

tyco

Flow Control

KEYSTONE

Features

- Bubble-tight shut-off at full pressure rating (PTFE lined configuration is drop tight).
- The seat and the disc are the only two valve parts in contact with the medium.
- Superior design for abrasive and erosive media.
- Famous Keystone dovetail seat design.
- Very low pressure drop.
- Large number of material combinations available.
- Standardized actuator flange for easy operator interchangeability.
- Top bushing absorbs side thrust loads.
- Hub seal provided by preloaded contact between flattened seat surface and disc hub area for positive sealing at all disc positions.
- One-piece wafer thin disc stem gives the very minimum obstruction to flow.
- Field replaceable seat isolates the body and stem from the flow.
- Molded-in O-rings provides flange sealing and eliminates need for gaskets.

The Figure 9 series feature a one piece disc stem and field replaceable seat.

**General application**

The ideal valve for dry bulk conveying, food and beverage processing, corrosive slurries and paperstock.

Technical data

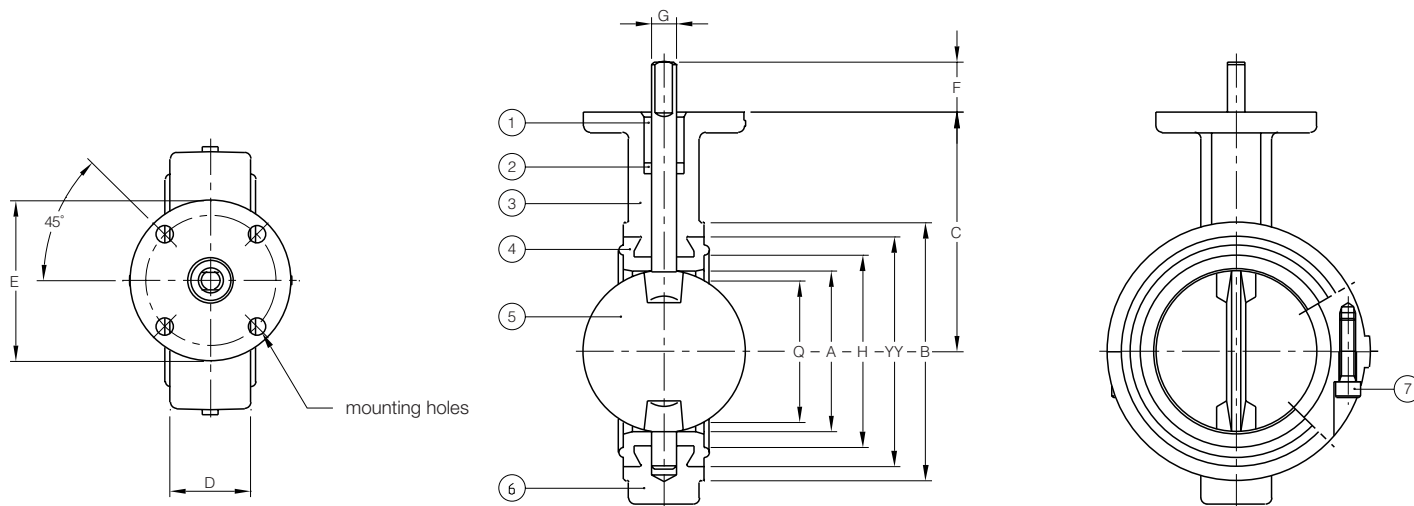
Pressure (bar)	:10*
Temperature (°C)	: -40 + 150
Sizes (mm)	: 25-500
Flange acc.	: PN 10 ANSI 150 Other flanges on request

* For EPDM covered disc and PTFE/EPDM seat with PTFE covered disc the max. differential pressure is 5 bar for sizes 350-500 mm.

* For mirror polished/satin finished disc the max. differential pressure is 6 bar for sizes 150-300 mm.

