KEYSTONE PRINCE WAFER SWING CHECK VALVES

FIGURES 809 TO 815

Compact wafer style design and round unobstructed port to tackle many tough applications

FEATURES

- Minimizes piping support with the compact wafer style body. This range of wafer check valves are two to three times lighter than traditional full-bodied check valves.
- To meet special applications and service conditions, These valves can be offered with many different options, such as: silicone-free cleaning, oxygen-cleaning, vertical service, left-hand operation, levers, weights and cushions.
- For media containing fibrous matter or caustics, These offers an external spring (Figure 813 and Figure 815) which eliminates the spring from the flow path. This will prohibit the possibility of fiber wrapping around the spring or chemical attack of the spring.
- Maintenance is minimal with the field replaceable O-ring seat, available in all styles and sizes.

GENERAL APPLICATION

These wafer check valves are used to stop flow reversal in chemical refineries, ammonia compressors, waste water treatment plants, HVAC systems and most other industrial applications.

TECHNICAL DATA

Size range:	NPS 2 to 36
Pressure rating:	150 - 740 psi
ASME flange rating:	125 - 300

FIGURE 809 (INTERNAL SPRING) SPECIFICATIONS, ASME 300 RATED

General
The check valve shall be a wafer style (flangeless) swing check design utilizing a torsional spring to assist in faster closure. The valve must be capable of gravity closure should the loss of spring tension occur when system back pressure is present.
Body/Seat
The body shall be of the one-piece construction and shall possess a machined dovetail groove for a polymer seal. The seal shall not be vulcanized to facilitate seat retention, and shall be field replaceable. The seal shall provide positive shut-off at both low and high pressure.
Disc
The valve shall utilize a one-piece disc/arm assembly. The disc shall completely cover the seal when in the closed position to provide positive seal regardless of disc orientation.
Disc/Stem Connection
The stem shall possess a double 'D' design that when mated to the corresponding disc/arm assembly bore provides positive connection.

The valve shall be F809 as manufactured by Emerson.

FIGURE 810 (INTERNAL SPRING) SPECIFICATIONS, ASME 125 AND 150 RATED

General
The check valve shall be a wafer style (flangeless) swing check design utilizing a torsional spring to assist in faster closure. The valve must be capable of gravity closure should the loss of spring tension occur when system back pressure is present.
Body/Seat
The body shall be of one-piece construction and shall (1) possess a machined dovetail groove for elastomer and polymer seals, or (2) possess an integral metal seat machined into the body when metal-to-metal seats are required. The resilient seals shall not be vulcanized to facilitate seat retention. The resilient seals shall be field replaceable. The resilient seals shall provide positive shut-off at both low and high pressure.
Disc
The valve shall utilize a one-piece disc/arm assembly. The disc shall completely cover the seal when in the closed position to provide positive seal regardless of disc orientation.
Disc/Stem Connection
The stem shall possess a double 'D' design that when mated to the corresponding disc/arm assembly bore provided positive connection.

The valve shall be F810 as manufactured by Emerson.

FIGURE 813 (EXTERNAL SPRING) SPECIFICATIONS, ASME 125 AND 150 RATED

General
The check valve shall be a wafer style (flangeless) swing check design utilizing an external torsional spring to assist in faster closure. The valve must be capable of gravity closure should the loss of spring tension occur when system back pressure is present. The valve shall have capability to add lever and/or weight for back-flush capabilities. The lever and/or weight assembly to be field installable. The external spring, lever and weight must be field adjustable.
Body/Seat
The body shall be of one-piece construction and shall (1) possess a machined dovetail groove for elastomer and polymer seals, or (2) possess an integral metal seat machined into the body when metal-to-metal seats are required. The resilient seals shall not be vulcanized to facilitate seal retention. The resilient seals shall be field replaceable. The resilient seals shall provide positive shut-off at both low and high pressure.
Disc
The valve shall utilize a one-piece disc/arm assembly. The disc shall completely cover the seal when in the closed position to provide positive seal regardless of disc orientation.
Bushing and Disc/Stem Connection
The valve shall possess (2) stainless steel or bronze bushings to provide support and alignment to the disc/arm and stem. The stem shall possess a double 'D' design that when mated to the corresponding disc/arm assembly bore provides positive connection.

