             | M20            |                   | 94           |
|                                | PN16               |               | 181.0        | 386          | 322          | 12             | M24            |                   | 97           |
|                                | PN25               |               | 181.0        | 403          | 322          | 16             | M27            |                   | 98           |
|                                | PN40               |               | 181.0        | 420          | 322          | 16             | M30            |                   | 99           |
| 14(350)                        | PN10               |               | 184.2        | 440          | 348          | 16             | M20            |                   | 122          |
|                                | PN16               |               | 184.2        | 446          | 348          | 16             | M24            |                   | 123          |
|                                | PN25               |               | 222.3        | 460          | 348          | 16             | M30            |                   | 174          |
|                                | PN40               |               | 222.3        | 477          | 348          | 16             | M33            |                   | 176          |
| 16(400)                        | PN10               |               | 190.5        | 491          | 424          | 16             | M24            |                   | 131          |
|                                | PN16               |               | 190.5        | 498          | 424          | 16             | M27            |                   | 133          |
|                                | PN25               |               | 231.8        | 517          | 424          | 16             | M33            |                   | 204          |
|                                | PN40               |               | 231.8        | 549          | 424          | 16             | M36            |                   | 207          |
| 18(450)                        | PN10               |               | 203.2        | 541          | 457          | 20             | M24            |                   | 141          |
|                                | PN16               |               | 263.5        | 558          | 457          | 20             | M27            |                   | 284          |
|                                | PN25               |               |              |              |              |                |                |                   |              |
|                                | PN40               |               | 263.5        | 574          | 457          | 20             | M36            |                   | 294          |
| 20(500)                        | PN10               |               | 219.1        | 596          | 512          | 20             | M24            |                   | 215          |
|                                | PN16               |               | 292.1        | 620          | 512          | 20             | M30            |                   | 354          |
|                                | PN25               |               | 292.1        | 627          | 512          | 20             | M33            |                   | 359          |
|                                | PN40               |               | 292.1        | 631          | 512          | 20             | M39            |                   | 363          |
| 24(600)                        | PN10               |               | 222.3        | 698          | 603          | 20             | M27            |                   | 358          |
|                                | PN16               |               | 317.5        | 737          | 603          | 20             | M33            |                   | 518          |
|                                | PN25               |               | 317.5        | 734          | 603          | 20             | M36            |                   | 516          |
|                                | PN40               |               | 317.5        | 750          | 603          | 20             | M45            |                   | 521          |

# Dual Plate Check Valves

## Ordering Instructions



### BODY & PLATE MATERIAL

| FIG | MATERIAL                       | SPECIFICATION                |
|-----|--------------------------------|------------------------------|
| C   | Carbon Steel                   | ASTM A216WCB                 |
| L   | Low Temp Carbon Steel          | ASTM A352 LCB                |
| O   | Low Temp Carbon Steel          | ASTM A352 LCC                |
| D   | High Temp Cr Mo Steel          | ASTM A217 WCB                |
| N   | Low Alloy Steel                | ASTM A487 GR 4N              |
| K   | Low Alloy Steel                | ASTM A487 GR 4C              |
| E   | 410 Stainless Steel            | ASTM A217 CA15               |
| P   | 5% Cr Steel                    | ASTM A217 C5                 |
| W   | 9% Cr Steel                    | ASTM A217 C12                |
| G   | Low Temp 13% Cr 4%Ni           | ASTM A352 CA6NM              |
| S   | 316 Stainless Steel            | ASTM A182 F316/A351 CF8M     |
| F   | 316L Stainless Steel           | ASTM A182 F316L/A351 CF3M    |
| Y   | 347 Stainless Steel(High Temp) | ASTM A351 CF8C               |
| Q   | 22%Chrome Duplex               | ASTM A890 4A                 |
| R   | Ferrallium 255-3SC             | UNS S32550                   |
| Z   | 25% Chrome Super Duplex        | UNS S32760                   |
| H   | Alloy 825                      | UNS N008825                  |
| I   | Alloy 625                      | ASTM A494 CW6MC              |
| J   | Hastelloy C276                 | UNS N10276/ASTM A494 CWRMN   |
| M   | Monel                          | ASTM A494-M35-2              |
| A   | Nickel Aluminium Bronze        | BS 1400 AB2/ASTM B148 C95800 |
| 1   | Chromium Molybdenum Steel      | ASTM A217 GR WC9             |
| 2   | 3.5% Nickel Steel              | ASTM A352 LC3                |
| 3   | 304 Stainless Steel            | ASTM A351 CF8                |
| 4   | 304L Stainless Steel           | ASTM A351 CF3                |
| 5   | Alloy 20                       | ASTM A351 CN7M               |
| 6   | 317 Stainless Steel            | ASTM A352 CG8M               |
| 7   | Carbon Molybdenum Steel        | ASTM A352 LC1                |
| 8   | Gray Iron                      | ASTM A126 Class B            |
| 9   | Ductile Iron                   | ASTM A395                    |
| X   | To Be Specified                | TO BE SPECIFIED              |

## ■ VALVE TYPE

- SW WAFER
- SF FLANGED
- SL SOLID LUG

## ■ VALVE SIZE

- INCHES : For ANSI, AWWA & API Standards
- MILIMETERS : For KS, JIS Standards

### BODY SEAT/PLATE OVERLAY MATERIAL

| FIG | MATERIAL             | OPERATING TEMP RANGE(°C) |
|-----|----------------------|--------------------------|
| P   | Same as Body/Plate   | -AS Body /Plate          |
| E   | 410 Stainless Steel  | -29 to 538               |
| S   | 316 Stainless Steel  | -267 to 815              |
| F   | 316L Stainless Steel | -316L                    |
| U   | Stellite No6         | -267 to 815              |
| J   | Viton GLT            | -30 to 204               |
| V   | Viton A              | -40 to 204               |
| N   | Buna-N               | -57 to 121               |
| T   | Neoprene             | -40 to 121               |
| K   | Teflon               | -129 to 232              |
| D   | EPDM                 | -10 to 110               |

### ANSI/JIS,KS PRESSURE RATINGS

| FIG | PRESSURE RATINGS |
|-----|------------------|
| 015 | ANSI150          |
| 030 | ANSI300          |
| 060 | ANSI600          |
| 090 | ANSI900          |
| 150 | ANSI1500         |
| K05 | JIS,KS5K         |
| K10 | JIS,KS10K        |
| K20 | JIS,KS20K        |
| K40 | JIS,KS40K        |

### SPRING MATERIAL

| FIG | MATERIAL            |
|-----|---------------------|
| S   | 316 Stainless Steel |
| Y   | Inconel X750        |
| I   | Inconel 625         |
| M   | Monel K500          |
| C   | Carpenter 20        |
| X   | To Be Specified     |

### END CONNECTION

| FIG | CONNECTION                |
|-----|---------------------------|
| R   | Raised Face 125-250 AARH  |
| S   | Stock Finish 250-500 AARH |
| J   | Ring Type Joint           |
| F   | Flat Face                 |
| H   | Clamped End               |
| X   | To Be Specified           |

### SPECIAL FEATURES

| FIG | MATERIAL                                  |
|-----|-------------------------------------------|
| -   | No Special Features                       |
| /   | To be specified in order and inquiry text |
| S   | Super Torque Spring                       |
| L   | Low Torque Spring                         |

### FLANGE STADRARD

| FIG | STANDARD             |
|-----|----------------------|
| A   | ANSI B16.47 Series B |
| D   | AWWA C207 Class D    |
| E   | AWWA C207 Class E    |
| J   | JIS 2210, KSB 1511   |

## High Performance Check Valves

The enterprise which advance on the world with technique of best

### Upper Temperature Limits

| Spring Material | Upper Limit F(°C) |
|-----------------|-------------------|
| 316 SS          | 250[121]          |
| Inconel X750    | 1000[537]         |
| Monel           | 400[204]          |
| Hastelloy       | 800[426]          |
| Alloy 20        | 250[121]          |

| Seat Material  | Upper Limit F(°C) |
|----------------|-------------------|
| Buna-N[NBR]    | 250[121]          |
| EPDM           | 300[149]          |
| PTFE           | 450[232]          |
| Metal Overlay  | As Body           |
| Metal to Metal | As Body           |

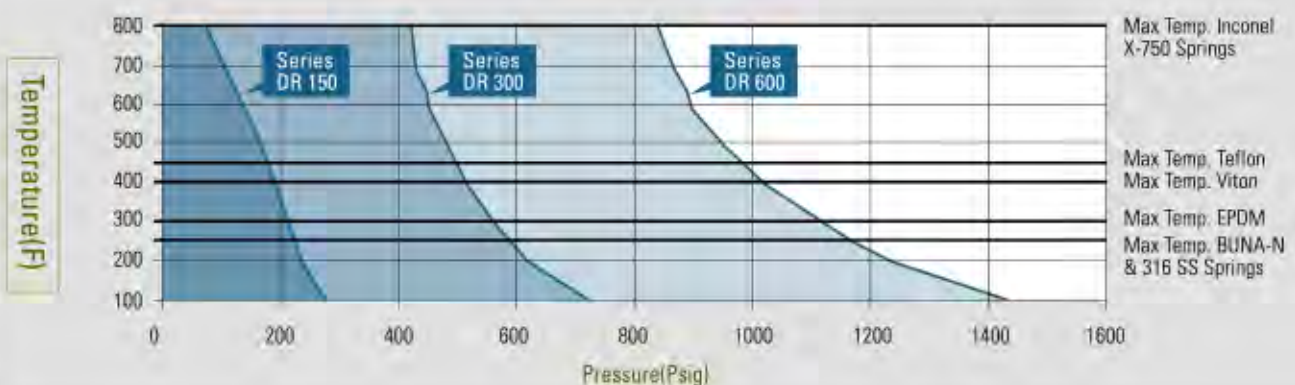
### Lower Temperature Limits

| Material    | Lower Limit F(°C) |
|-------------|-------------------|
| A126/ WCB   | -20[-28.9]        |
| LCC         | -50[-45.6]        |
| CF8M        | -450[-268]        |
| Buna-N[NBR] | -70[-56.7]        |
| EPDM        | -14[-11.4]        |
| Viton       | -40[-40]          |
| PTFE        | -200[-129]        |
| Metal       | As Body           |

