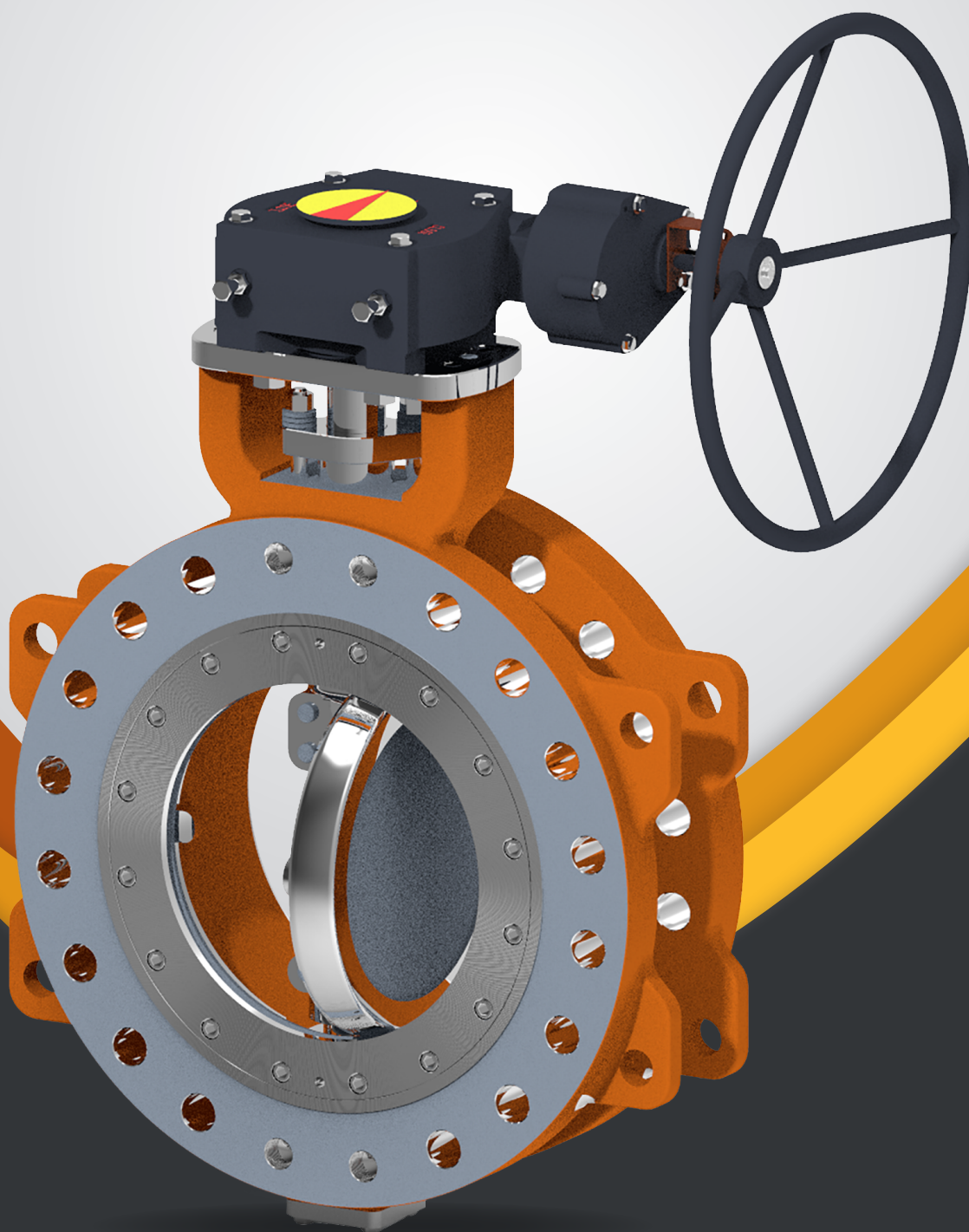




Enriching Lives

HIGH PERFORMANCE BUTTERFLY VALVE

AS PER API 609 SERIES - 2TK, 2TL, 2TN, 2TP, 2TR, 2TS



KIRLOSKAR BROTHERS LIMITED

Established 1888

A Kirloskar Group Company

ABOUT KBL

Kirloskar Brothers Limited (KBL) is a world-class pump manufacturing company with expertise in the engineering and manufacturing of fluid management systems. Established in 1888 and incorporated in 1920, KBL is the mother company of the Kirloskar Group. KBL provides complete fluid management solutions for large infrastructure projects in the areas of water supply, power plants, irrigation, building & construction, oil & gas industry, and marine & defence. KBL manufactures industrial, agriculture and domestic pumps, valves and hydro-turbines.