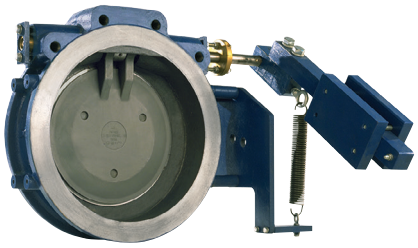
The valve shall be F813 as manufactured by Emerson.

FIGURE 815 (EXTERNAL SPRING) SPECIFICATIONS, ASME 125 AND 150 RATING

General
The check valve shall be a semi-lug, swing check design utilizing an external tension spring to assist in faster closure. The valve must be capable of gravity closure should the loss of spring tension occur when system back pressure is present. The valve shall have the capability of adding an adjustable hydraulic cushion for those applications that require damping systems. The external spring (and the damping cushion) must be field adjustable.

Body/Seat
The body shall be of one-piece construction and shall (1) possess a machined dovetail groove for elastomer and polymer seals, or (2) possess a stainless steel or nickel aluminum bronze seat ring. The metal seat ring shall have a machined dovetail groove to mechanically retain the elastomer seal. No vulcanized bonding or chemical bonding is permitted to facilitate seat retention. The seals shall be field replaceable. The elastomer seals to provide positive shut-off at both low and high pressure.

Disc
The disc shall completely cover the seat ring/seal when in the closed position to provide positive seal regardless of disc orientation.



The valve shall be F815 as manufactured by Emerson.