### ■ Pressure Temperature Chart In Accordance with ASME B16.1,A126-B

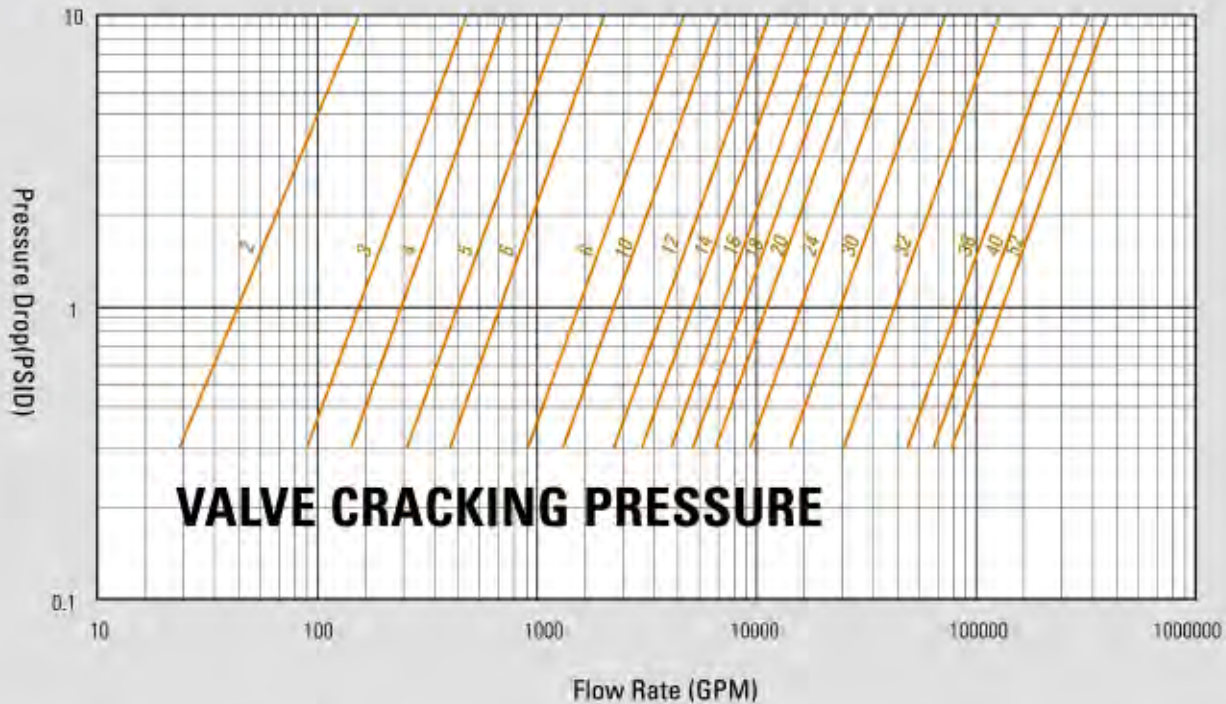


### ■ Pressure Temperature Chart In Accordance with ASME B16.34,CF8M



**Note** Upon prolonged exposure to temperatures above 800°F, the carbide phase of carbon steel may be converted to graphite.

## ■ Dual Plate Check Valve Pressure Drop-Air (Sizes 2"-52")



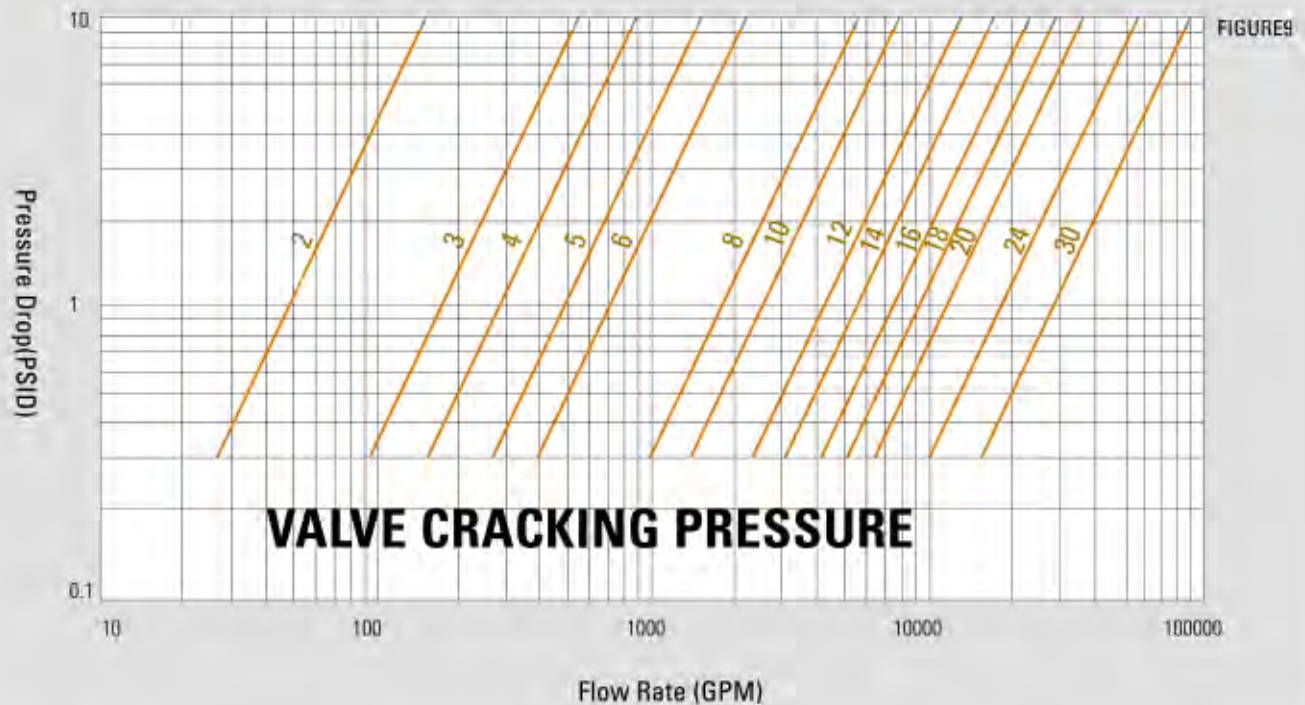
### Note

1. Pressure drop curves are based on air flow at 60°F and 1 ATM pressure.
2. Valve cracking pressure is equal to or less than 0.3 psid.
3. Valve cracking pressure increases to between 0.75 and 1.25 psid when installed vertically with flow upwards.

### Cv Values (US-GPM @ 1PSID)

| Valve Size -in(mm) | Cv    | Valve Size -in(mm) | Cv      |
|--------------------|-------|--------------------|---------|
| 2"(50)             | 48    | 20"(500)           | 12,004  |
| 3"(80)             | 181   | 24"(600)           | 17,804  |
| 4"(100)            | 291   | 26"(650)           | 30,000  |
| 5"(125)            | 494   | 28"(700)           | 33,600  |
| 6"(150)            | 705   | 30"(750)           | 38,400  |
| 8"(200)            | 1,795 | 32"(800)           | 48,000  |
| 10"(250)           | 2,563 | 36"(900)           | 55,200  |
| 12"(300)           | 4,259 | 40"(1000)          | 84,000  |
| 14"(350)           | 5,436 | 42"(1050)          | 96,000  |
| 16"(400)           | 7,355 | 48"(1200)          | 117,600 |
| 18"(450)           | 9,537 | 52"(1300)          | 141,300 |

### ■ Dual Plate Check Valve Pressure Drop-Liquids (Sizes 2"-30")



#### Note

1. Pressure drop curves are based on water flow.
2. Valve cracking pressure is equal to or less than 0.3 psid.
3. Valve cracking pressure increases to between 0.75 and 1.25 psid when installed vertically with flow upwards.