Butterfly Valve Figure 9

25-500 mm



Valve dimensions in mm

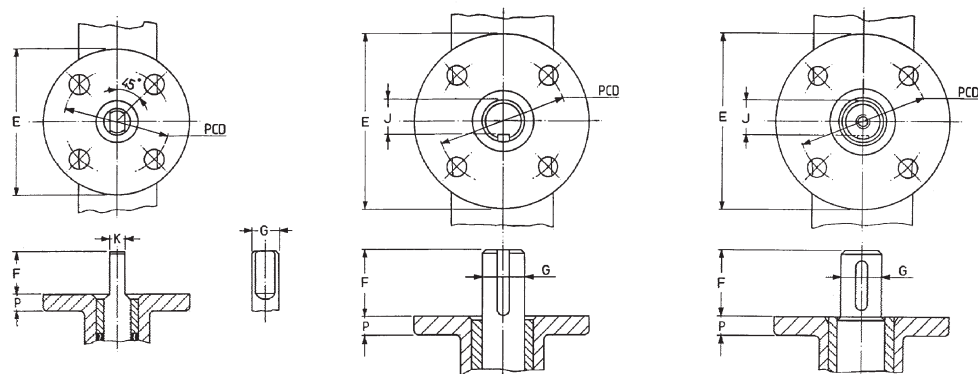
Size	A	B	C	D	E	F	G	H	YY	Q	Mass (kg)
25	31	62	79	29	57	19	9,53	37	50	15	0,7
40	45	82	94	30	57	19	9,53	55	67	35	1,1
50	51	109	108	41	102	32	14,28	68	87	33	3,0
65	64	129	122	45	102	32	14,28	81	98	48	3,5
80	76	144	132	45	102	32	14,28	94	114	64	4,0
100	102	164	152	51	102	32	15,88	122	146	90	5,5
125	127	194	152	54	102	32	19,05	149	168	117	7,2
150	146	220	173	54	102	32	19,05	176	197	138	8,5
200	197	275	211	64	152	32	22,20	233	254	189	15,0
250	248	330	229	64	152	51	28,58	284	305	241	20,5
300	298	377	308	76	152	51	28,58	338	353	291	31,0
350	337	429	305	76	152	51	28,58	370	403	330	40,0
400	387	489	329	102	152	51	41,28	429	464	376	56,0
450	438	546	368	108	203	57	47,63	468	521	427	92,0
500	489	600	403	127	203	57	47,63	535	575	475	112,0

Part name

- Bushing
- Shaft seal
- Upper body
- Seat
- Disc-stem
- Lower body
- Body screws

Notes

- Valve size shown is the 100 mm; other sizes show different configurations. For information see separate data sheets.
- Q is the disc chordal dimension at face of valve for disc clearance into pipe fitting or equipment.



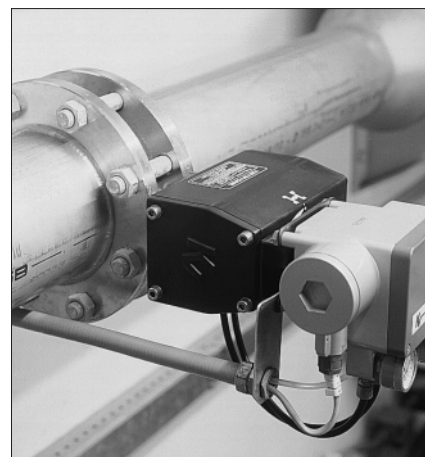
DN 25-200

DN 250-300 / DN 400-450

DN 350 / DN 500

Actuator flange dimensions in mm

Size	Shaft dimensions				Actuator flange dimensions					
	F	G	K	J	keysize width x height	E	P	PCD	hole ø	no. of holes
25	19	9,53	6,35	-	-	57	8	44,5	7	4
40	19	9,53	6,35	-	-	57	8	44,5	7	4
50	32	14,28	9,5	-	-	102	13	82,6	11	4
65	32	14,28	9,5	-	-	102	13	82,6	11	4
80	32	14,28	9,5	-	-	102	13	82,6	11	4
100	32	15,88	11,10	-	-	102	13	82,6	11	4
125	32	19,05	12,70	-	-	102	13	82,6	11	4
150	32	19,05	12,70	-	-	102	13	82,6	11	4
200	32	22,20	15,88	-	-	152	16	127,0	14	4
250	51	28,58	-	25,04	6,35 x 6,35	152	16	127,0	14	4
300	51	28,58	-	25,04	6,35 x 6,35	152	16	127,0	14	4
350	51	28,58	-	25,04	6,35 x 6,35	152	16	127,0	14	4
400	51	41,28	-	35,60	12,70 x 9,53	152	16	127,0	14	4
450	57	47,63	-	42,01	12,70 x 9,53	203	19	165,1	21	4
500	57	47,63	-	42,01	12,70 x 9,53	203	19	165,1	21	4



Butterfly Valve Figure 9

valve data

Note

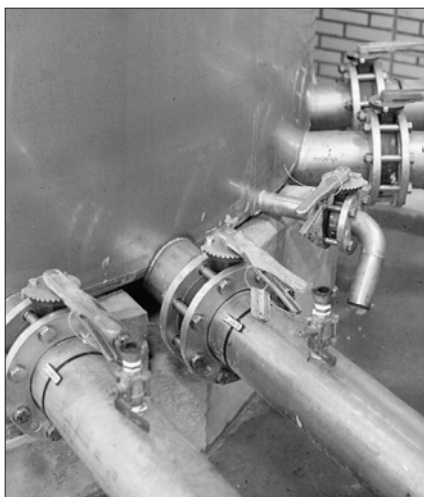
- Rated Kv = the volume of water in m³/hr that will pass through a given valve opening at a pressure drop of 1 bar.