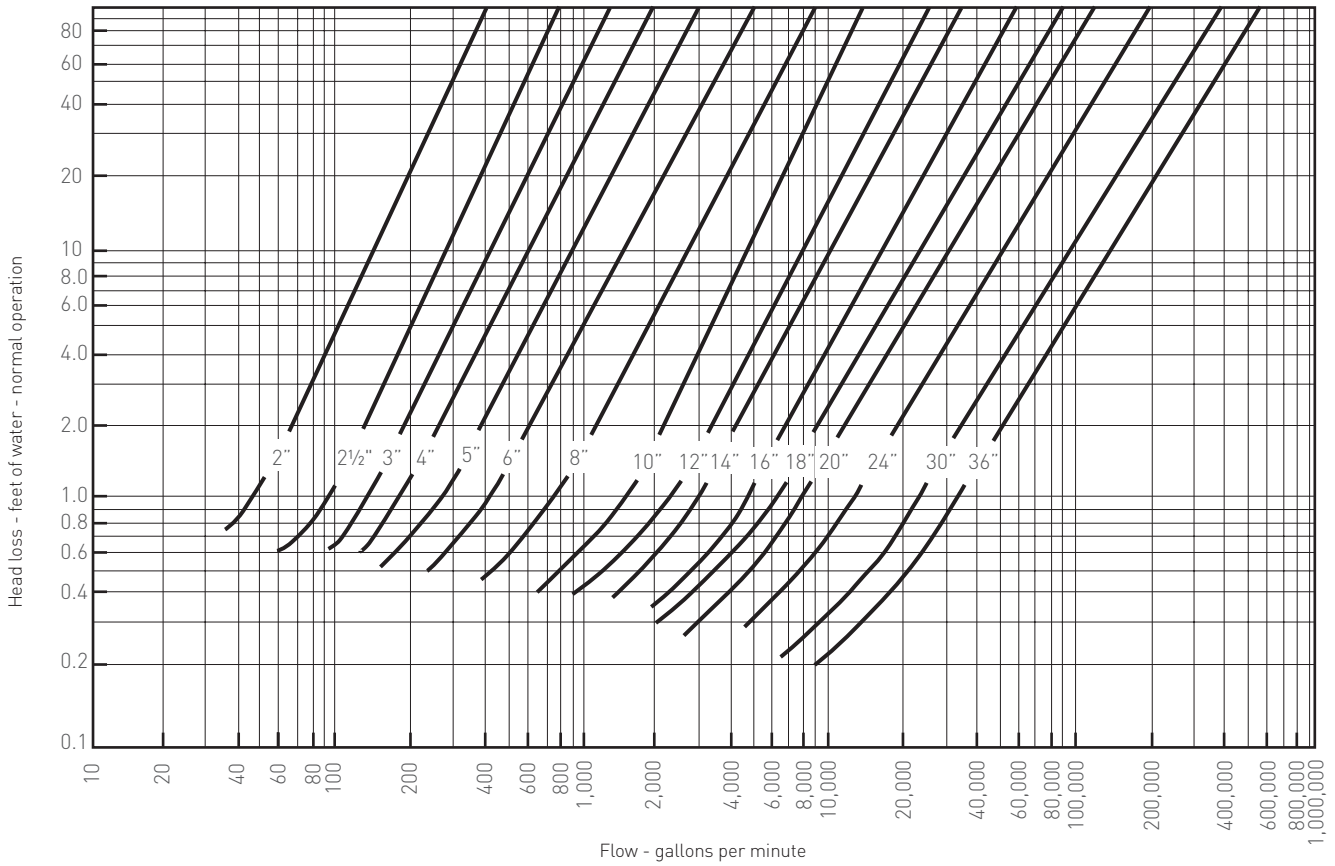
PRODUCT SUMMARY

Type	ASME flange rating	Pressure rating	Size (NPS)	Body material/ ASTM	Disc/arm	Seat	Spring	Outside hardware
Figure 809	300	740	2 - 6	Carbon Steel/ ASTM A216 Gr. WCB	316 S/S	PTFE Neoprene	316 S/S (Std.)	-
Figure 810	125	200	2 - 12	Cast Iron/ ASTM A126 Class B	316 S/S	NBR (Std.)EPDM Fluoroelastomer PTFE Metal-to-metal	316 S/S (Std.) 2-5 inch 17-7 PH SS (Std.) 6-12 inch Inconel® 750	-
	150	285	2 - 12	Carbon Steel/ ASTM A216 Gr. WCB	316 S/S	NBR (Std.) EPDM Fluoroelastomer	316 S/S (Std.) 2-5 inch 17-7 PH S/S (Std.)	-
	150	275	2 - 12	316 S/S ASTM A351 Gr. CF8M		PTFE Metal-to-metal	6-12 inch Inconel® 750	
Figure 813	125	200	2 - 12	Cast Iron/ ASTM A126 Class B	316 S/S	NBR (Std.) EPDM Fluoroelastomer PTFE Metal-to-metal	316 S/S (Std.) Inconel® 750	2 Pos adjustable spring (Std.) Lever Adjustable Weight
	150	285	2 - 12	Carbon Steel/ ASTM A216 Gr. WCB	316 S/S	NBR (Std.) EPDM Fluoroelastomer	316 S/S (Std.) Inconel® 750	2 Pos Adjustable spring (Std.) Lever
	150	275	2 - 12	316 SS/ ASTM A351 Gr. CF8M		PTFE Metal-to-metal		Adjustable Weight
Figure 815	125	200	12	Cast Iron/ ASTM A126 Class B	316 S/S	NBR (Std.) EPDM	Carbon Steel (Std.) 316 S/S	Adjustable spring Lever Adjustable Wt. (Std.) Hydraulic Cushion Limit Switch
		150	14 - 36			Fluoroelastomer Ni-AB 316 SS		
	150	285	12 - 36	Carbon Steel/ ASTM A216 Gr. WCB	316 S/S	NBR (Std.) EPDM	Carbon Steel (Std.) 316 S/S	Adjustable Spring Lever Adjustable Wt. (Std.) Hydraulic Cushion Limit Switch
	150	275	12 - 36	316 SS/ ASTM A351 Gr. CF8M		Fluoroelastomer Ni-AB		

NOTES
1. Left hand versions available on all external spring models for horizontal service.
2. Not for use in pulsating or reciprocating services.