### ■ Method of Calculating Flow

#### Liquid Flow

$$C_v = Q \sqrt{\frac{G}{\Delta P}} \quad Q = C_v \sqrt{\frac{\Delta P}{G}} \quad \Delta P = G \left( \frac{Q}{C_v} \right)^2$$

#### Gas Flow

$$C_v = \frac{Q}{963} \sqrt{\frac{GT}{\Delta P (P_1 + P_2)}} \quad Q = 963 C_v \sqrt{\frac{\Delta P (P_1 + P_2)}{GT}}$$

#### Saturated Vapour

$$C_v = \frac{W}{K} \sqrt{\frac{1}{\Delta P (P_1 + P_2)}} \quad W = C_v K \sqrt{\Delta P (P_1 + P_2)}$$

#### Superheated Vapour

$$C_v = \frac{W(1+0.0007T_{SH})}{K} \sqrt{\frac{1}{\Delta P (P_1 + P_2)}} \quad C_v = \frac{C_v K}{(1+0.0007T_{SH})} \sqrt{\Delta P (P_1 + P_2)}$$

#### Variables

- $C_v$  = Valve Coefficient
- $\Delta P$  =  $(P_1 - P_2)$  Pressure Drop
- $P_1$  = Inlet Pressure (PSIA)
- $P_2$  = Outlet Pressure (PSIA)
- $G$  = Specific Gravity
- Water = 1.0 at 60°F and 1 ATM
- Air = 1.0 at 60°F and 1 ATM
- $Q$  = Flow
- Liquid = USGPM
- Gas = SCFH
- $T$  = Absolute Temperature ( $^{\circ}\text{F} + 460$ )
- $K$  = Constant For Vapours
- $T_{SH}$  = Superheat ( $^{\circ}\text{F}$ ) / Total Temperature Minus Saturation Temperature
- $W$  = lbs. Per Hour (LB/H)

## A-Recommended, B-May Be Acceptable (Testing Recommended), N-Not Recommended

| CORROSIVE MEDIA           | BODY / DISC MATERIALS |     |     | SEAT MATERIALS |        |       | CORROSIVE MEDIA         | BODY / DISC MATERIALS |    |     | SEAT MATERIALS |        |       |
|---------------------------|-----------------------|-----|-----|----------------|--------|-------|-------------------------|-----------------------|----|-----|----------------|--------|-------|
|                           | AB                    | CS  | 316 | EPDM           | BUNA-N | VITON |                         | AB                    | CS | 316 | EPDM           | BUNA-N | VITON |
| Acetaldehyde              | A                     | B   | A   | A              | N      | N     | Lactic Acid             | N                     |    | A   | 70             | 70     | A     |
| Acetone                   | A                     | A   | A   | B              | N      | N     | Lime                    | A                     |    | A   | A              | B      | A     |
| Acetylene                 | N                     | A   | A   | A              |        | A     | Liquefied Petroleum Gas | A                     | A  | A   | N              | A      | A     |
| Air                       | A                     | A   | A   | A              | A      | A     | Mercuric Chloride       | B                     | N  | B   | A              | A      | A     |
| Aluminum Acetate          | A                     | A   | A   | A              | B      | N     | Mercury                 | N                     | A  | A   | A              | A      | A     |
| Aluminum Nitrate          | N                     | N   | A   | A              | A      | A     | Methane                 | A                     | A  | A   | N              | A      | A     |
| Amino Acids               | N                     |     | A   | N              | N      | A     | Methyl Alcohol          | A                     | A  | A   | A              | B      | N     |
| Ammonia Gas               |                       | A   | A   | B              | 70     | N     | Methyl Acetate          |                       | B  | A   | B              | N      | N     |
| Ammonium Bicarbonate      |                       | B   | A   | A              | N      | N     | Methyl Chloride         | A                     | A  | A   | N              | N      | A     |
| Ammonium Phosphate        |                       | N   | A   | A              | A      | A     | Naphtha                 | A                     | A  | A   | N              | N      | A     |
| Arsenic Acid              | N                     | N   | A   | A              | A      | A     | Natural Gas             | A                     | A  | A   | N              | A      | A     |
| Beer-Breweries            | N                     | N   | A   | A              | A      | A     | Nitrogen-Gas            | A                     | A  | A   | A              | A      | A     |
| Beet Sugar Liquors        | A                     | N   | A   | A              | A      | A     | Nitrous Oxide           | B                     | B  | A   |                | B      |       |
| Benzene                   | A                     | A   | A   | N              | N      | 70    | Oil-Crude (sweet)       | A                     | A  | A   | N              | A      | A     |
| Brine                     | B                     | N   | A   | S              | A      | A     | Oil-Crude (sour)        | A                     | A  | A   | N              | B      | A     |
| Bromine - Anhydrous       | N                     | N   | N   | N              | N      | A     | Oil - Vegetable         | B                     | N  | A   | B              | A      | A     |
| Bromine - Wet             | N                     | N   | N   | N              | N      | A     | Oleic Acid              |                       | B  | A   | N              | N      | B     |
| Butane                    | A                     | A   | A   | N              | A      | A     | Olive Oil               | B                     | B  | A   | A              | A      | A     |
| Butanoic Acid             |                       |     | A   |                |        |       | Oxalic Acid             |                       |    | A   | A              | B      | A     |
| Butyl Alcohol             | A                     | A   | A   | B              | A      | A     | Oxygen-Gas              | A                     | A  | A   | A              | B      | A     |
| Butylene (Gas)            | A                     | A   | A   | N              | N      | A     | Palm Oil                |                       | N  | A   |                | A      | A     |
| Calcium Chlorate          | N                     | A   | A   | A              | A      | A     | Paint-Thinner/Remover   | A                     | A  | A   | N              | N      | A     |
| Calcium Hydroxide         | B                     | B   | A   | A              | A      | A     | Phenol                  | B                     | B  | A   | B              | N      | A     |
| Carbonated Water          | N                     | B   | A   | A              | A      | A     | Plating Solutions       | N                     | A  | N   | A              | N      | A     |
| Carbon Monoxide           | A                     | A   | A   | A              | A      | B     | Potassium Acetate       |                       | N  | A   | A              | B      | N     |
| Carbonic Acid             | N                     | B   | A   | A              | A      | A     | Potassium Bisulfate     |                       |    | A   |                |        |       |
| Caster Oil                | A                     | A   | A   | B              | A      | A     | Potassium Chlorate      |                       | N  | A   | A              | B      | A     |
| Chlorine (Wet or Dry)     | N                     | 70  | N   | N              | N      | A     | Potassium Cyanide       | A                     | A  | A   | A              | A      | A     |
| Cider                     | A                     | N   | A   | A              | B      | A     | Potassium Sulfide       | N                     | A  | A   | B              | N      | A     |
| Citric Acid               | B                     | N   | A   | A              | A      | A     | Potassium Sulfate       | A                     | A  | A   | A              | A      | A     |
| Citric Juices             | B                     | N   | A   | A              | A      | A     | Propylene Glycol        |                       | N  | A   | A              | A      | A     |
| Corn Oil                  | B                     | A   | A   | N              | A      | A     | Propylene Oxide         | N                     |    | A   | A              | B      |       |
| Diacetone Alcohol         | A                     | A   | A   | A              | N      | N     | Pyridene                | B                     | A  | A   | B              | N      | N     |
| Dibutyl Phthalate         | A                     | A   | A   | B              | N      | N     | Shellac                 | B                     | A  | A   | A              | A      |       |
| Dichloroethane            |                       |     | A   | N              | N      | A     | Silver Nitrate          | N                     | N  | A   | A              | N      | A     |
| Diesel Fuel               |                       | A   | A   | N              | A      | A     | Sodium Bicarbonate      | A                     | A  | A   | A              | A      | A     |
| Dieldrin                  | A                     | A   | A   | N              | B      | A     | Sodium Carbonate        | N                     | B  | A   | A              | A      | A     |
| Diphenyl Oxide            | N                     | A   | A   | N              | N      | A     | Sodium Chlorate         | N                     |    | A   | A              | B      | A     |
| Dowtherm                  | B                     | A   | A   | N              | N      | A     | Sodium Chloride         | N                     | B  | B   | A              | A      | A     |
| Ethanol                   | A                     | A   | A   | A              | A      | N     | Sodium Nitrite          | B                     | A  | A   | A              | A      |       |
| Ether                     | A                     | A   | A   | N              | N      | N     | Sodium Sulfate          | A                     | B  | A   | A              | A      | A     |
| Ethyl Acetate             | B                     | A   | A   | B              | N      | N     | Sodium Sulfide          | B                     | A  | A   | A              | A      | A     |
| Ethyl Chloride            | B                     | 200 | A   | A              | A      | A     | Sodium Thiosulfate      |                       | B  | A   | A              | B      | A     |
| Ethylene Glycol           | A                     | A   | A   | A              | A      | A     | Soybean Oil             | B                     | B  | A   | N              | A      | A     |
| Ethylene Oxide            | N                     | A   | A   | N              | N      | N     | Steam and Hot Water     | A                     | B  | A   | A              | N      |       |
| Fatty Acids               | N                     | N   | A   | N              | A      | A     | Sulfur                  | N                     | B  | A   | A              | N      | N     |
| Ferrous Chloride          | N                     | N   | N   | A              | A      | A     | Sulfuric Acid           | N                     | N  | B   | A              | N      | A     |
| Fish Oils                 | B                     | B   | A   |                | A      |       | Sulfurous Acid          | N                     | N  | B   | N              | N      | A     |
| Gas-Natural               | A                     | A   | A   | N              | A      | A     | Tararic Acid            |                       | B  | A   | N              | A      | A     |
| Gasoline-Ethyl            | A                     | A   | A   | N              | N      | A     | Terachloroethane        | B                     | 75 | A   | B              | N      | A     |
| Gasoline-Regular          | A                     | A   | A   | N              | A      | A     | Turpentine              | A                     | A  | A   | N              | A      | A     |
| Glucose                   | A                     | A   | A   | A              | A      | A     | Varnish                 | A                     | A  | A   | N              | N      | A     |
| Glycerine                 | A                     | A   | A   | A              | A      | A     | Vinegar                 | N                     | N  | A   | N              | B      | A     |
| Helium Gas                | A                     | A   | A   | A              | A      | A     | Water, Carbonated       | N                     | B  | A   | A              | A      | A     |
| Hydraulic Fluid (Pydraul) | A                     | A   | A   | N              | N      | A     | Water, Chilled          | A                     | B  | A   | A              | A      | A     |
| Hydrocarbons (Aromatic)   | N                     | A   | A   | N              | N      | A     | Water, Distilled        | N                     | B  | A   | A              | A      | A     |
| Hydrogen Peroxide         | N                     | N   | A   | A              | N      | A     | Water, Salt, Sea        | A                     | N  | A   | A              | A      | B     |
| Hydrogen Sulfide          | N                     | B   | A   | A              | 70     | N     | Wine                    | B                     | N  | A   | A              | A      | A     |
| Iodine                    | N                     | N   | N   | N              | N      | A     | Zinc Bromide            | N                     |    | A   | A              | A      |       |
| Isopropyl Acetate         |                       |     | B   | B              | N      | N     | Zinc Cyanide            | N                     | N  | A   |                | A      |       |
| Kerosene                  | A                     | A   | A   | N              | A      | A     | Zinc Sulfate            | N                     | N  | A   | A              | A      | A     |

