KEYSTONE OPTISEAL

RESILIENT SEATED BUTTERFLY VALVE

A resilient seated butterfly valve in wafer and lug body style for general purpose applications

GENERAL APPLICATION

Food and beverage processing, dry bulk conveying, paper mills, slurry handling etc. Grease or silicone free valves are available for special applications such as paint or oxygen systems.
OptiSeal with PTFE lined seat and PTFE covered disc stem is ideally suited to applications where excellent chemical resistance and non-toxic properties are required.

TECHNICAL DATA

Pressure (bar):	16 (CI body: 10 bar)
End of line (bar):	6-10-16
Temperature (°C):	-40 to +160
Sizes (DN):	40-500

Flange accommodation wafer:
DN 40-500: PN 10/16,
ASME/ASTM B16.5 Cl#150,
JIS 10K, BS table E

Flange accommodation lugged:
PN 10/16
ASME/ASTM B16.5 Cl#150
JIS 10K

FEATURES

- Top bushing absorbs actuator side thrust loads.
- Actuator flange acc. ISO 5211 for all sizes and and Keystone mount available for DN 350 to DN 500.
- High solid, glossy, silicone free, paint system ensuring excellent corrosion resistance.
- Extended body neck allows pipe insulation.
- Body locating holes ease installation and centering between the flanges.
- Rounded polished disc edge gives full concentric sealing, lower torques, longer seat life and bubble-tight shut-off.
- The seat is field replaceable and fully isolates the body and stem from the flow.
- Primary stem sealing exceeds the pressure rating of the valve and prevents leakage through shaft area to atmosphere.
- A secondary shaft sealing provides back-up safety.
- No flange gaskets required.
- High C_V value.
- Top and bottom shaft bearings for optimized support and minimum friction in all body materials, except cast iron.
- Wafer and lugged body design, acc. EN 593, EN 558, ISO 5752 short.
- All valves comply to Pressure Equipment Directive Module B+D - CE Marking.
- Available approvals: KIWA, DNV.

Figure 14 wafer
DN 40-500

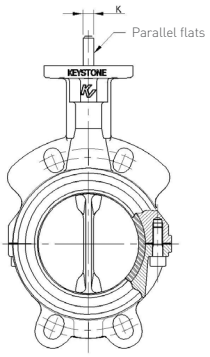
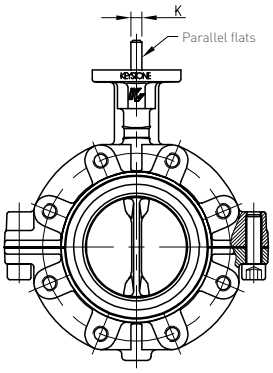
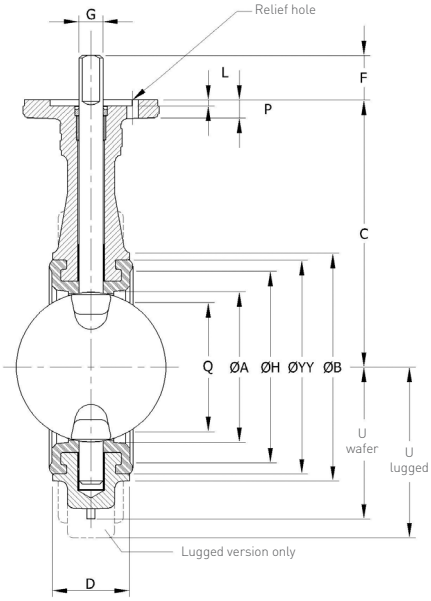


Figure 16 lugged
DN 40-500





Actuator flange acc. ISO 5211
DN 40 to DN 500
Keystone mount DN 350 to DN 500

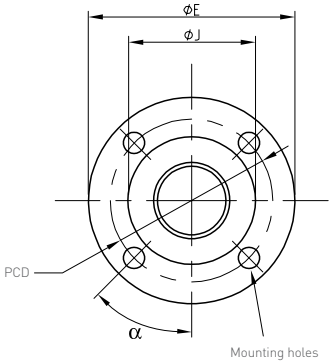


Figure 14 and 16

VALVE DIMENSIONS - ISO MOUNTED - METRIC (mm)

Size											Shaft			Actuator flange acc. ISO 5211									
(DN)	A	B	C	U Wafer	U Lugged	D	H	Q	YY	F	G_{h9}	$K_{-0.05}^{0}$	Key-size❖	Type	E	J	L	P	PCD	Hole ø	No. of holes	α	Wafer mass (kg)	Lugged mass (kg)
40	40	78	130	54	68	33	49	24	64	25	12	8	-	F05	65	35	4	9	50	6.6	4	45	1.5	2.7
50	50	94	135	59	73	43	66	27	80	25	12	8	-	F05	65	35	4	9	50	6.6	4	45	2.1	3.7
65	62	109	150	74	80	46	78	43	93	30	16	11	-	F07	90	55	4	12	70	9.0	4	45	3.2	5.0
80	78	126	160	92	103	46	97	64	112	30	16	11	-	F07	90	55	4	12	70	9.0	4	45	3.7	5.9
100	99	156	180	106	117	52	129	87	144	30	16	11	-	F07	90	55	4	12	70	9.0	4	45	5.3	8.3
125	124	189	195	120	133	56	160	113	175	30	20	14	-	F07	90	55	4	12	70	9.0	4	45	7.7	11.5
150	151	214	210	131	144	56	181	141	196	30	20	14	-	F07	90	55	4	12	70	9.0	4	45	8.6	13.0
200	195	267	240	167	180	60	233	188	248	50	25	18	-	F12	150	85	4	18	125	13.5	4	45	16.2	22.2
250	245	321	275	200	220	68	290	237	305	50	30	22	-	F12	150	85	4	18	125	13.5	4	45	23.7	33.5
300	292	375	310	234	245	78	340	283	355	50	30	22	-	F12	150	85	4	18	125	13.5	4	45	32.2	51
350	325	413	325	264	264	78	378	319	398	70	35	-	10 x 8	F12	150	85	4	18	125	13.5	4	45	42	66
400	380	470	360	299	299	102	435	369	455	70	40	-	12 x 8	F16	210	130	6	25	165	22.0	4	45	64	120
450	434	530	395	334	334	114	495	422	515	70	40	-	12 x 8	F16	210	130	6	25	165	22.0	4	45	85	144
500	486	584	430	385	385	127	549	472	569	70	50	-	14 x 9	F16	210	130	6	25	165	22.0	4	45	107	173