Over the years, KBL has developed innovative products, which have enabled it to carve a niche globally. It is a global conglomerate and is equipped with the best technologies in the world. It is also India's largest centrifugal pump manufacturer with nine manufacturing facilities in India along with other international subsidiaries and operations in the Netherlands, South Africa, Thailand, the United Kingdom, and the United States of America. KBL has over 16,000 channel partners globally and is supported by best-in-class Pan-India network of authorised service and refurbishment centres.

KBL is the first Indian pump manufacturing company to be certified for Integrated Management System, (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, ISO 50001:2018).

Its factories deploy Total Quality Management tools using the European Foundation for Quality Management (EFQM) model.

Indian subsidiaries and joint ventures

- Kirloskar Ebara Pumps Limited (KEPL) manufactures API, Non-API pumps, and steam turbines.
- Kirloskar Corrocoat Private Limited (KCPL) is the leading solution provider in long-term corrosion protection and energy conversion.

- Karad Projects and Motors Limited (KPML) is a motor manufacturing company with expertise in the manufacture of stampings, stators, rotors, AC rotating machines, aluminium die-cast connecting rods and pump assemblies. It also houses a notable foundry facility specialising in the manufacture of a wide range of carbon steel, alloy steel, stainless steel and cast iron castings for industries such as pumps, valves, turbines, shipping, heavy engineering applications and more.

International, subsidiaries and joint ventures

- SPP Pumps Limited, United Kingdom is a 140-year-old leading pumps manufacturer of centrifugal pumps and associated systems, a global principal in the design, supply and servicing of pumps, renowned fire pump packages and high-quality equipment for a wide range of applications and industry sectors. It is the largest pump manufacturer in the United Kingdom.
- SyncroFlo, Inc., United States of America manufactures pre-assembled pumping systems and provides solutions for HVAC systems, fire protection and turf irrigation.
- Rodelta Pumps International is a Dutch pump manufacturing company that offers products for flood control, irrigation, drinking water, wastewater, pulp & paper, power, chemical, oil & gas and general industries.
- Kirloskar Brothers Thailand Limited (KBTL), Bangkok is the Thailand Board of Investment (BOI) promoted headquarters and assembly plant of the KBL Group companies for the ASEAN and East Asia regions.
- Braybar Pumps (Pty) Limited, Republic of South Africa is engaged in the manufacturing and sales of high-head multi-stage pumps, rubber-lined slurry pumps and metal-lined bearings.

Pumps | Valves | Hydro Turbines | Turnkey Projects

Water Resource Management | Irrigation | Power | Industry | Oil & Gas | Marine & Defence | Building & Construction | Distribution (Small Pumps) | Valves | Customer Service & Spares



Global Headquarter:
"Yamuna", Baner, Pune.



INTRODUCTION & FEATURES

KBL develops and manufactures a variety of valves for regulating and isolating pipeline flow. These products are manufactured using the modern manufacturing processes and high quality assurance systems. These systems ensure products of consistent quality and durable performances products.

KBL's high-performance butterfly valves offer bi-directional, tight shut-off capability, excellent flow characteristics, and long product life. KBL's high performance butterfly valves are suitable for high pressure water, vacuum, steam, oxygen, etc. applications. These valves are suitable for a wide range of industrial applications and are available in a variety of material and seat combinations, as well as in wafer, lug and double flange body styles.

1. ISO TOP FLANGE - Universal mounting dimensions drilled as per ISO 5211 to accommodate direct mounting of various range of actuators and manual operators.