### Note

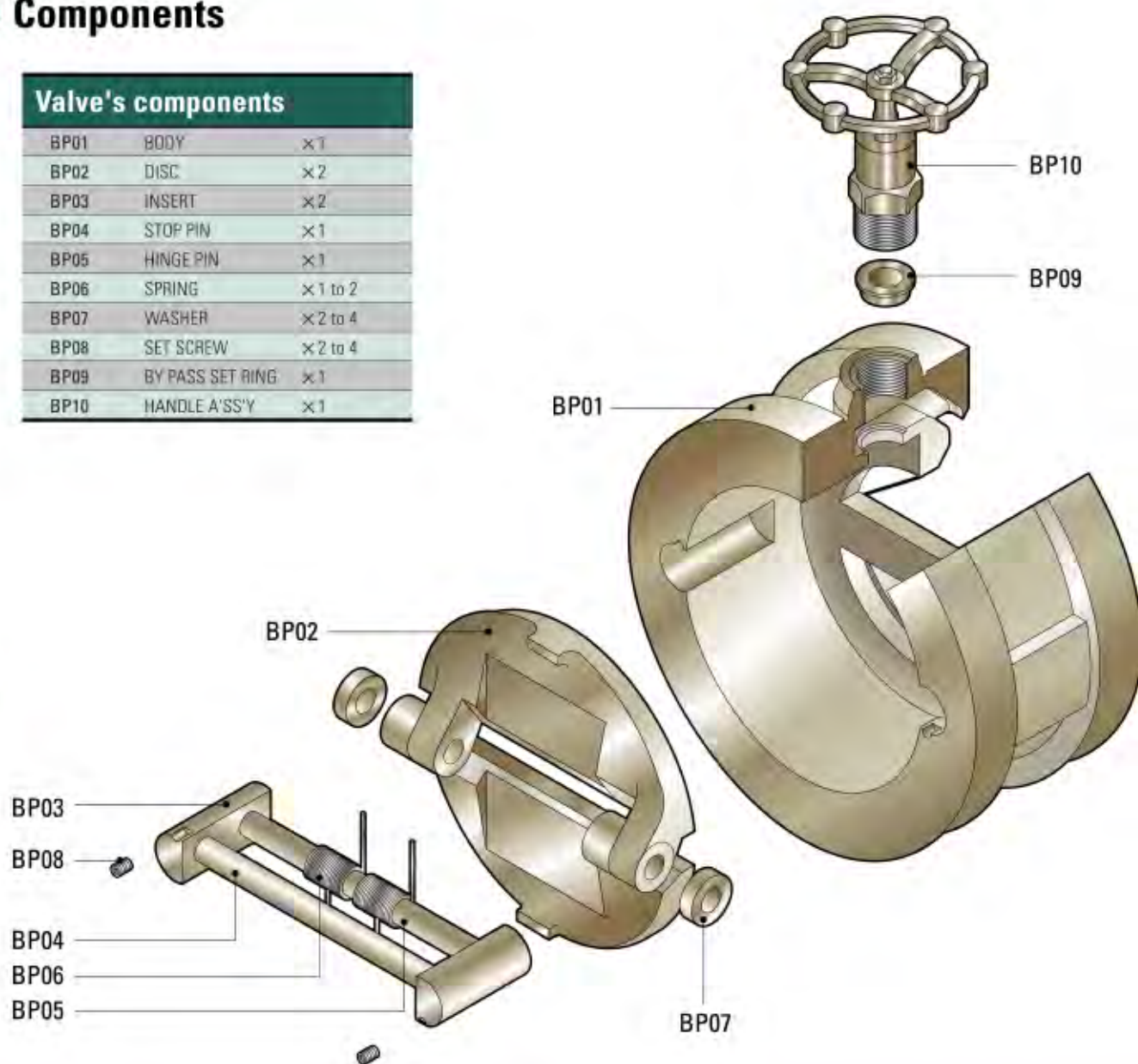
1. If # appears material is recommended for use up to indicated temperature (°F).
2. AB = Aluminum Bronze, CS = Carbon Steel, 316 = 316 Stainless Steel.
3. If uncertain please contact factory concerning valve compatibility.

No representation, warranty or guarantee of compatibility, expressed or implied, is made by this Selection Guide due to the complexity and almost infinite variations of mixtures, concentrations, temperatures and flow conditions possible in actual service. As a result, the end user must assume all responsibility for ultimate determination of valve compatibility.

## ■ Components

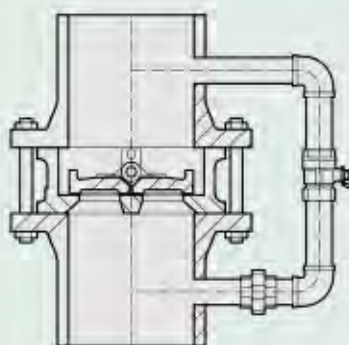
### Valve's components

|      |                  |          |
|------|------------------|----------|
| BP01 | BODY             | × 1      |
| BP02 | DISC             | × 2      |
| BP03 | INSERT           | × 2      |
| BP04 | STOP PIN         | × 1      |
| BP05 | HINGE PIN        | × 1      |
| BP06 | SPRING           | × 1 to 2 |
| BP07 | WASHER           | × 2 to 4 |
| BP08 | SET SCREW        | × 2 to 4 |
| BP09 | BY PASS SET RING | × 1      |
| BP10 | HANDLE A'SS'Y    | × 1      |

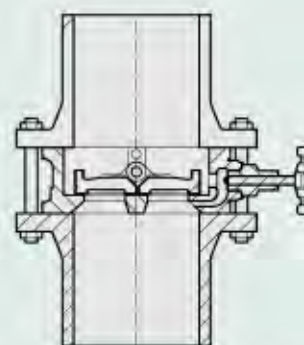


## ■ The advantage of S&W By-Pass check valve

The S&W By-Pass Check Valve has its own by-pass that the flow can be to inlet area without any add by-pass pipe line equipment. This By-Pass valve ensures not only to reduce cost but also to prevent the slam in pipe line as removing add by-pass pipe line's installation.