❖ Keysize width x height

NOTES

1. Flange accommodation must be specified when ordering.
2. Q is the disc chordal dimension at face of valve for disc clearance into pipe fitting or equipment.
3. Specify size, figure number, part name, material and flange accommodation when ordering spare parts.
4. Valve sizes shown are the DN 100.
5. For valves with composite disc stem, the mass shown is ± 3% till 20% lower, depending on size and wafer- or lugged type.
   For investment cast bodies, the mass is ± 30% lower.

Figure 14 wafer
DN 40-500

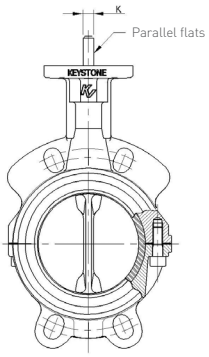
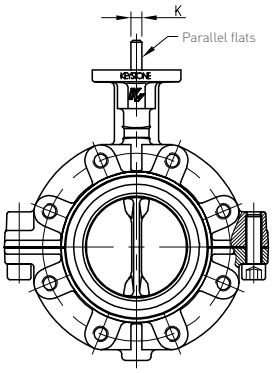
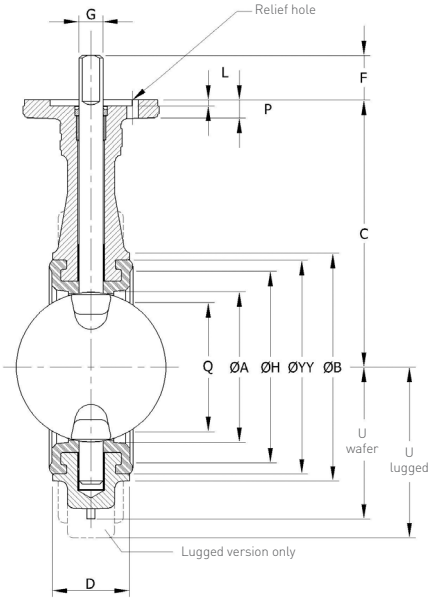


Figure 16 lugged
DN 40-500





Actuator flange acc. ISO 5211
DN 40 to DN 500
Keystone mount DN 350 to DN 500

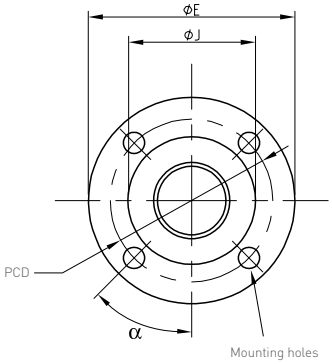


Figure 14 and 16

VALVE DIMENSIONS - KEYSTONE MOUNTED - METRIC (mm)

Size											Shaft			Top plate drilling								Wafer	Lugged
(DN)	A	B	C	U Wafer	U Lugged	D	H	Q	YY	F	G_{h9}	$K^{0}_{-0.05}$	Key-size❖	Type	E	J	L	P	PCD	Hole ø	No. of holes	α	mass (kg)	mass (kg)
350	325	413	325	264	264	78	378	319	398	76	34.925	-	7.94 x 7.94	CAG	150	-	-	18	127	13.5	4	45	42	66
400	380	470	360	299	299	102	435	369	455	76	34.925	-	7.94 x 7.94	DAG	210	130	6	25	165	22.0	4	45	64	120
450	434	530	395	334	334	114	495	422	515	76	41.275	-	9.53 x 9.53	DAH	210	130	6	25	165	22.0	4	45	85	144
500	486	584	430	385	385	127	549	472	569	108	47.625	-	12.7 x 9.53	DAJ	210	130	6	25	165	22.0	4	45	107	173

VALVE DIMENSIONS - KEYSTONE MOUNTED - IMPERIAL (inches)

Size											Shaft			Top plate drilling								Wafer	Lugged
(NPS)	A	B	C	U Wafer	U Lugged	D	H	Q	YY	F	G_{h9}	$K^{0}_{-0.05}$	Key-size❖	Type	E	J	L	P	PCD	Hole ø	No. of holes	α	mass (kg)	mass (kg)
14	12.80	16.26	12.80	10.39	10.39	3.07	14.88	12.56	15.67	2.99	1 3/8	-	5/16 x 5/16	CAG	5.91	-	-	0.71	5.00	0.53	4	45	92.59	145.5
16	14.96	18.50	14.17	11.77	11.77	4.02	17.13	14.53	17.91	2.99	1 3/8	-	5/16 x 5/16	DAG	8.27	5.12	0.24	0.98	6.50	0.87	4	45	141.1	264.55
18	17.09	20.87	15.55	13.15	13.15	4.49	19.49	16.61	20.28	2.99	1 5/8	-	3/8 x 3/8	DAH	8.27	5.12	0.24	0.98	6.50	0.87	4	45	187.39	317.47
20	19.13	22.99	16.93	15.16	15.16	5.00	21.61	18.58	22.40	4.25	1 7/8	-	1/2 x 3/8	DAJ	8.27	5.12	0.24	0.98	6.50	0.87	4	45	235.89	381.4

❖ Keysize width x height

NOTES

1. Flange accommodation must be specified when ordering.
2. Q is the disc chordal dimension at face of valve for disc clearance into pipe fitting or equipment.
3. Specify size, figure number, part name, material and flange accommodation when ordering spare parts.
4. Valve sizes shown are the DN 100.
5. For valves with composite disc stem, the mass shown is ± 3% till 20% lower, depending on size and wafer- or lugged type.
   For investment cast bodies, the mass is ± 30% lower.