KEYSTONE PRINCE WAFER SWING CHECK VALVES

FIGURES 809 TO 815



NOTES

1. Curves are for water at 60°F.
2. Feet of water x 0.4335 = psi
3. Use curves for estimating purposes only. Performance is based upon ideal inlet and outlet conditions with no springs or weights.

Disc Cracking Pressure

All valves equal approximately 0.5 psi without lever/weight or cushion. For valves with lever/weight or cushion, contact your sales representative.

TYPICAL DATA - AIR FLOW AT 60°F - S.C.F.M.

Pressure drop PSI	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	30	36
0.1	85	235	275	360	525	855	1555	2875	4710	5200	8565	11700	16000	30600	47750	77100
0.2	120	330	390	510	745	1210	2200	4050	6650	7350	12110	16500	22550	43500	67500	109000

FLOW COEFFICIENT - C_v

Size (NPS)	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	30	36
C_v	70	190	225	295	430	700	1270	2350	3850	4250	7000	9550	13000	25000	39000	63000

KEYSTONE PRINCE WAFER SWING CHECK VALVES

FIGURES 809 TO 815

For Liquids

Pressure Drop = S.G. $\left(\frac{Q_L}{C_V}\right)^2$

Where:
QL = Flow in gallons per minute
S.G. = Specific Gravity of Liquid
C_V = Valve flow coefficient from table

NOTE
30 fps is the nominal maximum allowable velocity for liquids.

For Gases

Pressure Drop = $\frac{Q_g^2 GT}{514 P_1 C_v^2}$

Where:
Q_g = Flow in standard cubic feet per minute
P_1 = Upstream pressure absolute (psi + 14.7)
G = Specific Gravity of Gas
T = Temperature (Rankin)(°F + 460°)
C_V = Valve flow coefficient from table

NOTE
120 fps is the nominal maximum velocity for gases.

NOTE
Where valve construction consists of more than one material, the effective service range of the valve is the same as that of the most restrictive material in the valve.