BY-PASS PIPELINE



BY-PASS CHECK VALVE

## ■ Wafer Type \_ Code No. SWB

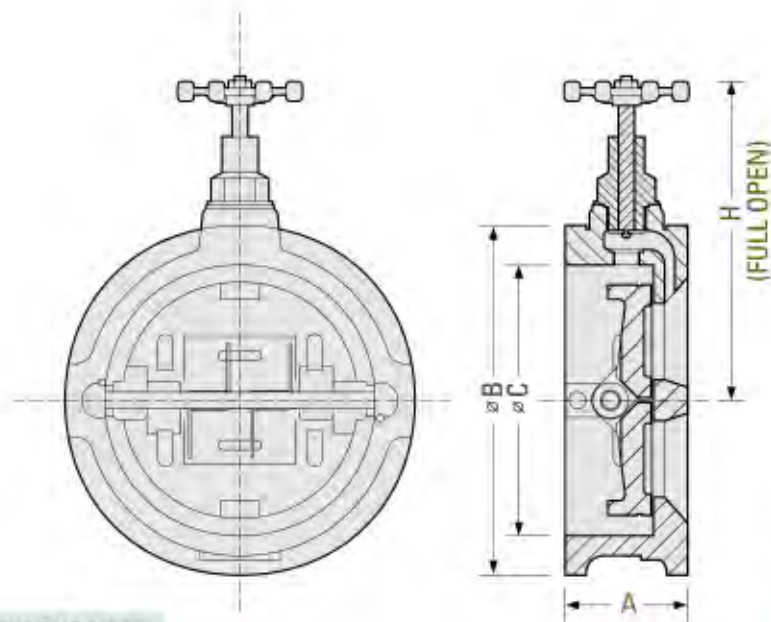
### Performance Standard

\_JIS 2210 & KSB 1511- Flange Dimension

\_API 598-Testing

\_ANSI B16.34- Wall Thickness

\_API 605[B16.47]-Flange Dimension



JIS 2210 & KS B1511

### Dimension Data (JIS 10K-20K)

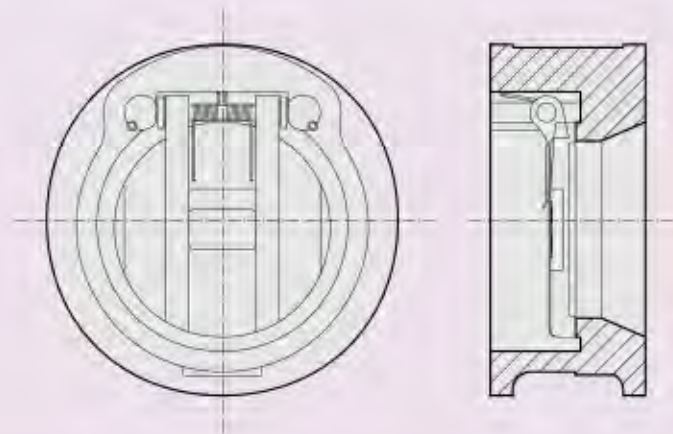
### Stud Selection

| SIZE<br>in (mm) | Pressure<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | H<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|--------------------|---------------|--------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 10K                | RF            | 54           | 104          | 60           | 138          | 4    | M16            | 145               | 2.3          |
|                 | 20K                | RF            | 54           | 104          | 60           | 138          | 8    | M16            | 150               | 2.3          |
| 2.5(65)         | 10K                | RF            | 54           | 124          | 75           | 147          | 4    | M16            | 155               | 3.5          |
|                 | 20K                | RF            | 60           | 124          | 75           | 147          | 8    | M16            | 160               | 3.5          |
| 3(80A)          | 10K                | RF            | 57           | 134          | 95           | 157          | 4    | M16            | 153               | 4.5          |
|                 | 20K                | RF            | 67           | 134          | 95           | 157          | 8    | M20            | 180               | 4.7          |
| 4(100)          | 10K                | RF            | 64           | 159          | 116          | 168          | 8    | M16            | 157               | 5.6          |
|                 | 20K                | RF            | 67           | 165          | 116          | 168          | 8    | M20            | 185               | 6.3          |
| 5(125)          | 10K                | RF            | 70           | 190          | 145          | 184          | 8    | M20            | 178               | 9.4          |
|                 | 20K                | RF            | 83           | 203          | 145          | 184          | 8    | M22            | 200               | 10.3         |
| 6(150)          | 10K                | RF            | 77           | 220          | 168          | 197          | 8    | M20            | 185               | 11.6         |
|                 | 20K                | RF            | 95           | 238          | 168          | 197          | 12   | M22            | 215               | 15.6         |
| 8(200)          | 10K                | RF            | 96           | 270          | 219          | 219          | 12   | M20            | 205               | 20.4         |
|                 | 20K                | RF            | 127          | 283          | 219          | 226          | 12   | M22            | 250               | 27.7         |
| 10(250)         | 10K                | RF            | 108          | 333          | 273          | 250          | 12   | M22            | 228               | 32.1         |
|                 | 20K                | RF            | 140          | 356          | 273          | 254          | 12   | M24            | 275               | 50           |
| 12(300)         | 10K                | RF            | 143          | 378          | 322          | 273          | 16   | M22            | 264               | 49.4         |
|                 | 20K                | RF            | 181          | 406          | 322          | 283          | 16   | M24            | 315               | 70.2         |

### ■ Wafer Type \_ Code No. SWS

#### Performance Standard

- \_ANSI B16.5[1.5" up to 24"]- Flange Dimension
- \_API 6A- Face to Face Dimension
- \_API 598-Testing, Allowable leakage rate
- \_ANSI B16.34- Wall Thickness

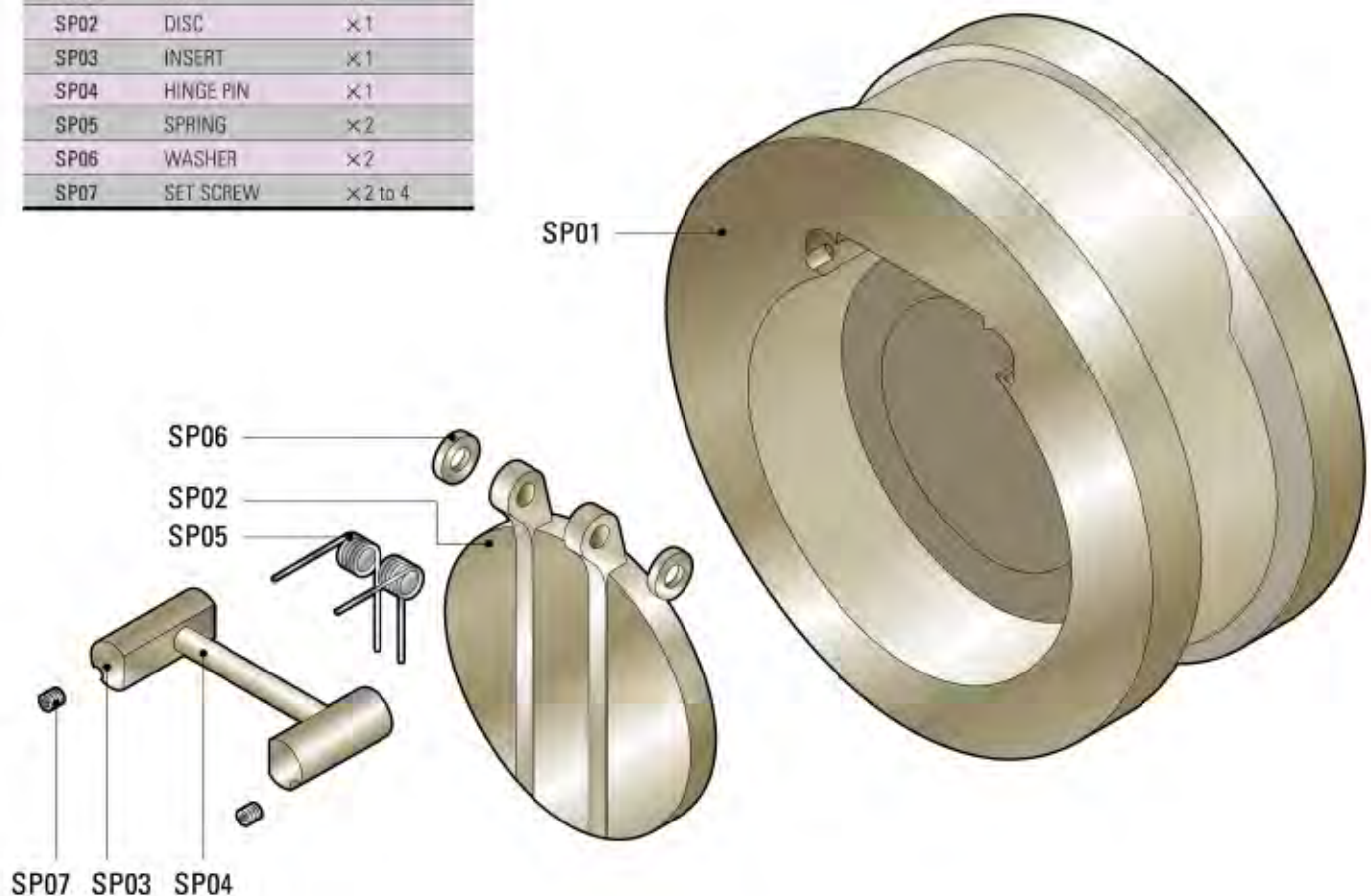


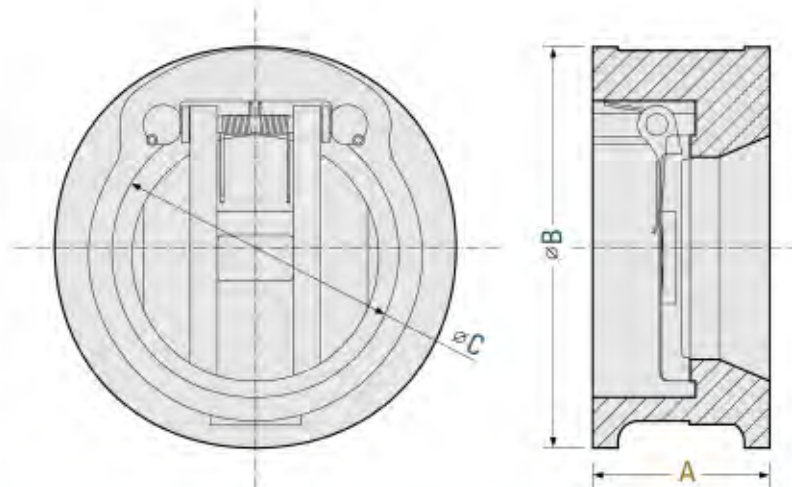
### ■ Retainerless Design

S&W unique Design doesn't have any holes bored through the body wall being different from many competitors. This unique design prohibits shell leakage originally and functions perfectly in large size of valves and high rating valve's application.

#### Valve's components

|      |           |         |
|------|-----------|---------|
| SP01 | BODY      | ×1      |
| SP02 | DISC      | ×1      |
| SP03 | INSERT    | ×1      |
| SP04 | HINGE PIN | ×1      |
| SP05 | SPRING    | ×2      |
| SP06 | WASHER    | ×2      |
| SP07 | SET SCREW | ×2 to 4 |