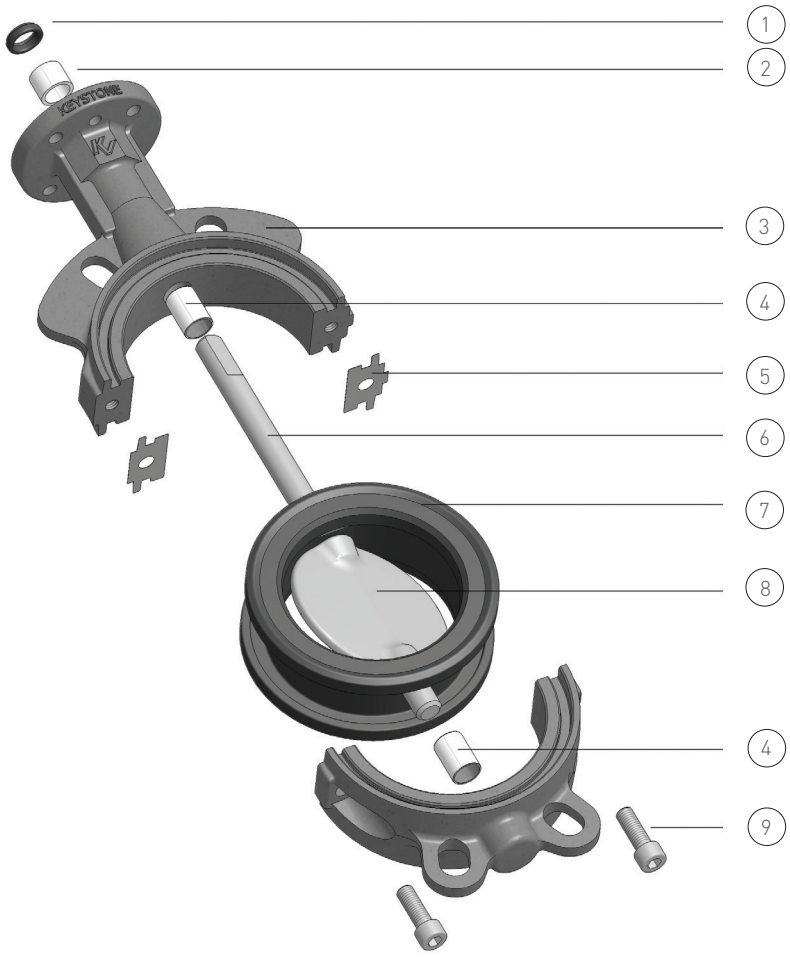
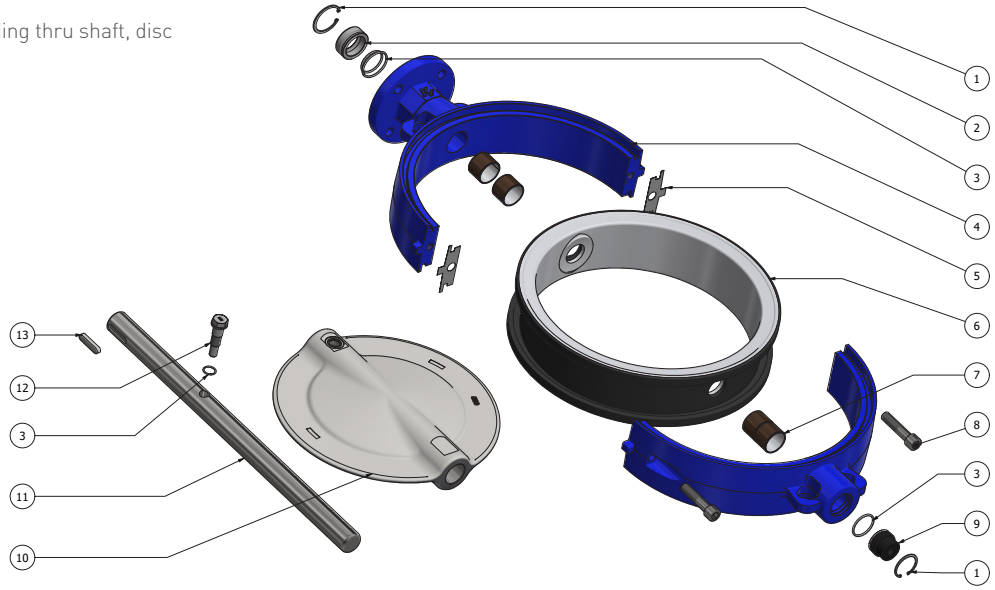


Figure 14/16 exploded view
(Ductile iron bodies)