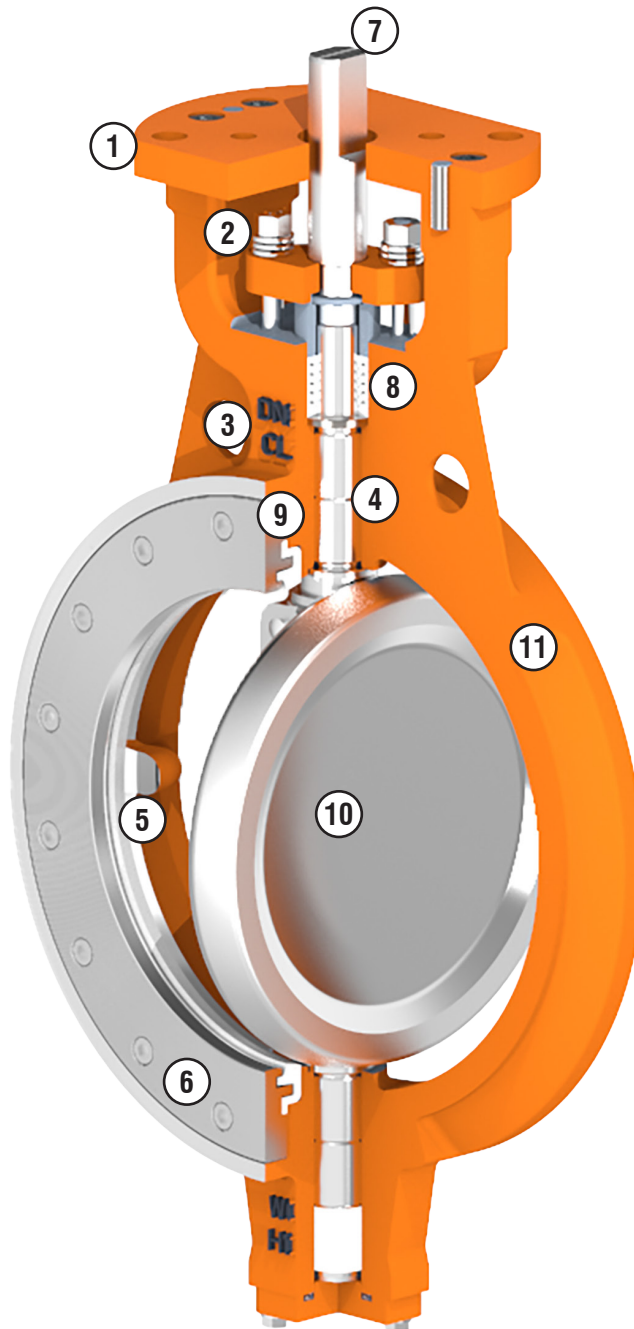
2. LIVE LOADING - Gland flange assembly with Belleville spring washers. Used to reduce the loss of packing stress and ensure continuous compression of packing under normal operating conditions.

3. EXTENDED NECK - The extended neck allows for 2" (50mm) of pipeline insulation and easy access to actuator mounting & stem packing.

4. BEARINGS - Drive side & Non-drive side bearings are made from an advanced composite polymer material with low coefficient of friction and excellent thermal, chemical and wear resistance. The full length ensures maximum stem support.

5. POSITIVE AS CAST DISC STOPPER - is design to prevent seat damage due to over travel of disc.

6. RETAINER RING - Mechanically fastened retainer ring holds and securely supports the seat inside the body. Supplied equivalent to body material. Compatible to standard & spiral wound gasket. Also suitable for bi-directional dead end service at full pressure rating.



7. STEM - High strength 17-4PH / Stainless steel single-piece stem design with excellent corrosion resistance for high torque applications. Designed according to API 609 standards.

8. STEM PACKING - Stem packing design provide positive sealing around the stem with help of PTFE Chevron packing or flexible graphite. Adjustable stem packing provides easy access for nut adjustment removal without dismantling of operator.

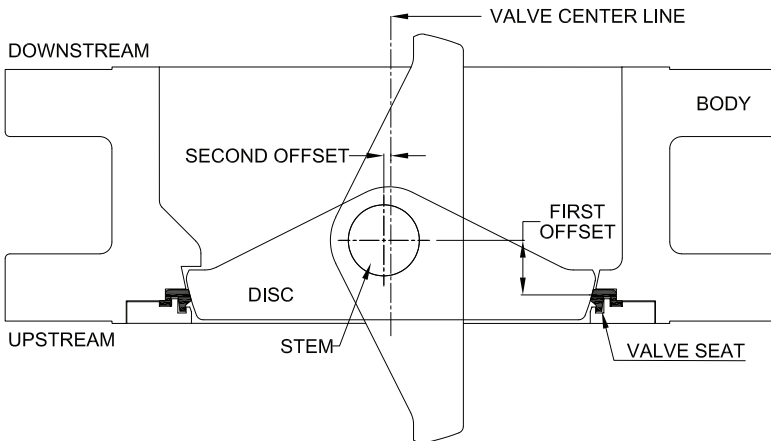
9. SEAT - An advanced self energizing, flexible pressure assisted seal provides positive sealing under low & high pressure requirements in bi-directional operating directions. The seat does not rely on any secondary components to hold it in place. Seat provides low torque, longer life, excellent performances and less maintenance. Easy field replaceable seat.

10. DISC - The disc profile is designed to maximize flow and minimize resistance, ensuring a high flow coefficient (Cv). Discs are designed to withstand higher stress with high pressure applications. The wide spherical edge of the disc provides a larger sealing surface. Special surface coatings such as Stellite overlay are available for critical or severe service conditions.

11. BODY - Robust one-piece unique body design available in wafer/lug/double flange construction. Body complying to requirement of ASME 816.34 and designed to withstand ASME pressure Class 150 and 300.