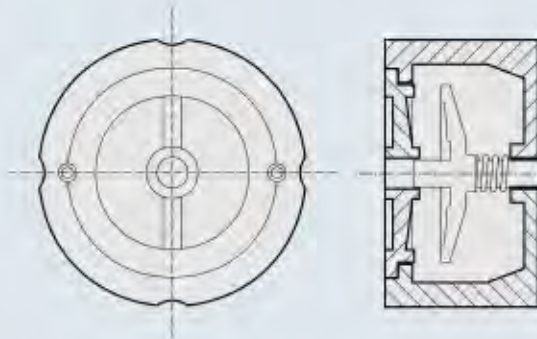


### Dimension Data (ANSI Class 150-300)

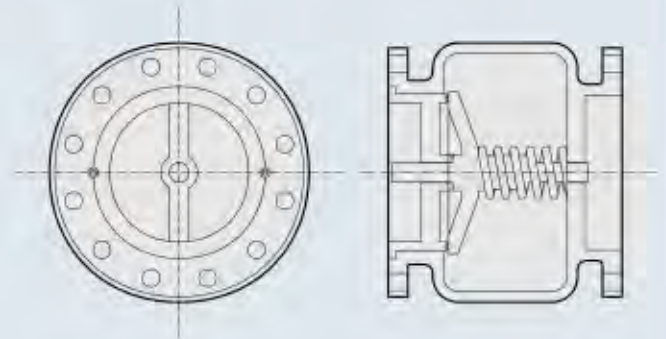
### Stud Selection

| SIZE<br>in (mm) | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
|-----------------|----------------|---------------|--------------|--------------|--------------|------|----------------|-------------------|--------------|
| 2(50)           | 150            | RF            | 60           | 104          | 57           | 4    | 16             | 152               | 2.3          |
|                 | 300            | RF            | 60           | 111          | 57           | 4    | 16             | 152               | 3.2          |
| 3(80)           | 150            | RF            | 72           | 137          | 82           | 8    | 16             | 178               | 4.1          |
|                 | 300            | RF            | 72           | 149          | 82           | 8    | 19             | 207               | 5.9          |
| 4(100)          | 150            | RF            | 72           | 175          | 110          | 8    | 16             | 178               | 8.6          |
|                 | 300            | RF            | 72           | 181          | 110          | 8    | 16             | 178               | 12.8         |
| 6(150)          | 150            | RF            | 97           | 222          | 158          | 8    | 19             | 203               | 13           |
|                 | 300            | RF            | 97           | 250          | 158          | 12   | 19             | 245               | 16.2         |
| 8(200)          | 150            | RF            | 125          | 279          | 180          | 8    | 19             | 248               | 23           |
|                 | 300            | RF            | 125          | 308          | 180          | 12   | 22             | 286               | 32.1         |
| 10(250)         | 150            | RF            | 146          | 340          | 241          | 12   | 22             | 279               | 43           |
|                 | 300            | RF            | 146          | 362          | 241          | 16   | 25             | 324               | 24.3         |
| 12(300)         | 150            | RF            | 181          | 410          | 314          | 12   | 22             | 311               | 71           |
|                 | 300            | RF            | 181          | 422          | 314          | 16   | 29             | 372               | 80.9         |
| 14(350)         | 150            | RF            | 184          | 451          | 336          | 12   | 25             | 330               | 81.6         |
|                 | 300            | RF            | 222          | 486          | 336          | 20   | 29             | 419               | 102.7        |
| 16(400)         | 150            | RF            | 191          | 514          | 390          | 16   | 25             | 343               | 104          |
|                 | 300            | RF            | 232          | 540          | 390          | 20   | 32             | 441               | 187.9        |

### ■ Wafer Type \_ SWSC-W



### ■ Flange Type \_ SWSC-F



### Performance Standard

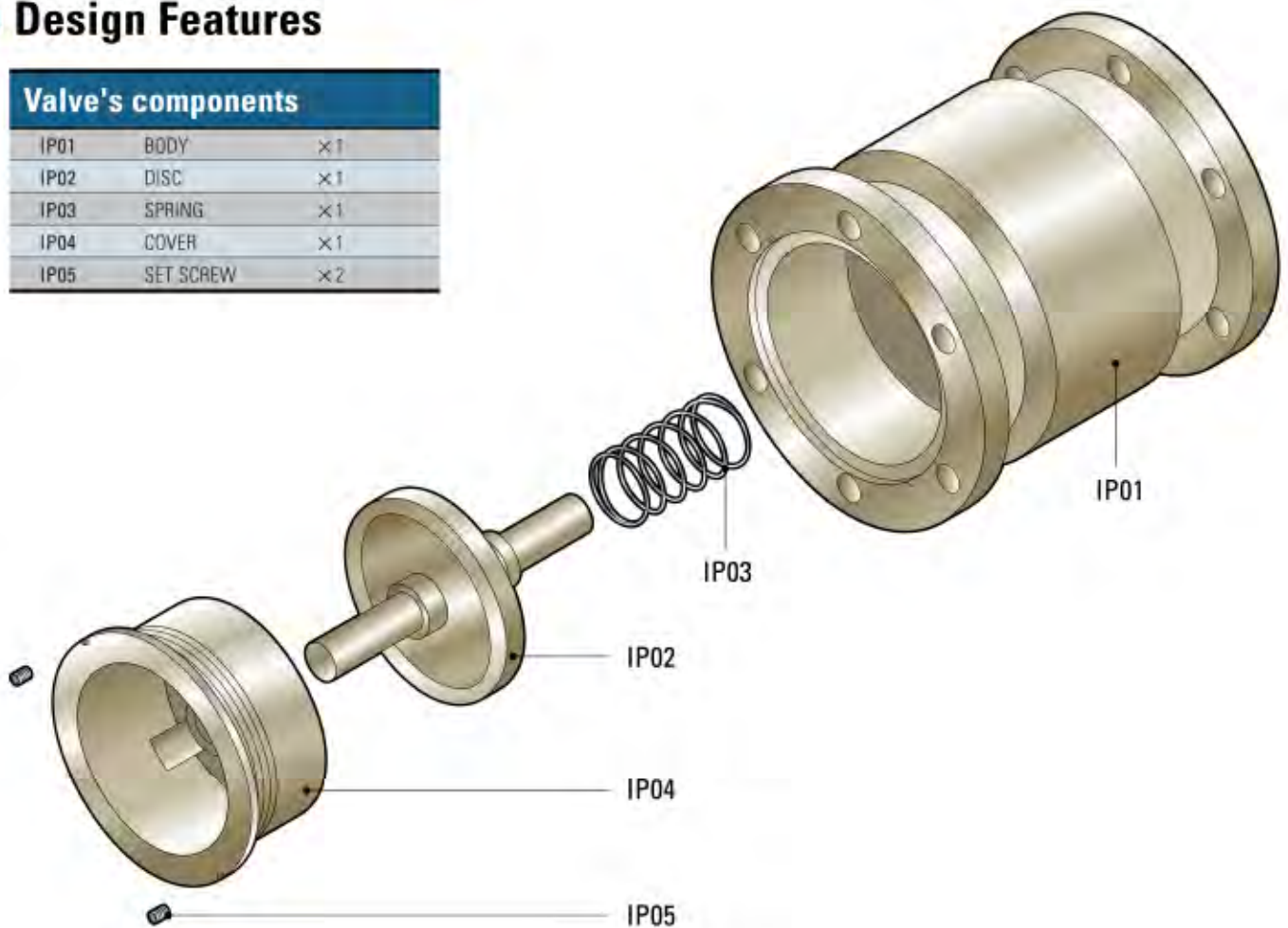
\_ANSI B16.5- Flange Dimension  
\_API 594- Material, Face to Face

\_JIS 2210 & KS B1511 Flange Dimension  
\_ANSI B16.34- Wall Thickness

### ■ Design Features

#### Valve's components

|      |           |    |
|------|-----------|----|
| IP01 | BODY      | ×1 |
| IP02 | DISC      | ×1 |
| IP03 | SPRING    | ×1 |
| IP04 | COVER     | ×1 |
| IP05 | SET SCREW | ×2 |



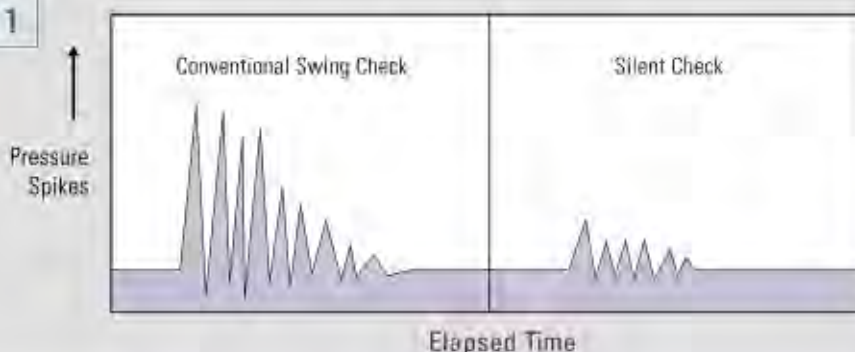
## ■ Why use a Silent Check Valve?

Water hammer is the generation and effect of high pressure shock waves in relatively incompressible fluids. When a liquid is decelerated abruptly in a pipe by a valve disc, water hammer is caused by the resulting shock waves. These high pressure waves act against the piping and the valve, exerting very high forces that can result in large stress on the metal and vibrations in the system. If not accounted for, these high transient forces can damage the pipe or other components in the system.

The problems of water hammer can be eliminated or greatly minimized by installing an S&W Silent Check valve. Unlike a swing check valve, S&W Series Silent Check Valves do not rely on gravity or reverse flow to successfully close and seat. Instead, as the forward moving fluid slows, a spring assists the valve in closing.

Due to the relative short distance the disc must travel when compared to the other types of check valves, the valve closes prior to the fluid forward velocity reaching zero. When reverse flow is eliminated, the forces necessary to produce water hammer are substantially minimized.

CHART 1



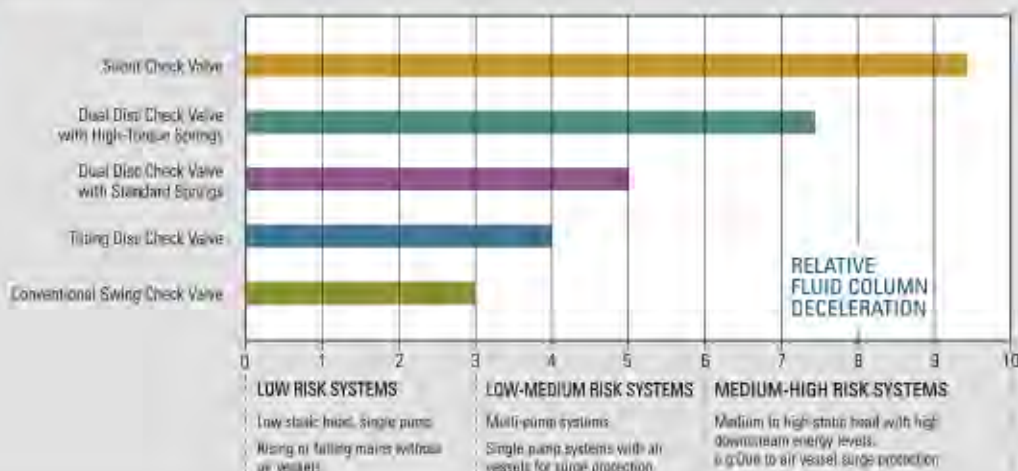
It is known that the magnitude of these surge pressure is proportional to the velocity change that occurs and the properties of the fluid and pipe. The magnitude of the pressure rise can be modeled as;

$$PR = a(VR_{max})P$$

- PR = Pressure Rise
- a = Speed of Sound
- VR<sub>max</sub> = Maximum Reverse Velocity of the fluid  
which is a function of the system deceleration
- P = Density

Therefore, different valves will produce different pressure surge magnitudes. Chart 2 outlines the relative effectiveness of various types of check valves in handling fluid deceleration.

