KEYSTONE SWING TYPE WAFER CHECK VALVE

FIGURE 86

High capacity, spring loaded swing type wafer check valve

FEATURES

- Lightweight, wafer type check valve with face-to-face dimensions according ISO 5752, table 5 long
- High flow capacity featuring a special shaped disc with a large opening angle resulting in high K_v values
- Spring loaded disc for positive shut-off
- Choice of cast iron or stainless steel body types
- Field replaceable O-ring seat
- Internal travel stop prevents the disc from slamming against the pipe
- Excellent low pressure shut-off
  The standard low pressure shut-off is less than 0.1 bar (10 kPa)
- Slam free operation
- Optional heavy spring for slam free operation in systems with high decelerations
- Optional light spring for systems with low line velocities
- Optional adjustable travelstop for system with reduced inner diameter pipe

GENERAL APPLICATIONS

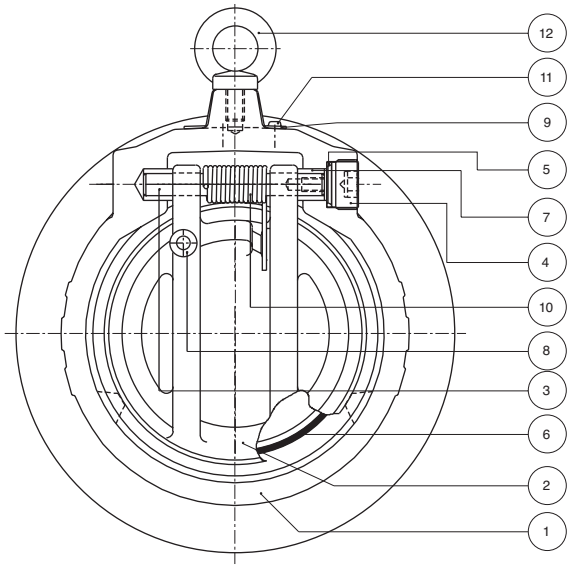
- Back flow prevention in pump or multi-pump systems
- High slam risk systems up to flow deceleration of 25 m/s^2
- Combined low line velocity and low pressure tightness
- Vacuum breaker for storage tank protection
- High capacity/low pressure drop to ensure economical use
- Not suitable for pulsating applications

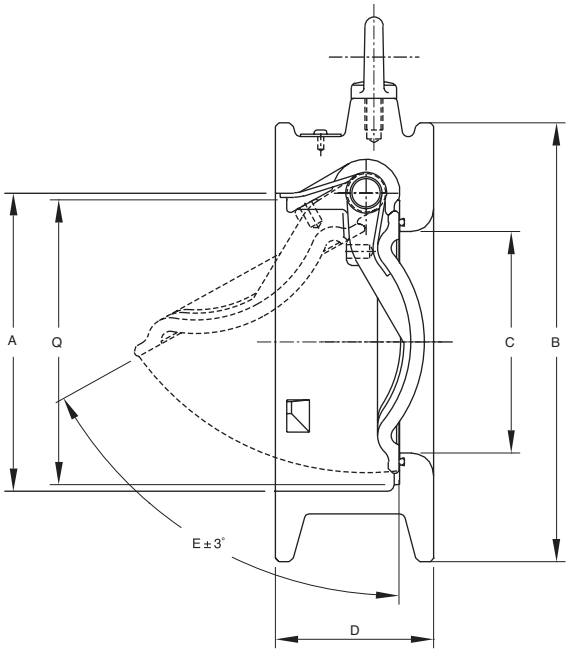
TECHNICAL DATA

Sizes (DN):	40-300
Temperature (°C):	-40 to +190
Pressure (bar/kPa):	16/1600
Flange acc.:	PN 6/10/16/25
	ASME 150/300
	AS 2129 C, D & E (multi)
	JIS 5/10/16/20/30

KEYSTONE SWING TYPE WAFER CHECK VALVE

FIGURE 86





DIMENSIONS (mm)

Size DN	A	B (PN10/PN16)	B1	B2	C	D	E	Q	Mass (kg)
40	47.0	94	-	-	22.0	33	54	38	0.9
50	60.0	109	98	105	34.0	43	59	50	1.4
65	70.5	129	111	124	43.5	46	60	65	1.9
80	82.5	144	130	137	59.5	64	62	78	3.0
100	114.3	162	162	175	77.0	64	60	102	3.7
125	132.0	194	194	197	98.0	70	61	126	5.6
150	168.0	220	215	222	115.0	76	72	149	8.2
200	220.0	272	272	279	158.0	89	70	196	12.4
250	267.0	330	336	340	185.0	114	66	250	23.3
300	324.0	380/386	380	410	241.5	114	65	298	33.0

NOTE

Dimension B is the outside diameter for ISO PN 10/PN 16 flange drilling.