SIZE - TEMPERATURE - PRESSURE RATINGS

FIGURE 809

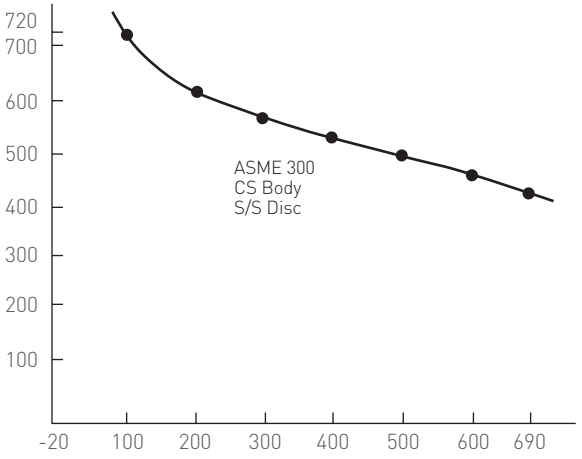


FIGURE 810 AND 813

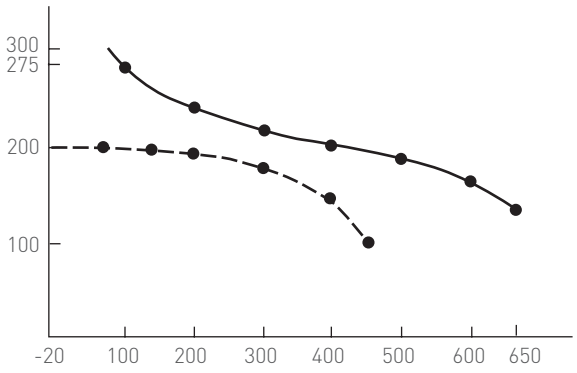
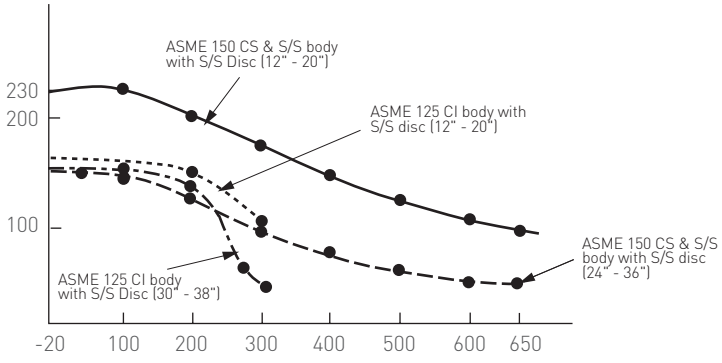
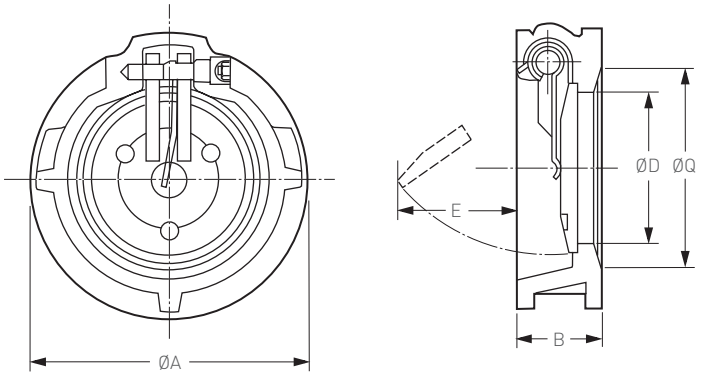


FIGURE 815



Seat Temperature Ratings	
NBR	0 to 212°F
EPDM	-40 to 250°F
FKM	-40 to 400°F
PTFE	-40 to 300°F
Metal	Refer to Temperature/pressure charts

FIGURE 809
Sizes NPS 3 to 6

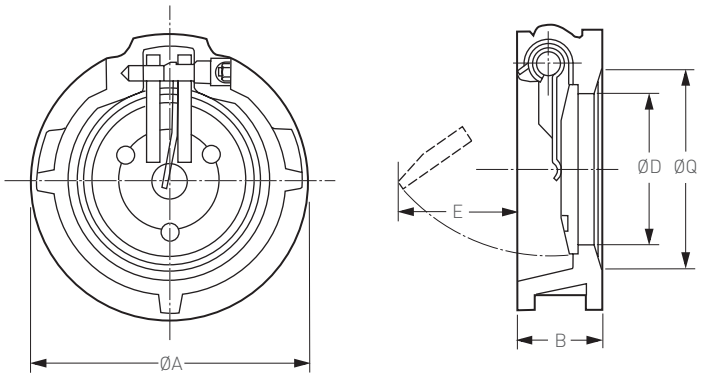


DIMENSIONS (inches)

Size NPS	ØA	B	ØQ[1]	ØD	E	Wt. (lbs.)
3	5 7/8	2	3 1/16	2 1/16	2	7
4	7 1/8	2 1/4	4 1/32	3 1/32	2	11
5	8 1/2	2 1/2	5 1/32	3 7/8	3	15
6	9 7/8	2 3/4	6 1/16	4 3/4	3 13/16	22

NOTE
The Q dimension is the minimum pipe or companion flange inside diameter for proper valve operation.