PRINCIPLES OF OPERATION

DOUBLE OFFSET DISC DESIGN



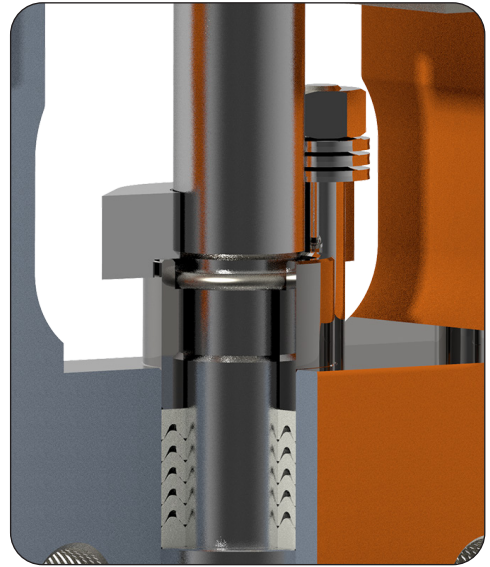
The first offset is achieved by locating the shaft downstream of the valve seat centreline. This allows for a totally unobstructed 360° sealing surface.

The second offset locates the stems off-centre of the vertical axis of the seat.

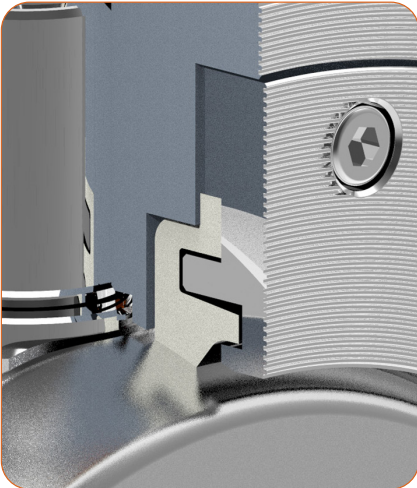
The combination of these two offsets creates a camming effect as the disc swings into and out of the seat. The disc lifts quickly out of the seat in the first few degrees of travel and does not contact the seat again until it is nearly closed. There are no wear points between the seat and disc, while operating torques are reduced and seat life is extended.

BLOW OUT PROOF SHAFT

The KBL, high performance butterfly valve contains a blow-out resistant shaft as a standard. The snap ring reliably prevents the shaft from ejecting. This functionality is achieved by providing a groove in the shaft, a snap ring lock in the groove and covered between the gland and gland flange.



SEAT DESIGN



A) SOFT SEAT DESIGN

Flexible seat design retains its original shape and maintain sealing against the disc profile irrespective of the flow direction.

Low torque, excellent performances, longer service life with less maintenance.



B) FIRE SAFE SEAT DESIGN

The fire safe seat design is designed for applications where fire is a concern and a seat assembly with primary soft seat and secondary metal ring. During and after fire, the primary seat is partially or completely destroyed, & the secondary backup metal seat provides an effective shut-off in both the directions.



C) METAL SEAT DESIGN

Dynamic and flexible metal seat design provides class- IV leakage from both the direction. The mechanical properties & shape of the seat ensures positive sealing against the disc.

STANDARD & COMPLIANCE

DESIGN STANDARD:

API-609 Category-B, BS EN 593, ASME B16.34,

FACE TO FACE STANDARD:

API-609 Category - B, ASME B16.10, BS EN 558,
ISO 5752, MSS SP 68

FLANGE DRILLING STANDARD:

ASME B16.5 (Class 150, Class 300),
MSS SP 44 (Class 150)

TESTING STANDARD:

API 598, BS EN 12266-1, ANSI/FCI 70-2 Class VI,
ISO 5208 & For Metal Seat – ANSI/FCI 70-2 Class IV

FUGITIVE EMISSION (OPTIONAL)

ISO 15848

NACE COMPLIANCE (OPTIONAL)

NACE MR0175/ISO 15156, NACE MR0103/ISO 17945

FIRE SAFE STANDARD:

API 607

BODY STYLE:

Wafer, Lug, Double Flange

NOMINAL SIZE / CLASS RANGE:

Class 150 - DN50 (2") to DN600(24")
Class 300 - DN50 (2") to DN600(24")

MODE OF OPERATION:

Hand Lever / Gear Box / Pneumatic Actuator /
Gear box with Electric Actuator

COMPLIANCE WITH:

Pressure Equipment Directive 2014/68/EU

TEMPERATURE RANGE:

- 29°C to 250°C for Soft Seat & Fire Safe Seat
- 29°C to 538°C for Metal Seat

TYPICAL APPLICATION

VACUUM

Standard valves are rated for tight shut-off to vacuum service down to 1×10^{-3} Hg absolute pressure.

OXYGEN SERVICE

Valves for critical gaseous oxygen applications are specially prepared, cleaned, inspected, assembled, and tested to ensure removal of all burrs, sharp edges, dirt, hydrocarbon oils, greases and other contaminants.

NACE SERVICE

High performance butterfly valves conforming for NACE (MR0175 & MR0103) standard. These valves are suited for oil and gas industry applications requiring resistant material to sulfide stress cracking.