Dimension B1 is the outside diameter for AS 2129 C, D & E flange drilling.

Dimension B2 is the outside diameter for ASME 150 flange drilling.

Dimension Q is the chordal disc dimension at the outlet face of the valve for disc clearance into pipe fitting or equipment.

MATERIAL SELECTION

Body	Disc	Seat	Shaft	Trim no.	Sizes (DN)
Cast iron	Stainless steel	EPDM	Stainless steel	203	40-300
		NBR		204	40-300
		Fluorelastomer		205	40-300
Stainless steel	Stainless steel	NBR	Stainless steel	208	50-300
		Fluorelastomer		207	50-300

KEYSTONE SWING TYPE WAFER CHECK VALVE

FIGURE 86

PARTS LIST

Part	Name
1	Body
2	Disc
3	Shaft
4	Plug
5	Seal
6	O-ring
7	Bushing
8	Travel stop
9	Tagplate
10	Spring
11	Rivet
12	Eye bolt

MATERIAL SPECIFICATION

Part name	Material	EN/ASTM designation	EN mat. no.	Remark
Body	Cast iron	GJL-250	JL-1040	
	Stainless steel	GX5CrNiMo19-11-2 / CF8M	1.4408	
Disc	Stainless steel	GX5CrNiMo19-11-2 / CF8M	1.4408	
Shaft	Stainless steel	X5CrNiMo17-12-2 / 316 S/S	1.4401	
Plug	Stainless steel	X5CrNiMo17-12-2 / 316 S/S	1.4401	
Bushing	Stainless steel	X5CrNiMo17-12-2 / 316 S/S	1.4401	
Travel stop	Stainless steel	X5CrNiMo17-12-2 / 316 S/S	1.4401	Optional
Spring	Stainless steel	X5CrNiMo17-12-2 / 316 S/S	1.4401	
Seal	PTFE			
O-ring	NBR			
	EPDM			
	Fluorelastomer			
Tag plate	Aluminium			
Rivet	Aluminium			
Eye-bolt	Steel galvanized			Size 125-300

PRESSURE-TEMPERATURE DIAGRAM

Seat material	Disc material	Body material	Size range DN (mm)	Valve function Wafer/end of line	Temperature in °C -60	-40	-30	-20	-15	0	50	100	120	130	160	190	Notes
EPDM	all	all	all	W					16 Bar								1
NBR	all	all	all	W						16 Bar							2
FKM	all	all	all	W								16 Bar					3

PRESSURE-TEMPERATURE DIAGRAM

Note	Trims
1	203
2	204 / 208
3	205 / 207

KEYSTONE SWING TYPE WAFER CHECK VALVE

FIGURE 86

RELATION BETWEEN DECELERATION OF FLOW (m/s²) AND MAXIMUM RETURN VELOCITY (m/s)