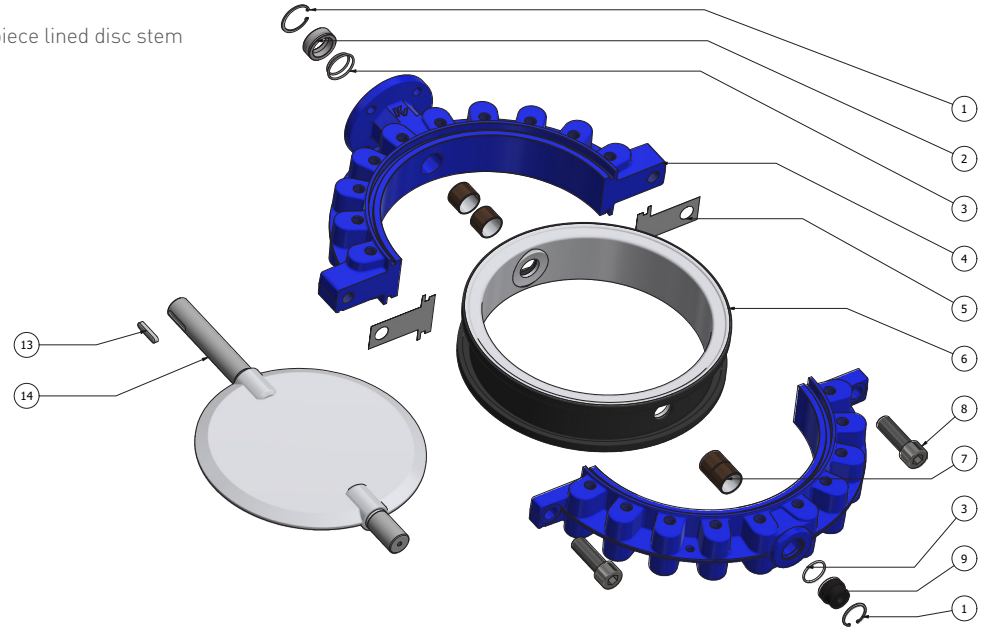
PARTS LIST

Part	Name
1	Dirtscraper
2	Shaft bushing
3	Body
4	Bearing
5	Split seal
6	Shaft
7	Seat
8	Disc
9	Body screws

DN 350-500 - Including thru shaft, disc and disc screw



DN 350-500 - One-piece lined disc stem



PARTS LIST

Part	Name
1	Circlip
2	Bushing
3	O-Ring
4	Body
5	Split seal
6	Seat
7	Bearing
8	Body screw
9	Plug
10	Disc
11	Shaft
12	Disc screw
13	Key
14	Disc stem (one-piece)

K_V VALUES

Disc	Size in mm													
opening	40	50	65	80	100	125	150	200	250	300	350	400	450	500
10°	-	-	-	-	-	-	-	-	19.5	47.3	119	155	196	242
20°	0.6	0.9	2.4	5.0	9.2	14.8	22.4	53	151	314	304	397	503	621
30°	3.8	5.9	11.1	20.4	37.6	66.8	108	204	300	369	637	832	1053	1300
40°	9.2	14.3	26.2	47.4	84.8	143.0	221	392	572	718	1142	1492	1888	2331
50°	18.1	28.3	49.7	87.9	154.0	254.0	381	657	956	1212	1936	2529	3200	3951
60°	33.5	51.6	87.4	151.0	260.0	420.0	621	1050	1540	1993	3110	4062	5141	6347
70°	54.2	88.6	156.0	274.0	471.0	743.0	1062	1731	2628	3624	5010	6544	8288	10224
80°	57.6	111.0	232.0	442.0	789.0	1261.0	1802	2946	4616	6613	8969	11714	14826	18303
90°	58.5	112.0	249.0	492.0	895.0	1444.0	2099	3715	6883	11343	10407	13592	17203	21238

NOTES

1. Rated K_V = the volume of water in m^3/hr that will pass through a given valve opening at a pressure drop of 1 bar.
2. $K_v = Q\sqrt{\frac{R.D.}{\Delta P}}$ (liquid)
   Q = flow through valve (m^3/hr)
   R.D. = relative density of liquid (water = 1)
3. Values for composite disc stem, indication only. For details: contact factory.

DYNAMIC TORQUE FACTORS F_T FOR METRIC UNITS

Disc	Size in mm													
opening	40	50	65	80	100	125	150	200	250	300	350	400	450	500
10°	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20°	0.1	0.1	0.2	0.5	0.9	1.8	3.0	7.2	14.1	24.3	21.4	32.0	45.6	62.5
30°	0.1	0.3	0.6	1.1	2.1	4.1	7.1	16.8	32.8	56.7	64.3	96.0	136.7	187.5
40°	0.3	0.5	1.1	2.1	4.1	8.0	13.8	32.8	64.1	110.7	124.3	185.6	264.3	362.5
50°	0.4	0.9	1.9	3.6	7.0	13.7	23.6	56.0	109.4	189.0	235.8	352.0	501.2	687.5
60°	0.8	1.5	3.3	6.1	12.0	23.4	40.5	96.0	187.5	324.0	415.9	620.8	883.9	1212.5
70°	1.3	2.5	5.5	10.2	20.0	39.1	67.5	160.0	312.5	540.0	733.2	1094.4	1558.2	2137.5
80°	2.0	3.9	8.5	15.9	31.0	60.5	104.6	248.0	484.4	837.0	1346.3	2009.6	2861.3	3925.0
90°	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

1. 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)
2. The above mentioned dynamic torque includes all frictional resistances.
3. The dynamic torque is tending to close the disc.
4. ΔP to be determined with K_V formula.

MAXIMUM ALLOWABLE SHAFT TORQUES in Nm

	Valve size in mm													
	40	50	65	80	100	125	150	200	250	300	350	400	450	500
SS 1.4401	65	65	160	160	160	320	320	545	970	970	-	-	-	-
SS 1.4470	65	65	160	160	160	320	320	655	1160	1160	-	-	-	-
SS 1.4408	32	32	80	80	80	160	160	327	580	580	1542	1824	2977	3219
SS 1.4057	90	90	230	230	230	460	460	935	1660	1660	1760	2012	3472	3858
SS 1.4057*	65	65	110	160	160	320	320	935	1660	1660	-	-	-	-
SS 1.4462**	70	70	170	170	170	345	345	700	1215	1215	1156	1368	2233	2414

* for Composite disc

** The torque values apply for:
1. Thru shaft / disc / disc screw (ISO, metric) - U0
2. One piece lined disc stem (ISO, metric) - C0T+U0
3. One piece lined disc stem (KEY, metric) - C0T+U0

NOTES

1. In ISO 5211 a table is listed representing the maximum torques which can be transmitted through the actuator flange. These values are based upon specific criteria and can be lower than the maximum allowable shaft torques. In this case the criteria can be changed in order to reach the maximum allowable shaft torques.