STEAM

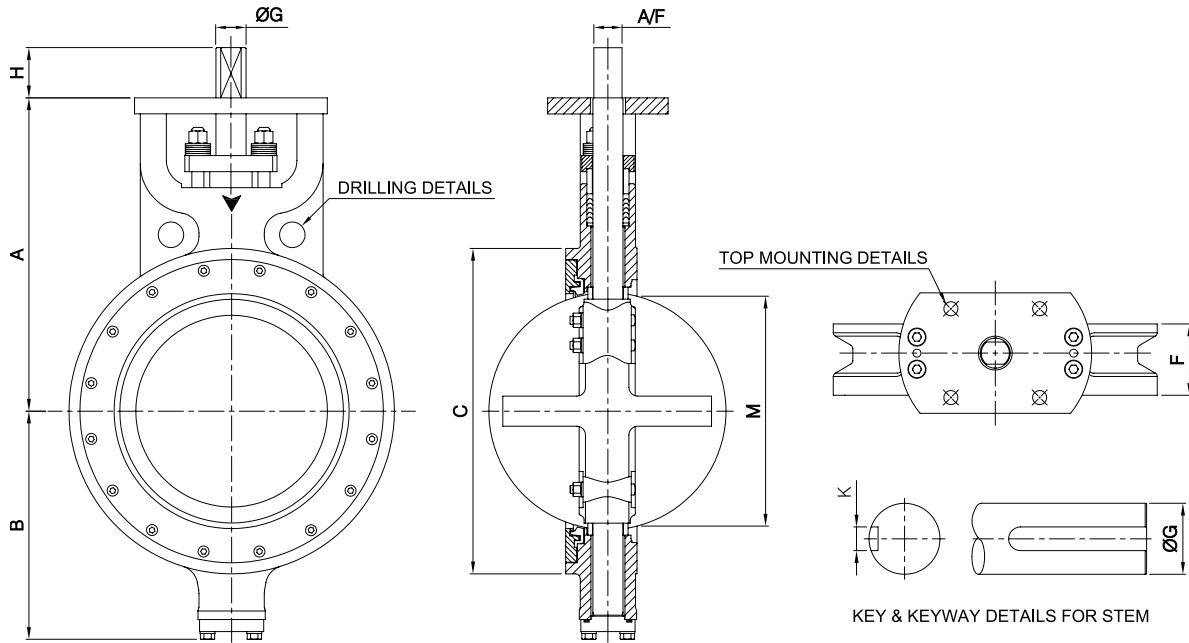
High performance butterfly valves are suitable for saturated steam with ultimate seat as per pressure-temperature chart for ON/OFF application.

APPLICATION SECTOR

High performances butterfly valves are designed for heavy-duty, long service life, maintenance free performance and are the most popular choice for

- Oil and Gas
- Chemical
- Petrochemical
- Power Sector
- Water Sector
- Utilities
- Refrigeration
- Paper and Pulp
- Steam and Vacuum services
- Heating Ventilation and Air Conditioning (HVAC)