FIGURE 810
Sizes NPS 2 to 12



DIMENSIONS (inches)

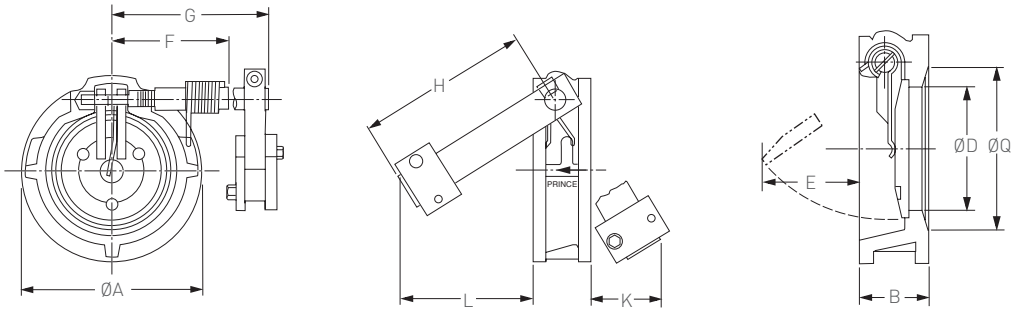
Size NPS	ØA	B	ØQ[1]	ØD	E	Wt. (lbs.)
2	4 1/8	1 3/4	2 1/16	1 17/32	13/16	4
2 1/2	4 7/8	1 7/8	2 15/32	1 3/4	11/16	5
3	5 3/8	2	3 1/16	2 1/16	1 5/8	7
4	6 7/8	2 1/4	4 1/32	3 1/32	2 1/4	11
5	7 3/4	2 1/2	5 1/32	3 7/8	3	15
6	8 3/4	2 3/4	6 1/16	4 3/4	3 3/4	22
8	11	2 15/16	7 31/32	6 7/16	4 5/8	30
10	13 3/8	3 1/8	10	7 5/8	6 7/16	58
12	16 1/8	3 1/2	12	9 1/2	8 1/8	85

NOTE
The Q dimension is the minimum pipe or companion flange inside diameter for proper valve operation.

KEYSTONE PRINCE WAFER SWING CHECK VALVES

FIGURES 809 TO 815

FIGURE 813 (with optional lever and weight)
Sizes NPS 2 to 12



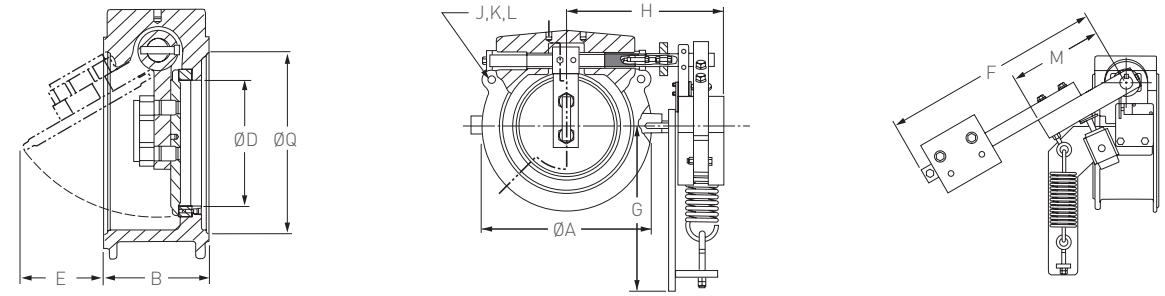
DIMENSIONS (inches)

Size NPS	ØA	B	ØQ[1]	ØD	E	F	G	H	J	K	Wt. (lbs.)
2	4 1/8	1 3/4	2 1/16	1 17/32	1 3/16	3 1/16	4 23/32	6 1/2	5 5/32	2 21/32	5
2 1/2	4 7/8	1 7/8	2 15/32	1 3/4	1 1/16	3 5/16	5 7/32	7 1/2	5 7/8	3 3/32	6
3	5 3/8	2	3 7/16	2 1/16	1 5/8	3 1/2	5 11/16	8 1/2	6 13/16	3 5/8	9
4	6 7/8	2 1/4	4 1/32	3 1/32	2 1/4	3 1/4	6 13/32	8 1/2	6 3/4	3 13/32	13
5	7 3/4	2 1/2	5 1/32	3 7/8	3	5 15/32	7 7/32	8 3/8	6 19/32	3 1/2	19
6	8 3/4	2 3/4	6 1/16	4 3/4	3 3/4	5 29/32	7 3/4	8 3/8	6 21/32	3 1/4	24
8	11	2 15/16	7 31/32	6 7/16	4 5/8	6 31/32	9 5/32	9 3/8	7 7/16	3 5/8	32
10	13 3/8	3 1/8	10	7 5/8	6 7/16	5 5/16	10 13/32	10 3/8	8 1/16	4 3/16	60
12	16 1/8	3 1/2	12	9 1/2	8 1/8	6 1/4	12 7/32	12	9 3/8	4 11/16	87