KEYSTONE OPTISEAL

TORQUE DATA

SIZING TORQUES in Nm (STANDARD AND LINED SEAT)

	Size in mm													
ΔP in bar	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**
I*														
3.5	10	13	19	26	37	58	81	148	241	345	492	672	889	1146
7	10	13	20	27	40	63	88	164	271	387	559	773	1032	1342
10	11	14	21	30	44	70	99	188	315	451	660	923	1247	1636
14	11	15	23	33	49	80	113	219	374	536	-	-	-	-
16	12	15	25	36	51	85	120	235	403	578	-	-	-	-
II*														
3.5	11	14	21	29	42	66	93	169	274	392	555	755	994	1276
7	11	14	22	31	45	71	100	185	303	434	623	856	1138	1472
10	11	15	23	33	49	78	111	208	347	498	724	1007	1352	1766
14	12	16	26	36	54	88	125	240	406	583	-	-	-	-
16	12	17	27	38	56	93	132	255	436	626	-	-	-	-
III*														
3.5	12	15	23	32	48	74	105	190	306	439	619	839	1100	1406
7	12	16	24	34	50	79	112	206	336	481	686	939	1243	1602
10	12	16	26	36	54	86	122	229	380	545	787	1090	1457	1896
14	13	17	28	40	59	96	136	261	439	629	-	-	-	-
16	13	18	29	41	61	101	143	276	468	672	-	-	-	-

SIZING TORQUES in Nm (REINFORCED SEAT**)

	Size in mm													
ΔP in bar	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**
I*														
10	-	18	28	40	59	95	134	250	412	591	851	1173	1563	2026
14	-	19	30	43	64	104	148	281	471	676	986	1374	1849	2419
16	-	19	31	44	67	109	155	297	501	719	1053	1474	1992	2615
II*														
10	-	20	31	45	67	107	152	281	461	662	947	1298	1721	2221
14	-	21	33	48	72	117	166	313	520	746	1081	1499	2007	2614
16	-	21	34	49	74	121	173	328	549	789	1149	1599	2150	2810
III*														
10	-	27	43	63	96	151	216	396	640	919	1297	1755	2300	2936
14	-	28	45	66	101	161	230	427	699	1004	1432	1956	2586	3329
16	-	28	46	68	103	166	237	443	728	1046	1499	2057	2729	3525

* Application I, II, III

NOTES

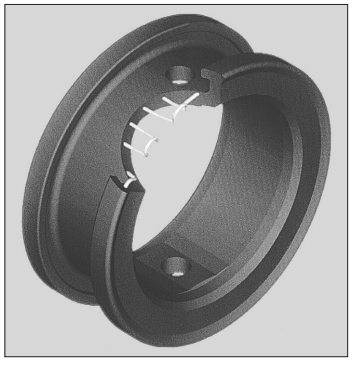
1. **Application I:** Water, seawater, lubricating types of hydrocarbons.
   Application II: All other liquid applications and lubricating gasses.
   Application III: Non lubricating and dry media.
2. The charted maximum sizing operating torque is the sum of all friction and resistance for opening and closing of the disc against the indicated pressure differential.
3. The effect of dynamic torque is not considered in tabulation.
4. In sizing operators it is not necessary to include safety-factors.
5. Torque values for application I, II and III are relevant for the temperature range of: 0 °C to 80 °C, when valve opens at least once a month (for other temperatures, contact factory).

** For limited shaft material selection only.

REINFORCED SEAT

Suitable for:

- severe vacuum applications
- high line velocities up to 12 m/s for liquids
- Bördel and slip-on flanges
- full rated end-of-line service
- pressure testing during erection and commissioning