DIMENSIONS



SERIES 2TK, ASME CLASS 150, WAFER TYPE

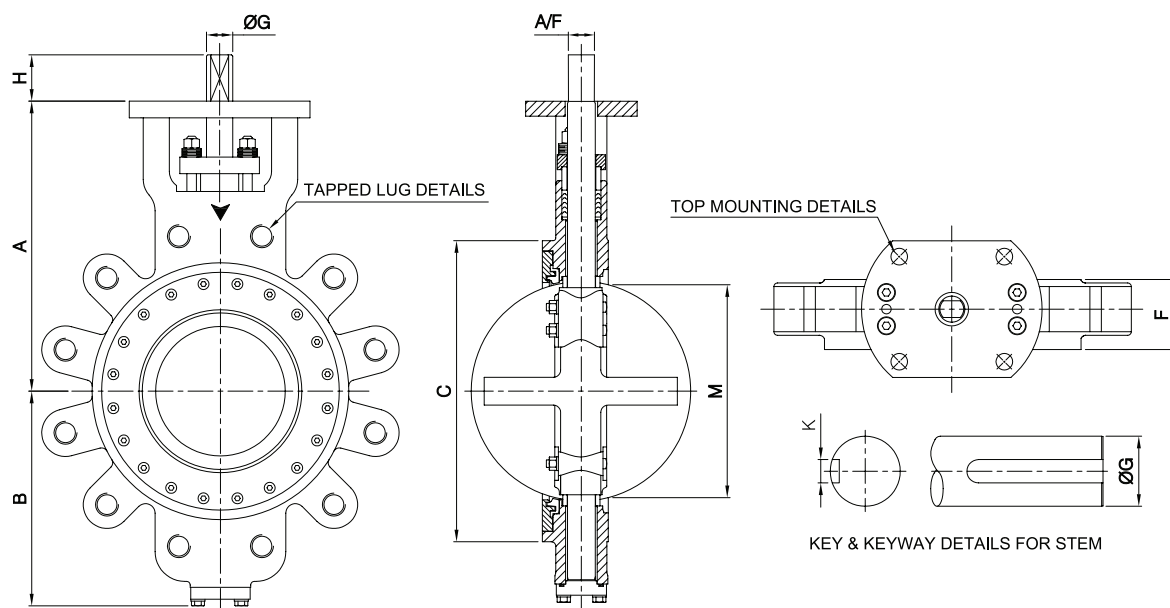
VALVE SIZE		A	B	C	F	ØG	A/F	K	H	M	TOP MOUNTING DETAILS			DRILLING DETAILS					WEIGHT
NPS	DN										PCD	HOLES		PCD	HOLES NOS.	DIA.	TAP NOS.	TAP SIZE	
2	50	163	100	102	43	14	10	--	32	38.0	50/70	4	7/9	120.6	2	3/4	-	-	4.50
2½	65	175	112	120	48	14	10	--	32	53.0	50/70	4	7/9	139.7	2	3/4	-	-	6.10
3	80	178	122	139	48	16	11	--	32	68.1	50/70	4	7/9	152.4	2	3/4	-	-	7.60
4	100	197	148	170	54	16	11	--	32	93.2	50/70	4	7/9	190.5	2	3/4	-	-	10.5
5	125	224	161	186	57	19	13	--	32	110.8	70/125	4	9/13	215.9	2	7/8	-	-	14.1
6	150	226	161	216	57	19	13	--	32	136.5	70/125	4	9/13	241.3	2	7/8	-	-	16.4
8	200	261	199	270	64	22	16	--	32	183.1	70/125	4	9/13	298.4	2	7/8	-	-	22.0
10	250	306	228	324	71	30	22	--	51	232.9	102/125	4	11/13	362.0	2	1	-	-	36.0
12	300	342	265	381	81	35	24	--	51	267.0	102/125	4	11/13	431.8	2	1	-	-	52.8
14	350	390	296	413	92	40	29	--	51	307.7	125/140	4	13/17	476.2	2	1-1/8	-	-	73.3
16	400	430	328	470	102	50	--	14 x 9	62	356.3	140/165	4	17/21	539.8	4	1-1/8	-	-	106
18	450	492	352	534	114	50	--	14 x 9	62	398.1	140/165	4	17/21	577.8	4	1-1/4	-	-	148
20	500	520	382	585	127	50	--	14 x 9	62	446.5	140/165	4	17/21	635.0	-	-	4	1-1/8	180
24	600	614	456	693	154	60	--	18 x 11	110	528.7	165/254	4 / 8	21 / 17	749.3	-	-	4	1-1/4	307

SERIES 2TL, ASME CLASS 300, WAFER TYPE

VALVE SIZE		A	B	C	F	ØG	A/F	K	H	M	TOP MOUNTING DETAILS			DRILLING DETAILS					WEIGHT
NPS	DN										PCD	HOLES		PCD	HOLES NOS.	DIA.	TAP NOS.	TAP SIZE	
2	50	163	100	102	43	14	10	--	32	38.0	50/70	4	7/9	127.0	2	3/4	-	-	4.50
2½	65	175	112	120	48	14	10	--	32	53.0	50/70	4	7/9	149.4	2	7/8	-	-	6.10
3	80	178	122	139	48	16	11	--	32	68.1	50/70	4	7/9	168.1	2	7/8	-	-	7.60
4	100	197	148	170	54	16	11	--	32	93.2	50/70	4	7/9	200.2	2	3/4	-	-	10.5
5	125	224	161	186	57	19	13	--	32	110.8	70/125	4	9/13	235.0	2	7/8	-	-	14.1
6	150	245	181	216	59	22	16	--	32	135.1	70/125	4	9/13	269.7	2	7/8	-	-	17.3
8	200	293	215	270	73	30	22	--	51	178.9	102/125	4	11/13	330.2	2	1	-	-	31.0
10	250	339	247	324	83	35	24	--	51	229.6	102/125	4	11/13	387.4	-	-	4	1	49.2
12	300	372	288	381	92	40	29	--	51	263.1	125/140	4	13/17	450.8	-	-	4	1-1/8	69.9
14	350	445	325	413	117	50	--	14 x 9	62	298.3	140/165	4	17/21	514.4	-	-	4	1-1/8	118
16	400	470	356	470	133	55	--	16 x 10	62	327.6	140/165	4	17/21	571.5	-	-	4	1-1/4	155
18	450	550	404	534	149	60	--	18 x 11	110	386.1	165/254	4 / 8	21/17	628.6	-	-	4	1-1/4	237
20	500	590	435	585	159	60	--	18 x 11	110	435.4	165/254	4 / 8	21/17	685.8	-	-	4	1-1/4	282
24	600	690	510	693	181	80	--	22 x 14	132	521.4	254/298	8	17/21	812.8	-	-	4	1-1/2	460

Note: All dimensions are in mm, weight in kg (approx).