NOTES

1. The Q dimension is the minimum pipe or companion flange inside diameter for proper valve operation.
2. Right hand valve is shown.

FIGURE 815 (with optional cushion)
Sizes NPS 12 to 36



DIMENSIONS (inches)

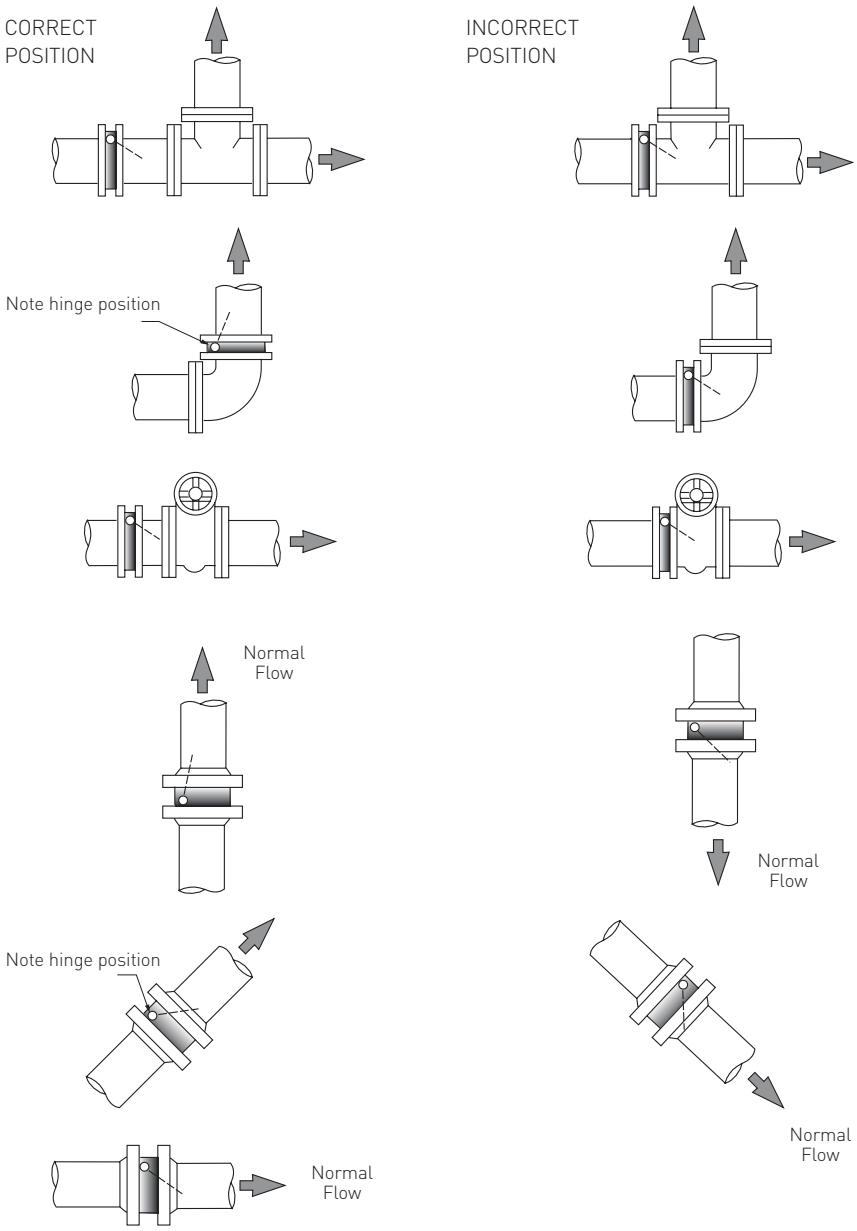
Size NPS	ØA	B	ØQ[1]	ØD	E	F	G	H	J	K	L	M	Wt. (lbs.)
12	16	4 3/4	12	9 1/2	7 7/32	18	7 1/2	15 3/4	17	4	7/8 - 9	4 5/8	212
14	17 5/8	7 3/4	13 1/4	10 3/16	6 3/4	30	20 7/32	17 1/4	18 3/4	4	1 - 8	12 3/4	350
16	20 1/8	8 3/4	15 1/4	11 3/16	7 31/32	30	19 5/32	18 5/8	21 1/4	6	1 - 8	12 3/4	410
18	21 1/2	8 3/4	17 1/4	12 11/16	9 3/8	30	18 3/16	19 3/8	22 3/4	4	1 1/8 - 7	12 3/4	450
20	23 5/8	9 3/4	19 1/4	15	11 7/16	30	17 1/4	20 1/2	25	6	1 1/8 - 7	14	775
24	28	9 3/4	23 1/4	18 1/2	15	30	16	22 3/4	29 1/2	6	1 1/4 - 7	14	925
30	34 1/2	9 3/4	29 1/4	23 1/2	19 7/32	30	26	26 3/4	36	8	1 1/4 - 7	14	1225
36	41 1/8	14 1/2	35 1/4	27 7/8	19 7/16	40	23 7/16	38 15/16	42 3/4	8	1 1/2 - 6	20 1/8	2100