PRESSURE-TEMPERATURE DIAGRAM (DN 40-300) - INLINE / EOL

Body material	Seat material	Disc material	Temperature in °C: -40	-20	-15	-10	0	50	100	120	130	150	160
Cast iron (GJL-250)	EPDM - FG	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†, EPDM coated					10 bar / 6 bar						
	EPDM - FG - HT	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†					10 bar / 6 bar						
		EPDM coated					10 bar / N/A†						
		Composite†					10 bar / N/A†						
	EPDM - Metal reinforced	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†					10 bar / 10 bar						
	FKM (A/B)	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†					10 bar / 6 bar				[2]		
	NBR - Metal reinforced	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†					10 bar / 10 bar						
	NBR and white NBR	DI-Epoxy, SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite†					10 bar / 6 bar						
	PTFE/EPDM	SS (One piece)*, SS-Satin*, SS-Mirror*, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					10 bar / 6 bar			[2]	[4]		
		PTFE lined†					6 bar / N/A†			[5]	[6]		
Ductile iron (GJS-400-15)	EPDM - FG	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)					16 bar / 10 bar						
		SS (One piece)*, SS-Satin*, SS-Mirror*					10 bar / 6 bar						
		Composite† (DN 200-300), EPDM coated					10 bar / N/A†						
	EPDM - FG - HT	SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)					16 bar / 10 bar						
		SS (One piece)*, SS-Satin*, SS-Mirror*					10 bar / 6 bar						
		Composite† (DN 200-300)					10 bar / N/A†						
	EPDM - Metal reinforced	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 16 bar						
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite†					10 bar / 10 bar						
	FKM (A/B)	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 10 bar					[1]	
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite†					10 bar / 6 bar					[2]	
	NBR - Metal reinforced	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 16 bar						
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite†					10 bar / 10 bar						
	NBR and white NBR	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)					16 bar / 10 bar						
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite† (DN 200-300)					10 bar / 6 bar						
	PTFE/EPDM	SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 10 bar			[1]	[2]		
		SS (One piece)*, SS-Satin*, SS-Mirror*, PTFE lined†					10 bar / 6 bar			[2]	[4]		
Ductile iron Heat Treated (GJS-400-18U-LT), Stainless steel	EPDM - FG	DI-Epoxy					16 bar / 10 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)		16 bar / 10 bar									
		SS (One piece)*, SS-Satin*, SS-Mirror*		10 bar / 6 bar									
		Composite† (DN 200-300), EPDM coated		10 bar / N/A†									
	EPDM - FG - HT	SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)		16 bar / 10 bar									
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite† (DN 200-300)		10 bar / 6 bar									
	EPDM - Metal reinforced	DI-Epoxy					16 bar / 16 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•		16 bar / 16 bar									
		SS (One piece)*, SS-Satin*, SS-Mirror*		10 bar / 10 bar									
	FKM (A/B)	DI-Epoxy					16 bar / 10 bar					[1]	
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•			16 bar / 10 bar							[1]	
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite†			10 bar / 6 bar							[2]	
	NBR - Metal reinforced	DI-Epoxy					16 bar / 16 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•				16 bar / 16 bar							
		SS (One piece)*, SS-Satin*, SS-Mirror*				10 bar / 10 bar							
	NBR and white NBR	DI-Epoxy					16 bar / 10 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 40-150)				16 bar / 10 bar							
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite† (DN 200-300)				10 bar / 6 bar							
	PTFE / EPDM	SS (Standard), Duplex, NiAlBz, Hstl, Ur•		16 bar / 10 bar						[1]	[2]		
		SS (One piece)*, SS-Satin*, SS-Mirror*, Composite†, PTFE lined†		10 bar / 6 bar						[2]	[4]		

NOTES

† Not suitable for end-of-line service, or not covered by PED approval
• Discontinued material
* Size DN 300 max 6 bar

1. 10 bar / 6 bar
2. 6 bar / 4 bar
3. 6 bar / N/A†
4. 4 bar / 2 bar
5. 4 bar / N/A†
6. 2 bar / N/A†

MATERIAL SPECIFICATION (DN 40-300)

Part name	Material	Designation	EN/DIN mat.no	Remark
Body	Cast iron	GJL-250	EN JL-1040	Max. pressure 10 bar
	Ductile iron	GJS-400-15	EN JS-1030	
	Ductile iron Heat Treated	GJS-400-18U-LT	EN JS-1049	With heat treatment certificate and Charpy V-notch test
	Stainless steel	GX5CrNiMo19-11-2	EN 1.4408	Wafer and Lug style DN 40-300
Disc	Ductile iron CTD	GJS-400-15	EN JS-1030	CTD = Epoxy coated max temp 120 °C
	Duplex	GX2CrNiMoN22-5-3	EN 1.4470	
	Hastelloy C4C	ASTM A494 CW2M	-	Shaft connection by welded pins
	NiAlBz	CuAl10Fe5Ni5	EN CC333G	Comparable with BS 1400 AB2
	Stainless steel	GX5CrNiMo19-11-2	EN 1.4408	Comparable with CF8M
	Stainless steel MP	GX5CrNiMo19-11-2	EN 1.4408	DN 40-250 max 10 bar, DN 300 max. 6 bar
	Stainless steel SF	GX5CrNiMo19-11-2	EN 1.4408	DN 40-250 max 10 bar, DN 300 max. 6 bar
	EPDM covered steel			Max. 10 bar 120 °C
	PTFE covered steel			Max. 10 bar
	Composite			DN 40-300 Engineered composite XP1620
Shaft	Stainless steel	X5CrNiMo17-12-2	EN 1.4401	Standard shaft material
	Stainless steel	X17CrNi16-2	EN 1.4057	Similar to ASTM A276/Gr. 431. Used for DI, DI-CTD and Composite disc
	Stainless steel	GX5CrNiMo19-11-2	EN 1.4408	Comparable with CF8M for mirror polished and satin finished disc
	Duplex	X2CrNiMoN22-5-3	EN 1.4462	For EPDM, PTFE covered, Hastelloy, Uranus disc
	Duplex	GX2CrNiMoN22-5-3	EN 1.4470	For Duplex disc
Seat	EPDM			Food grade
	Reinforced seat EPDM			Seat reinforced with metal insert food grade
	NBR			Food grade
	Reinforced seat NBR			Seat reinforced with metal insert food grade
	NBR white			Food grade
	FKM			
	PTFE lined EPDM			
	EPDM FG HT			Food grade
	EPDM WA-3			KIWA
Body screws	Steel			Quality 8.8
	Stainless steel			Optional
Bushing	Polyester			
Dirt scraper	NBR/Steel			
Bearing	PTFE lined			Standard in CS, SS, DI and DI HTC body
Split-seal	Graphite			