DIMENSIONS



SERIES 2TN, ASME CLASS 150, LUG TYPE

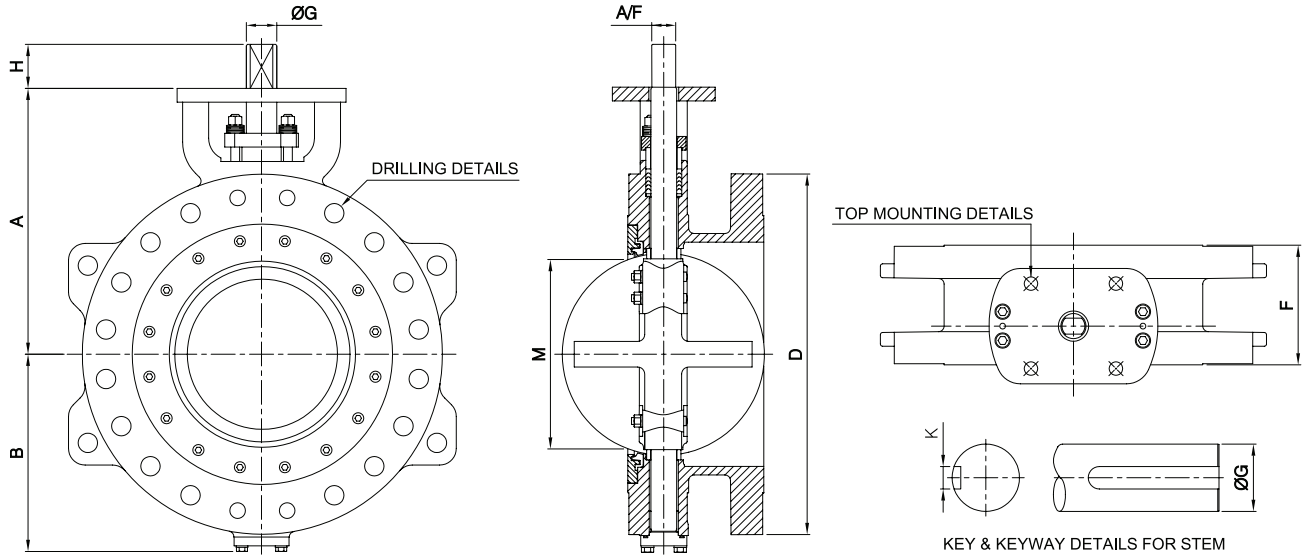
VALVE SIZE		A	B	C	F	ØG	A/F	K	H	M	TOP MOUNTING DETAILS			TAPPED LUG DETAILS			WEIGHT
NPS	DN										PCD	HOLES		PCD	TAP NOS.	TAP SIZE	
												NOS.	DIA.				
2	50	163	100	102	43	14	10	--	32	38.0	50/70	4	7/9	120.6	4	5/8	5.60
2½	65	175	112	120	48	14	10	--	32	53.0	50/70	4	7/9	139.7	4	5/8	6.80
3	80	178	122	137	48	16	11	--	32	68.1	50/70	4	7/9	152.4	4	5/8	8.20
4	100	197	148	170	54	16	11	--	32	93.2	50/70	4	7/9	190.5	8	5/8	13.0
5	125	224	161	186	57	19	13	--	32	110.8	70/125	4	9/13	215.9	8	3/4	18.0
6	150	226	161	216	57	19	13	--	32	136.5	70/125	4	9/13	241.3	8	3/4	20.9
8	200	261	199	270	64	22	16	--	32	183.1	70/125	4	9/13	298.4	8	3/4	28.9
10	250	306	228	324	71	30	22	--	51	232.9	102/125	4	11/13	362.0	12	7/8	45.3
12	300	342	265	381	81	35	24	--	51	267.0	102/125	4	11/13	431.8	12	7/8	64.6
14	350	390	296	413	92	40	29	--	51	307.7	125/140	4	13/17	476.2	12	1	90.2
16	400	430	328	470	102	50	--	14 x 9	62	356.3	140/165	4	17/21	539.8	16	1	128
18	450	492	352	534	114	50	--	14 x 9	62	398.1	140/165	4	17/21	577.8	16	1-1/8	175
20	500	520	382	585	127	50	--	14 x 9	62	446.5	140/165	4	17/21	635.0	20	1-1/8	214
24	600	614	456	693	154	60	--	18 x 11	110	528.7	165/254	4 / 8	21/17	749.3	20	1-1/4	359