NOTES

1. The Q dimension is the minimum pipe or companion flange inside diameter for proper valve operation.
2. Right hand valve is shown.

KEYSTONE PRINCE WAFER SWING CHECK VALVES

FIGURES 809 TO 815



FLANGE AND BOLTING DATA - FIGURE 809

ASME 300			
Size (NPS)	**Diameter of bolt circle**	**No. of bolts**	**Bolt thread**
2	5	8	5/8 - 11
3	6 5/8	8	3/4 - 10
4	7 7/8	8	3/4 - 10
5	9 1/4	8	3/4 - 10
6	10 5/8	12	3/4 - 10
8	13	12	7/8 - 9
10	15 1/4	16	1 - 8
12	17 3/4	16	1 1/8 - 7

FLANGE AND BOLTING DATA - FIGURE 809

ASME CLASS 125/150			
Size (NPS)	**Diameter of bolt circle**	**No. of Bolts**	**Bolt thread**
2	4 3/4	4	5/8 - 11
2 1/2	5 1/2	4	5/8 - 11
3	6	4	5/8 - 11
4	7 1/2	8	5/8 - 11
5	8 1/2	8	3/4 - 10
6	9 1/2	8	3/4 - 10
8	11 3/4	8	3/4 - 10
10	14 1/2	12	7/8 - 9
12	17	12	7/8 - 9
14	18 3/4	12	1 - 8
16	21 1/2	16	1 - 8
18	22 3/4	16	1 1/8 - 7
20	25	20	1 1/8 - 7
24	29 1/2	20	1 1/4 - 7
30[1]	36	28	1 1/4 - 7
36[1]	42 3/4	32	1 1/2 - 6

NOTE

1. ASME Class 125 Only

RECOMMENDATIONS FOR INSTALLATION POSITION

1. Position the check valve to promote smooth flow.
2. Allow clearance for disc movement.
3. Install the valve in horizontal or upward flow for proper valve closure.
4. Allow 5 pipe diameters between valve and turbulance-producing elements.

CAUTION

Do not use with reciprocating compressors, or in other pulsating services.