PRESSURE-TEMPERATURE DIAGRAM (DN 350-500) - INLINE / EOL

Body material	Seat material	Disc material	Temperature in °C											
			-40	-20	-15	-10	0	50	100	120	130	150	160
Ductile iron (GJS-400-15)	EPDM - FG	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)					10 bar / 6 bar						
		SS (One piece), SS-Satin, SS-Mirror					10 bar / 6 bar						
		Composite† (DN 350-500), EPDM coated					10 bar / N/A†						
	EPDM - FG - HT	SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)					10 bar / 6 bar						
		SS (One piece), SS-Satin, SS-Mirror					10 bar / 6 bar						
		Composite† (DN 350-500)					10 bar / N/A†						
	EPDM - Metal reinforced	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 16 bar						
		SS (One piece), SS-Satin, SS-Mirror, Composite†					10 bar / N/A†						
	FKM (A/B)	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 10 bar					[1]	
		SS (One piece), SS-Satin, SS-Mirror, Composite†					10 bar / 6 bar					[2]	
	NBR - Metal reinforced	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•					16 bar / 16 bar						
		SS (One piece), SS-Satin, SS-Mirror, Composite†					10 bar / 10 bar						
	NBR and white NBR	DI-Epoxy, SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)					10 bar / 6 bar						
		SS (One piece), SS-Satin, SS-Mirror, Composite† (DN 350-500)					10 bar / 6 bar						
	PTFE/EPDM	SS (Standard), Duplex, NiAlBz, Hstl, Ur•					10 bar / 6 bar			[1]	[2]		
		SS (One piece), SS-Satin, SS-Mirror, PTFE lined†					10 bar / N/A*			[2]	[4]		
Ductile iron Heat Treated (GJS-400-18U-LT), Stainless steel	EPDM - FG	DI-Epoxy					10 bar / 6 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)		10 bar / 6 bar									
		SS (One piece), SS-Satin, SS-Mirror		10 bar / 6 bar									
		Composite† (DN 350-500), EPDM coated		10 bar / N/A*									
	EPDM - FG - HT	SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)		10 bar / 6 bar									
		SS (One piece), SS-Satin, SS-Mirror, Composite† (DN 350-500)		10 bar / 6 bar									
	EPDM - Metal reinforced	DI-Epoxy					16 bar / 16 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•		16 bar / 16 bar									
		SS (One piece), SS-Satin, SS-Mirror		10 bar / N/A*									
	FKM (A/B)	DI-Epoxy					10 bar / 6 bar					[1]	
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•			10 bar / 6 bar							[1]	
		SS (One piece), SS-Satin, SS-Mirror, Composite†			10 bar / 6 bar							[2]	
	NBR - Metal reinforced	DI-Epoxy					16 bar / 16 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•				16 bar / 16 bar							
		SS (One piece), SS-Satin, SS-Mirror				10 bar / 10 bar							
	NBR and white NBR	DI-Epoxy					10 bar / 6 bar						
		SS (Standard), Duplex, NiAlBz, Hstl, Ur•, Composite† (DN 350-500)				10 bar / 6 bar							
		SS (One piece), SS-Satin, SS-Mirror, Composite† (DN 350-500)				10 bar / N/A*							
	PTFE / EPDM	SS (Standard), Duplex, NiAlBz, Hstl, Ur•		10 bar / 6 bar						[1]	[2]		
		SS (One piece), SS-Satin, SS-Mirror, Composite†, PTFE lined†		10 bar / N/A*						[2]	[4]		

NOTES

† Not suitable for end-of-line service, or not covered by PED approval

• Discontinued material

* For all Lined Disc material, no EOL is available. Maximum pressure is 10 bar.

SS = Stainless steel, DI = Ductile iron, CS = Carbon steel

1. 10 bar / 6 bar
2. 6 bar / 4 bar
3. 6 bar / N/A†
4. 4 bar / 2 bar

MATERIAL SPECIFICATION (DN 350-500)

Part name	Material	Designation	EN/DIN mat.no	Remark
Body	Cast steel	GP240GH	EN 1.0619	
	Ductile iron	GJS-400-15	EN JS-1030	
	Ductile iron Heat Treated	GJS-400-18U-LT	EN JS-1049	With heat treatment certificate and Charpy V-notch test
	Stainless steel	GX5CrNiMo19-11-2	EN 1.4408	Wafer and Lug style DN 350-500
Disc	Ductile iron CTD	GJS-400-15	EN JS-1030	CTD = Epoxy coated max temp 120 °C
	Ductile iron	GJS-400-15	EN JS-1030	
	NiAlBz	CuAl10Fe5Ni5	EN CC333G	Comparable with BS 1400 AB2
	Stainless steel	GX5CrNiMo19-11-2	EN 1.4408	Comparable with CF8M
	Stainless steel PP	GX5CrNiMo19-11-2	EN 1.4408	
	Stainless steel MP	GX5CrNiMo19-11-2	EN 1.4408	Optional
	Stainless steel SF	GX5CrNiMo19-11-2	EN 1.4408	Optional
	EPDM covered steel			Max. 10 bar 120 °C. Optional up to DN 400
	Ebonite covered DI			Ductile iron disc with Ebonite hard rubber lining
	Other materials			Duplex, Hastelloy on request
Shaft	Stainless steel	X17CrNi16-2	EN 1.4057	Similar to ASTM A276/Gr. 431. Standard shaft material for DN 350-500
	Duplex	X2CrNiMoN22-5-3	EN 1.4462	For EPDM, PTFE covered, Hastelloy, Uranus or Duplex disc
Seat	EPDM			Food grade
	Reinforced seat EPDM			Seat reinforced with metal insert food grade, max DN 500
	NBR			Food grade
	Reinforced seat NBR			Seat reinforced with metal insert food grade, max DN 500
	NBR white			Food grade
	PTFE lined EPDM			DN 300, DN 400, DN 500 (DN 600 on request)
	EPDM FG HT			Food grade
	EPDM			KIWA
Disc screw	Stainless steel	X2CrNiMoN22-5-3	EN 1.4462	
Disc screw O-ring	EPDM			
	NBR			
	FKM			
Plug	Carbon steel			
Plug O-ring	NBR			
Plug circlip	Stainless steel			
Bushing	Polyester			
Shaft/Body O-ring	NBR			
Bearing	PTFE/Steel			
Shaft/Body circlip	Stainless steel			
Body screws	Steel			Quality 8.8
	Stainless steel			Optional
Split-seal	Graphite			
Disc stem lined	PTFE-Steel-Duplex			Lined steel disc insert, duplex shafts
	EPDM-Steel-Duplex			Lined steel disc insert, duplex shafts