Notes

- Application I :**
Water, seawater, lubricating types of hydrocarbons. Temp.: 0-80°C;
Valve opens at least once a month.
Application II :
All other liquid applications and lubricating gasses.
Application III :
Non lubricating and dry media.
- The charted maximum sizing operating torque is the sum of all friction and resistance for opening and closing of the disc against the indicated pressure differential.
- The effect of dynamic torque is not considered in tabulation.
- In sizing operators it is not necessary to include safety-factors.

Notes

- Dynamic operating torque formula:
 $T_D = F_T \times \Delta P$
 T_D = Dynamic torque (Nm)
 ΔP = Pressure drop across disc at desired disc-opening (bar)
 F_T = Dynamic torque factor (see table)
- The dynamic torque includes all frictional resistances.
- The dynamic torque is tending to close the disc.
- The charted maximum allowable torques are only applicable for standard type valves.



K_v values

disc opening	size in mm														
	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500
10°	0,4	0,9	1,7	2,6	3,4	5	9	15	21	33	49	65	86	110	130
20°	1,7	4,3	7	10	14	25	38	52	95	155	220	290	380	490	610
30°	4,3	9,5	16	22	33	54	86	120	220	340	510	660	860	1120	1380
40°	6,9	16	26	38	57	95	160	220	380	610	860	1200	1550	1980	2490
50°	11	26	43	60	95	150	240	340	590	950	1460	1890	2410	3100	3960
60°	17	40	69	95	150	240	390	550	950	1550	2320	2920	3870	4990	6190
70°	29	66	110	160	240	400	640	950	1550	2580	3780	4820	6360	8260	10300
80°	46	103	170	250	370	620	950	1380	2410	3960	5850	7740	9460	12900	15500
90°	52	120	320	430	590	960	1510	2000	3550	5800	8460	8600	11200	15500	18900
90°*	52	120	320	430	590	960	1510	2000	3550	5800	8460	9460	12000	15500	18900

* Rubber covered disc

Maximum allowable shaft torques in Nm

shaft mat.	size in mm														
	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500
SS *	20	20	60	60	60	100	180	180	290	725	725	1050	1430	1960	2600
C45	-	-	70	70	70	110	200	200	310	1030	1210	1180	2160	-	-

* For mirror polished/satin finish disc, contact factory.

Sizing torques in Nm

ΔP in bar	size in mm														
	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500
Application I															
3,5	6	10	20	25	30	45	62	89	150	230	330	460	610	800	1020
7	7	11	21	26	32	48	68	100	180	270	380	560	750	1010	1310
10	8	12	23	27	35	52	74	110	200	300	440	650	890	1220	1600
Application II															
3,5	8	12	27	32	39	59	81	120	200	300	420	590	770	1000	1270
7	9	13	28	33	42	62	87	130	220	330	470	680	910	1210	1560
10	10	14	29	35	44	66	92	140	240	370	530	770	1050	1420	1850
Application III															
3,5	10	14	32	38	47	71	97	144	240	360	504	708	924	1200	1524
7	11	16	34	40	50	74	104	156	264	396	564	816	1092	1452	1872
10	12	17	36	42	53	79	110	168	288	444	636	924	1260	1704	2220

Dynamic torque factors F_T for metric units

disc opening	size in mm														
	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500
10°	0,08	0,2	0,5	0,9	1,2	2,7	4,3	6,1	13	28	39	64	82	128	150
20°	0,10	0,2	0,7	1,0	1,5	3,4	5,9	8,7	20	40	61	97	133	200	250
30°	0,11	0,3	0,8	1,3	2,1	4,8	8,4	13	30	61	95	154	220	320	420
40°	0,15	0,5	1,0	1,5	3,0	6,4	12	20	47	94	153	240	360	510	680
50°	0,20	0,7	1,5	2,6	4,3	10	19	30	71	141	230	370	550	790	1060
60°	0,25	0,8	2,1	3,9	6,4	15	29	48	112	220	380	600	880	1270	1720
70°	0,41	1,3	3,1	5,9	10	24	45	76	176	350	610	960	1420	2090	2770
80°	0,57	1,8	4,4	8,5	14	34	65	112	260	520	890	1400	2040	3070	4080