		Deceleration of flow (m/s²)																
Size DN	Spring type	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
40	L	0.00	0.32	0.63	0.88	1.12	1.30	-	-	-	-	-	-	-	-	-	-	-
	S	0.00	0.13	0.32	0.48	0.63	0.76	0.89	1.01	1.13	1.25	1.36	-	-	-	-	-	-
	H	0.00	0.07	0.25	0.37	0.48	0.56	0.63	0.69	0.75	0.80	0.85	0.89	0.93	0.97	1.01	1.05	1.09
50	L	0.02	0.40	0.69	0.96	1.19	1.40	-	-	-	-	-	-	-	-	-	-	-
	S	0.00	0.19	0.39	0.56	0.73	0.87	1.00	1.13	1.25	1.36	-	-	-	-	-	-	-
	H	0.00	0.13	0.29	0.41	0.51	0.59	0.66	0.72	0.77	0.82	0.87	0.91	0.95	0.99	1.03	1.07	1.11
65	L	0.04	0.41	0.69	0.94	1.15	1.34	-	-	-	-	-	-	-	-	-	-	-
	S	0.00	0.23	0.43	0.60	0.76	0.88	1.01	1.12	1.24	1.35	-	-	-	-	-	-	-
	H	0.00	0.14	0.30	0.41	0.51	0.58	0.66	0.72	0.78	0.84	0.89	0.95	1.01	1.06	1.12	1.17	1.23
80	L	0.16	0.48	0.70	0.87	1.02	1.16	1.30	-	-	-	-	-	-	-	-	-	-
	S	0.09	0.33	0.50	0.65	0.78	0.90	1.01	1.12	1.22	1.32	-	-	-	-	-	-	-
	H	0.03	0.22	0.35	0.46	0.54	0.63	0.69	0.75	0.81	0.86	0.91	0.97	1.02	1.07	1.12	1.18	1.23
100	L	0.12	0.42	0.67	0.88	1.07	1.23	1.37	-	-	-	-	-	-	-	-	-	-
	S	0.05	0.32	0.52	0.68	0.81	0.92	1.02	1.12	1.20	1.28	1.36	-	-	-	-	-	-
	H	0.00	0.16	0.31	0.42	0.51	0.58	0.65	0.72	0.79	0.86	0.93	1.00	1.07	1.14	1.21	1.28	1.35
125	L	0.16	0.45	0.70	0.91	1.09	1.25	1.39	-	-	-	-	-	-	-	-	-	-
	S	0.09	0.33	0.53	0.70	0.84	0.97	1.08	1.19	1.29	1.39	-	-	-	-	-	-	-
	H	0.02	0.18	0.33	0.44	0.53	0.61	0.69	0.77	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	-
150	L	0.22	0.68	1.02	1.35	-	-	-	-	-	-	-	-	-	-	-	-	-
	S	0.10	0.50	0.81	1.07	1.29	1.48	-	-	-	-	-	-	-	-	-	-	-
	H	0.03	0.39	0.63	0.82	0.98	1.10	1.22	1.31	-	-	-	-	-	-	-	-	-
200	L	0.19	0.62	0.98	1.26	1.48	-	-	-	-	-	-	-	-	-	-	-	-
	S	0.09	0.45	0.75	1.01	1.21	1.34	-	-	-	-	-	-	-	-	-	-	-
	H	0.00	0.34	0.56	0.73	0.88	0.99	1.10	1.19	1.29	1.39	-	-	-	-	-	-	-
250	L	0.21	0.48	0.73	0.93	1.13	1.29	1.45	-	-	-	-	-	-	-	-	-	-
	S	0.12	0.37	0.56	0.74	0.87	1.02	1.13	1.23	1.33	-	-	-	-	-	-	-	-
	H	0.04	0.21	0.34	0.46	0.55	0.65	0.74	0.81	0.88	0.95	1.02	1.09	1.16	1.23	1.30	1.37	-
300	L	0.23	0.51	0.76	0.96	1.16	1.32	-	-	-	-	-	-	-	-	-	-	-
	S	0.15	0.39	0.59	0.76	0.90	1.04	1.16	1.27	1.38	-	-	-	-	-	-	-	-
	H	0.07	0.23	0.36	0.48	0.57	0.67	0.76	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	-	-

L = light, S = standard, H = heavy

K_v VALUES

			Standard spring		Light spring		Heavy spring	
Size DN	K_v (m^3/h)	Zeta (-)	ΔP open ($x10^{-3}$ bar)	V_{st} (m/s)	ΔP open ($x10^{-3}$ bar)	V_{st} (m/s)	ΔP open w($x10^{-3}$ bar)	V_{st} (m/s)
40	26	6.06	16.0	1.1	8.0	0.82	20.0	2.1
50	60	2.78	12.0	1.4	6.0	1.10	15.0	2.7
65	100	2.85	13.0	1.4	6.5	1.10	16.0	2.6
80	170	2.27	6.9	1.5	3.5	1.30	8.8	2.5
100	300	1.78	9.0	1.2	4.5	0.95	11.0	2.2
125	477	1.72	10.0	1.2	5.0	0.96	12.0	2.2
150	730	1.52	3.7	1.6	1.9	1.40	4.6	2.5
200	1420	1.27	3.2	1.5	1.6	1.30	4.0	2.3
250	2340	1.14	4.0	1.5	2.0	1.30	4.9	2.3
300	3460	1.08	4.0	1.5	2.0	1.30	4.9	2.4

LOW PRESSURE TIGHTNESS

Fig. no	Low pressure tightness (bar)
86	< 0.1

DYNAMIC CHARACTERISTICS

The graphs and table show the relation between flow deceleration and maximum return velocity.
The pressure surge after disc closure can be calculated

$\Delta\rho = \rho \times c \times v_r \times 10^{-5}$ in which

- Δρ is the pressure rise to be added to the valve downstream pressure (bar)
- ρ is the density of the fluid (kg/m^3)
- c is the speed of sound through the fluid (m/s) (for water 1200 m/s)
- v_r is the maximum return velocity (m/s)

NOTES

1. K_v is the volume of water in m^3/hr that will pass through a given valve opening at a pressure drop of 1 bar.
2. Zeta is the flow resistance factor in the relation $\Delta\rho = zèta \times ½ \times \rho \times v^2 \times 10^{-5}$ in which
   Δρ is the pressure drop (bar)
   ρ is the fluid density (kg/m^3)
   v is the line velocity (m/s)
3. Δρ open is the openeningspressure of the valve ($x10^{-3}$ bar).
4. V_{st} is the steady flow velocity: this is the velocity at which the valve is just full open.
5. All data given for a horizontal pipeline.

KEYSTONE SWING TYPE WAFER CHECK VALVE

FIGURE 86