KEYSTONE OPTISEAL

MODEL CODE OPTIONS AND DESCRIPTIONS

Series		Size	End Connection	Drilling / Schedule	Face to Face	Pressure Rating		Body Material	Disc Material	Stem Material	Seat Material	Stem Seal	Operator Mounting Type	Actuation Type		Optional Feature 1	Optional Feature...		Actuation Option
OPTI	-	0050	W0	P1	00	06	-	D5	D02	S0	F0	00	I	B	-	NP1	TPZ	+	GS-001

SERIES

Code	Description
OPTI	OptiSeal

SIZE

Code	Description
0040	DN 40 / NPS 1½
0050	DN 50 / NPS 2
0065	DN 65 / NPS 2½
0080	DN 80 / NPS 3
0100	DN 100 / NPS 4
0125	DN 125 / NPS 5
0150	DN 150 / NPS 6
0200	DN 200 / NPS 8
0250	DN 250 / NPS 10
0300	DN 300 / NPS 12
0350	DN 350 / NPS 14
0400	DN 400 / NPS 16
0450	DN 450 / NPS 18
0500	DN 500 / NPS 20

END CONNECTION

Code	Description
W0	Wafer
L0	Lugged

DRILLING / SCHEDULE

Code	Description
P1	PN 6
P2	PN 10
P3	PN 16
PB	PN 10 / 16
MH	PN 10 / 16, AS 2129 E
MN	PN 10 / 16, JIS 10
MJ	PN 10, JIS 10
A1	ASME 150
J1	JIS 5K
J3	JIS 10K
B2	BS 10 table E
M1	ASME 150, PN 10/16, BS E, JIS 10
M2	ASME 150, PN 10/16, BS E
MF	ASME 150, PN 10/16, BS E, JIS 5/10
MG	ASME 150, PN 10/16, BS E, JIS 10/16
M9	ASME 150, PN 6/10/16, BS E, JIS 10
ZZ	Special

FACE TO FACE

Code	Description
00	Standard (refer to product literature)

PRESSURE RATING

Code	Description
04	3.5 bar / 50 psi
06	6 bar / 90 psi
10	10 bar / 150 psi
16	16 bar / 230 psi

BODY MATERIAL

Code	Description
D5	Ductile Iron EN-GJS-400-15
DB	Ductile Iron EN-GJS-400-18-U-LT
CJ	Carbon Steel 1.0619 (GP240GH)
I3	Cast Iron EN 1561 EN-GJL-250 (5.1301)
J1	Stainless Steel 1.4408 (GX5CrNiMo 19-11-2)
ZZ	Special

DISC MATERIAL

Code	Description
D02	Ductile Iron - Epoxy
C0T	Steel - PTFE
C0E	Steel - EPDM
S00	Stainless Steel 316
S0M	Stainless Steel 316 - Mirror Polished
S0P	Stainless Steel 316 - Pickled + Passivated
S0S	Stainless Steel 316 - Satin Finish
N00	Nickel Aluminium Bronze
U00	Duplex 2205
H00	Hastelloy C-276
P10	Composite XP 1620

KEYSTONE OPTISEAL

MODEL CODE OPTIONS AND DESCRIPTIONS

Series		Size	End Connection	Drilling / Schedule	Face to Face	Pressure Rating		Body Material	Disc Material	Stem Material	Seat Material	Stem Seal	Operator Mounting Type	Actuation Type		Optional Feature 1	Optional Feature...		Actuation Option
OPTI	-	0050	W0	P1	00	06	-	D5	D02	S0	F0	00	I	B	-	NP1	TPZ	+	GS-001

STEM MATERIAL

Code	Description
S0	Stainless Steel 316
S2	Stainless Steel 431
M1	Monel K500
U0	Stainless Steel Duplex
ZZ	Special

SEAT MATERIAL

Code	Description
F1	FKM - A
E0	EPDM - FG HT
E1	EPDM - FG
E5	EPDM - WA3
E6	EPDM - Metal Reinforced
N0	NBR - FG
N8	NBR - Metal Reinforced
N9	NBR - White
F2	FKM - B
T1	PTFE / EPDM
ZZ	Special

STEM SEAL

Code	Description
00	Standard (Refer to Product Literature)
ZZ	Special

OPERATOR MOUNTING TYPE

Code	Description
I	ISO 5211
K	Keystone

ACTUATION TYPE

Code	Description
B	Bare Stem

OPTIONAL FEATURES

Code	Description
NP1	Additional 316 Stainless Steel Tag
TPZ	Special Hydrostatic Test Report
SFR	Oil and Grease Surface Cleaning (GS-40)
PSL	Silver Paint
CLF	Oxygen Service (per MSS-SP-138)

ADDITIONAL ACTUATION OPTIONS

Code	Description
HS-##	Standard Handle[1]
GS-###	Standard Gear[1]
PS-###	Standard Pneumatic[2]
HZ	Other Handle[3]
GZ	Other Gear Operators[3]
PZ	Other Pneumatic Actuators[3]
EZ	Other Electric Actuators[3]

NOTES

1. Additional characters identify specific handle or gear. For the full list, consult the Handles and Gear Operators Addendum (VCREF-14325).
2. Additional characters identify actuator configuration.
3. Required operator, mounting and accessory part number(s) are specified per order acknowledgement.

NOTE

For the full list of optional features, consult your local Emerson representative.