CHART 2



### ■ Valve Location and Orientation

The S&W silent check valve is designed to open fully to allow forward flow and close rapidly prior to flow reversal. These valves are used to prevent reverse flow through pumps or in piping system. S&W check valves are not intended for use with fluids containing suspended solids such as wastewater or any type of hazardous gas. Check valves should be installed a minimum of 3 pipe diameters from other line elements i.e. elbows, pumps, valves, etc.

Valves may be installed vertically, horizontally, or at other angles. Install the valve with proper positioning of the flow arrows. Support and align piping and valve. Install lubricated flanges bolts and torque using the cross-over flange bolt tightening method.

### ■ Maintenance

S&W check valves normally require no routine maintenance.

### ■ Troubleshooting

Presented below are several possible valve installation problems along with possible solutions;

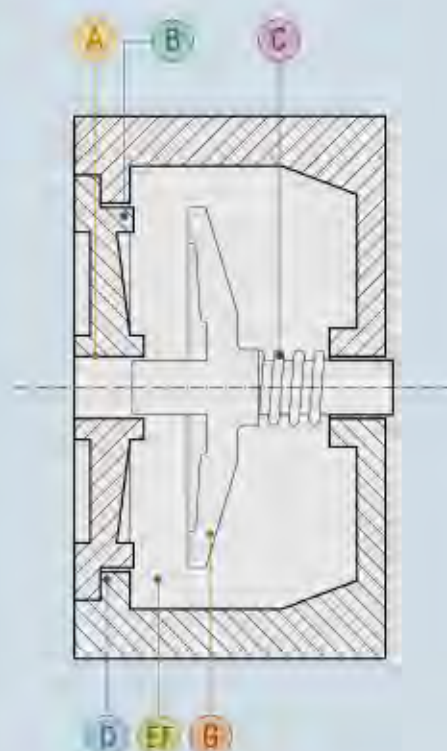
- **Valve chatters or vibrates:** Verify that the velocity is at least 4 ft/sec. A "clunking" noise may be the result of line cavitations due to high velocities, low downstream pressure, or an upstream expander. It is preferred that 3 pipe diameters of straight pipe are located upstream of the valve
- **Valve slams:** Remove valve and inspect spring. Heavier springs can furnished for severe applications. Contact S&W factory.
- **Valve does not pass flow:** Ensure valve is installed in the correct flow direction. Verify that downstream isolation valve is open and that no blockage exists inside the valve body cavity.

**A** Valves are equipped with double guided stems and large bearing surfaces to minimize wear and ensure proper disc seating. (SC600T valves are single guided only)

**C** The spring-assisted design insures that as forward flow decreases, the disc begins to move towards the seat. By the time the flow stops, the disc is closed thus minimizing the effects of water hammer.

**E** Valves designed to open at 0.5 psid differential pressure and fully open at 1.0 psid differential pressure.

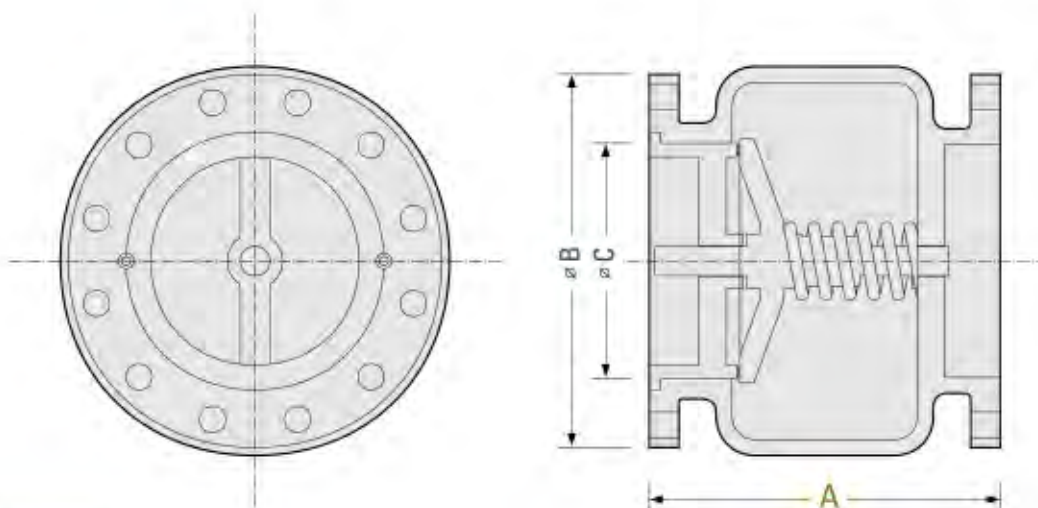
**G** The concave discs minimize side thrust that can result in premature valve failure.



**B** Standard metal to metal seating and optional resilient seating results in a check valve that is suitable for various liquid, gas or steam applications.

**D** Seat Retainer DOES NOT rely on gasket compression to remain in place, thus eliminating possible line gasket blow-out. (Series SC 150 and SC300 only)

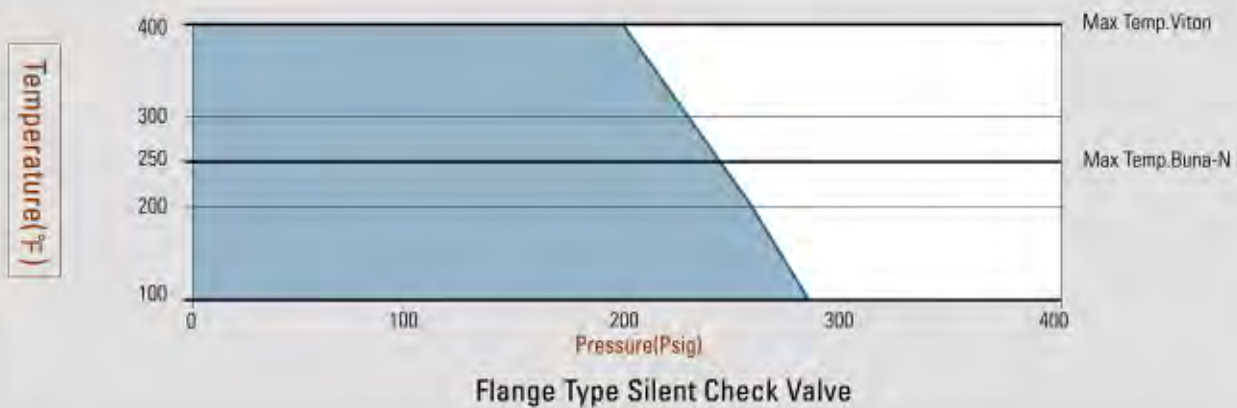
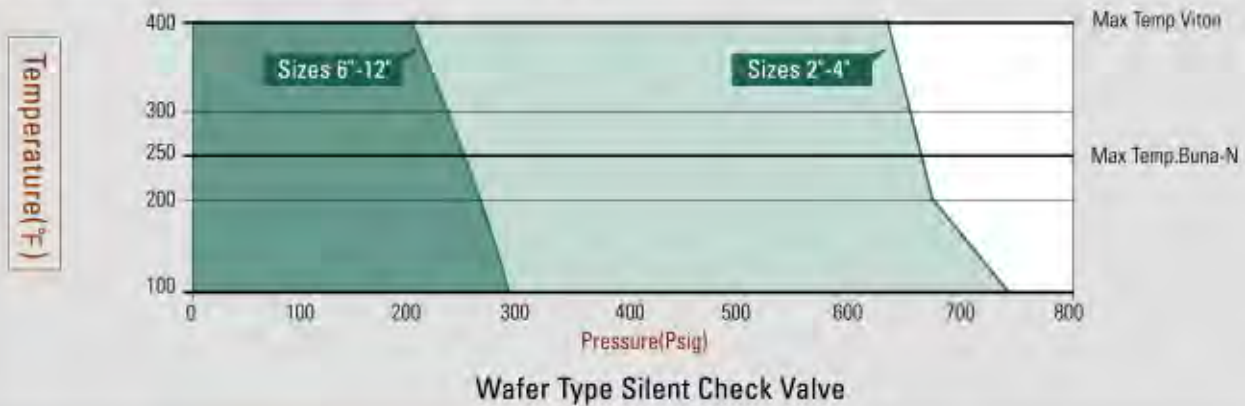
**F** With most sizes, valves' disc lift meets or exceeds 1/4" for each inch of nominal pipe size, thus minimizing the valve pressure drop in the full open condition.