Actuator selection

Actuator type	Figure	Remark
Handle	F401	Leverlock
	F411	Continuous adjustable
Gear	F422	-
Pneumatic	F790	-
Gear/pneumatic	F453+F790	Decutchable gearunits provides manual override for the Keystone pneumatic actuator
Electric	F777	

Butterfly Valve Figure 9

material selection

Body	Disc	Shaft	Seat	Trim no.	Sizes(mm)
Cast Iron	Ductile iron	Carbon-Steel	EPDM	101	50-500
			NBR	105	50-500
	Stainless Steel	Stainless Steel	EPDM	102	25-500
			NBR	106	25-500
			White NBR	169	25-500
			PTFE/EPDM	186	50-500
	Stainless Steel (satin finished)	Stainless Steel	EPDM	104	25-500
			NBR	107	25-500
			White NBR	185	25-500
			PTFE/EPDM	187	50-500
	Stainless Steel (mirror polished)	Stainless Steel	EPDM	239	50-500
			NBR	240	50-500
			White NBR	241	50-500
	Ductile Iron (nickel plated)	Carbon Steel	EPDM	261	50-300
NBR			262	50-300	
EPDM covered	Stainless Steel	EPDM	103	50-500	
PTFE covered	Stainless Steel	PTFE/EPDM	188	50-500	
Ductile Iron	Ductile iron	Carbon Steel	EPDM	111	50-300
			NBR	115	50-300
	Stainless Steel	Stainless Steel	EPDM	112	50-300
			NBR	116	50-300
			White NBR	177	50-300
			PTFE/EPDM	190	50-300
	Stainless Steel (satin finished)	Stainless Steel	EPDM	114	50-300
			NBR	117	50-300
			White NBR	189	50-300
			PTFE/EPDM	191	50-300
	Stainless Steel (mirror polished)	Stainless Steel	EPDM	243	50-300
			NBR	244	50-300
			White NBR	245	50-300
	Ni-plated	Carbon Steel	EPDM	264	50-300
NBR			265	50-300	
EPDM covered	Stainless Steel	EPDM	113	50-300	
PTFE covered	Stainless Steel	PTFE/EPDM	192	50-500	
Ductile Iron Heat Treated	Ductile iron	Carbon Steel	EPDM	350	350-400
			NBR	354	350-400
	Stainless Steel	Stainless Steel	EPDM	351	350-500
			NBR	355	350-500
			White NBR	361	350-500
			PTFE/EPDM	363	350-500
	Stainless Steel (satin finished)	Stainless Steel	EPDM	353	350-500
			NBR	356	350-500
			White NBR	362	350-500
			PTFE/EPDM	364	350-500
	Stainless Steel (mirror polished)	Stainless Steel	EPDM	373	350-500
			NBR	374	350-500
			White NBR	375	350-500
	EPDM covered	Stainless Steel	EPDM	352	350-500
PTFE covered	Stainless Steel	PTFE/EPDM	365	50-500	

Butterfly Valve Figure 9 pressure-temperature diagram

Pressure-Temperature Diagram

Seat material	Disc material	Body material	Size range DN (mm)	Valve function Wafer/End of Line	Temperature in °C											Notes	
					-40	-30	-20	-15	0	50	100	120	130	150	160		
EPDM	all	all	all	W	10 Bar											1	
	except: SS (MP/SF)	all	150-300	W	6 Bar											2	
	EPDM cover	all	350-500	W	5 Bar											3	
NBR and White NBR	all	all	all	W	10 Bar											4	
	except: SS (MP/SF)	all	150-300	W	6 Bar											5	
PTFE/EPDM	all	all	all	W	10 Bar											2 Bar	6
	except: SS (MP/SF)	all	150-300	W	6 Bar											1 Bar	7
	PTFE cover	all	350-500	W	5 Bar											1 Bar	8

Pressure-Temperature Diagram

Note	Trims																						
1	101	102	103	104	111	112	113	114	239	243	261	264	350	351	352	353	373						
2	104	114	239	243	353	373																	
3	103	113	352																				
4	105	106	107	115	116	117	169	177	185	189	240	241	244	245	262	265	354	355	356	361	362	374	375
5	107	117	185	189	240	241	244	245	356	362	374	375											
6	186	187	190	191	363	364																	
7	187	191																					
8	188	192	365																				