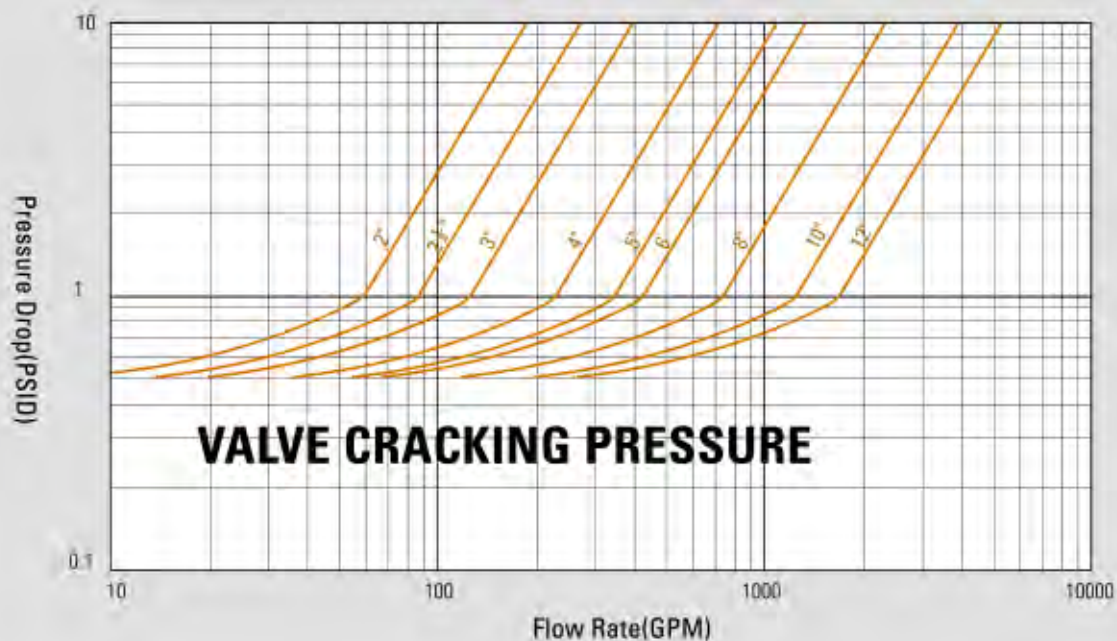
JIS 2210 & KS B1511

| Dimension Data (JIS 10K, 20K) |                |               |              |              |              | Stud Selection |                |                   |              |
|-------------------------------|----------------|---------------|--------------|--------------|--------------|----------------|----------------|-------------------|--------------|
| SIZE<br>in (mm)               | ANSI<br>Rating | End<br>Facing | A<br>in (mm) | B<br>in (mm) | C<br>in (mm) | Q'ty           | Dia<br>in (mm) | Length<br>in (mm) | Weight<br>kg |
| 2(50)                         | 10K            | RF            | 159          | 155          | 51           | 4              | M16            | 83                | 8            |
|                               | 20K            | RF            | 159          | 155          | 51           | 8              | M16            | 83                | 8            |
| 2.5(65)                       | 10K            | RF            | 178          | 175          | 64           | 4              | M16            | 89                | 11           |
|                               | 20K            | RF            | 178          | 175          | 64           | 8              | M16            | 89                | 11           |
| 3(80)                         | 10K            | RF            | 191          | 185          | 76           | 4              | M16            | 95                | 15           |
|                               | 20K            | RF            | 191          | 200          | 76           | 8              | M20            | 95                | 18           |
| 4(100)                        | 10K            | RF            | 216          | 210          | 102          | 8              | M16            | 95                | 27           |
|                               | 20K            | RF            | 216          | 225          | 102          | 8              | M20            | 95                | 33           |
| 5(125)                        | 10K            | RF            | 241          | 250          | 127          | 8              | M20            | 102               | 35           |
|                               | 20K            | RF            | 241          | 270          | 127          | 8              | M22            | 102               | 41           |
| 6(150)                        | 10K            | RF            | 267          | 280          | 152          | 8              | M20            | 102               | 43           |
|                               | 20K            | RF            | 267          | 305          | 152          | 12             | M22            | 102               | 51           |
| 8(200)                        | 10K            | RF            | 310          | 330          | 203          | 12             | M20            | 108               | 80           |
|                               | 20K            | RF            | 310          | 350          | 203          | 12             | M22            | 108               | 97           |
| 10(250)                       | 10K            | RF            | 413          | 400          | 254          | 12             | M22            | 121               | 127          |
|                               | 20K            | RF            | 413          | 430          | 254          | 12             | M24            | 121               | 153          |
| 12(300)                       | 10K            | RF            | 514          | 445          | 305          | 16             | M22            | 121               | 204          |
|                               | 20K            | RF            | 514          | 480          | 305          | 16             | M24            | 121               | 244          |
| 14(350)                       | 10K            | RF            | 578          | 490          | 337          | 16             | M22            | 133               | 258          |
|                               | 20K            | RF            | 578          | 540          | 337          | 16             | M30            | 133               | 310          |
| 16(400)                       | 10K            | RF            | 629          | 560          | 400          | 16             | M24            | 140               | 381          |
|                               | 20K            | RF            | 629          | 605          | 400          | 16             | M30            | 140               | 458          |

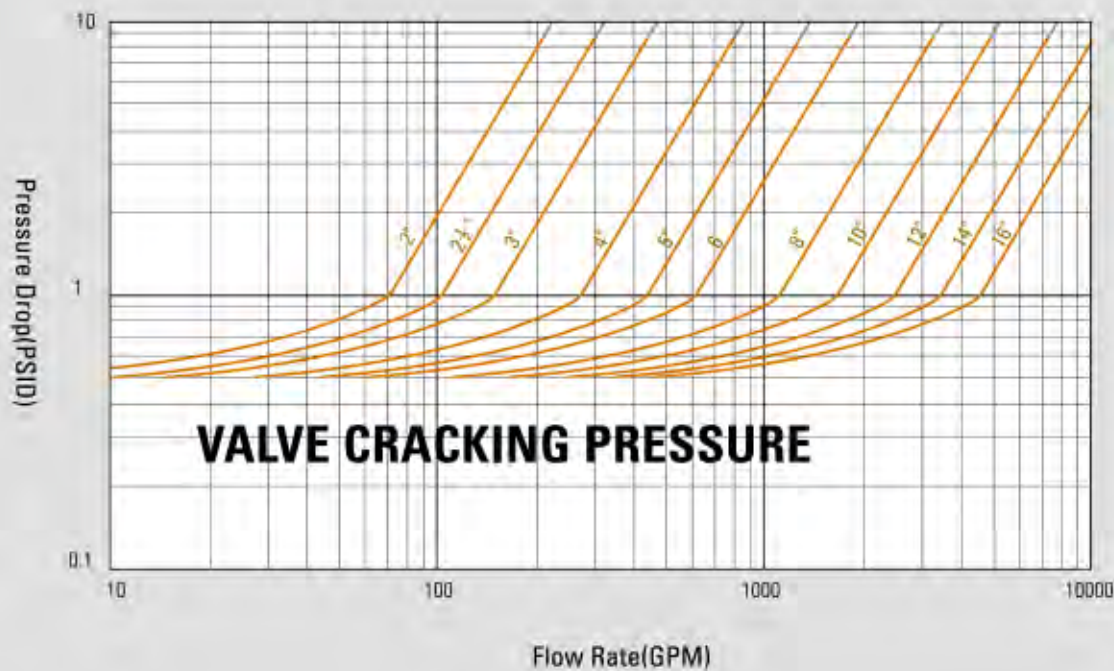
### ■ Pressure Temperature Chart (In Accordance with ASME B16.34)



### ■ Wafer Silent Check Valve Pressure Drop-Liquids (Sizes 2"-12")



## ■ Flanged Silent Check Valve Pressure Drop-Liquids (Sizes 2"-16")



### Note

1. Pressure drop curves are based on water flow.
2. Valve cracking pressure is equal to or less than 0.5 psid.
3. Valve cracking pressure increases to between 0.75 and 1.25 psid when installed vertically with flow upwards.

## ■ Method of Calculating Flow

### Liquid Flow

$$C_v = Q \sqrt{\frac{G}{\Delta P}} \quad Q = C_v \sqrt{\frac{\Delta P}{G}} \quad \Delta P = G \left( \frac{Q}{C_v} \right)^2$$

### Gas Flow

$$C_v = \frac{Q}{963} \sqrt{\frac{GT}{\Delta P (P_1 + P_2)}} \quad Q = 963 C_v \sqrt{\frac{\Delta P (P_1 + P_2)}{GT}}$$

### Saturated Vapour

$$C_v = \frac{W}{K} \sqrt{\frac{1}{\Delta P (P_1 + P_2)}} \quad W = C_v K \sqrt{\Delta P (P_1 + P_2)}$$

### Superheated Vapour

$$C_v = \frac{W(1+0.0007T_{SH})}{K} \sqrt{\frac{1}{\Delta P (P_1 + P_2)}} \quad C_v = \frac{C_v K}{(1+0.0007T_{SH})} \sqrt{\Delta P (P_1 + P_2)}$$

### Variables

- $C_v$  = Valve Coefficient
- $\Delta P$  =  $(P_1 - P_2)$  Pressure Drop
- $P_1$  = Inlet Pressure (PSIA)
- $P_2$  = Outlet Pressure (PSIA)
- $G$  = Specific Gravity
- Water = 1.0 at 60°F and 1 ATM
- Air = 1.0 at 60°F and 1 ATM
- $Q$  = Flow
- Liquid = USGPM
- Gas = SCFH
- $T$  = Absolute Temperature ( $^{\circ}F + 460$ )
- $K$  = Constant For Vapours
- $T_{SH}$  = Superheat ( $^{\circ}F$ ) / Total Temperature Minus Saturation Temperature
- $W$  = lbs. Per Hour (LB/H)

Class ANSI 150-1500

KS(JIS) 10K-40K

Sizes 2" up to 80" (50-2000mm)



*The enterprise which advance  
on the world with technique of best*

**S&W**

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