SERIES 2TP, ASME CLASS 300, LUG TYPE

VALVE SIZE		A	B	C	F	ØG	A/F	K	H	M	TOP MOUNTING DETAILS			TAPPED LUG DETAILS			WEIGHT
NPS	DN										PCD	HOLES		PCD	TAP NOS.	TAP SIZE	
												NOS.	DIA.				
2	50	163	100	102	43	14	10	--	32	38.0	50/70	4	7/9	127.0	8	5/8	5.10
2½	65	175	112	120	48	14	10	--	32	53.0	50/70	4	7/9	149.4	8	3/4	8.20
3	80	178	122	139	48	16	11	--	32	68.1	50/70	4	7/9	168.1	8	3/4	9.40
4	100	197	148	170	54	16	11	--	32	93.2	50/70	4	7/9	200.2	8	3/4	12.9
5	125	224	161	186	57	19	13	--	32	110.8	70/125	4	9/13	235.0	8	3/4	18.0
6	150	245	181	216	59	22	16	--	32	135.1	70/125	4	9/13	269.7	12	3/4	25.3
8	200	293	215	270	73	30	22	--	51	178.9	102/125	4	11/13	330.2	12	7/8	42.5
10	250	339	247	324	83	35	24	--	51	229.6	102/125	4	11/13	387.4	16	1	64.1
12	300	372	288	381	92	40	29	--	51	263.1	125/140	4	13/17	450.8	16	1-1/8	91.4
14	350	445	325	413	117	50	--	14 x 9	62	298.3	140/165	4	17/21	514.4	20	1-1/8	151
16	400	470	356	470	133	55	--	16 x 10	62	327.6	140/165	4	17/21	571.5	20	1-1/4	205
18	450	550	404	534	149	60	--	18 x 11	110	386.1	165/254	4 / 8	21/17	628.6	24	1-1/4	302
20	500	590	435	585	159	60	--	18 x 11	110	435.4	165/254	4 / 8	21/17	685.8	24	1-1/4	350
24	600	690	510	693	181	80	--	22 x 14	132	521.4	254/298	8	17/21	812.8	24	1-1/2	572

Note: All dimensions are in mm, weight in kg (approx).

DIMENSIONS



SERIES 2TR, ASME CLASS 150, DOUBLE FLANGE TYPE (SHORT PATTERN)

VALVE SIZE											TOP MOUNTING DETAILS			DRILLING DETAILS					WEIGHT
NPS	DN	A	B	D	F	ØG	A/F	K	H	M	PCD	HOLES		PCD	TOTAL HOLES	DIA.	TAP NOS.	TAP SIZE	
												NOS.	DIA.						
3	80	178	122	190	114	16	11	--	32	52.2	50/70	4	7/9	152.4	4	3/4	-	-	14.0
4	100	197	148	229	127	16	11	--	32	80.7	50/70	4	7/9	190.5	8	3/4	-	-	19.2
5	125	224	161	254	140	19	13	--	32	98.8	70/125	4	9/13	215.9	8	7/8	4	3/4	26.5
6	150	226	161	279	140	19	13	--	32	126.9	70/125	4	9/13	241.3	8	7/8	4	3/4	31.8
8	200	261	199	343	152	22	16	--	32	173.7	70/125	4	9/13	298.4	8	7/8	-	-	49.4
10	250	306	228	406	165	30	22	--	51	224.8	102/125	4	11/13	362.0	12	1	4	7/8	70.0
12	300	342	265	483	178	35	24	--	51	257.5	102/125	4	11/13	431.8	12	1	4	7/8	102
14	350	390	296	533	190	40	29	--	51	295.5	125/140	4	13/17	476.2	12	1-1/8	4	1	139
16	400	430	328	597	216	50	--	14 x 9	62	345.7	140/165	4	17/21	539.8	16	1-1/8	4	1	192
18	450	492	352	635	222	50	--	14 x 9	62	388.8	140/165	4	17/21	577.8	16	1-1/4	4	1-1/8	225
20	500	520	382	693	229	50	--	14 x 9	62	438.2	140/165	4	17/21	635.0	20	1-1/4	4	1-1/8	279
24	600	614	456	813	267	60	--	18 x 11	110	525.1	165/254	4 / 8	21/ 17	749.3	20	1-3/8	4	1-1/4	455

SERIES 2TS, ASME CLASS 300, DOUBLE FLANGE TYPE (SHORT PATTERN)

VALVE SIZE											TOP MOUNTING DETAILS				DRILLING DETAILS					WEIGHT
NPS	DN	A	B	D	F	ØG	A/F	K	H	M	PCD	HOLES		PCD	TOTAL HOLES	DIA.	TAP NOS.	TAP SIZE		
												NOS.	DIA.							
3	80	178	122	210	114	16	11	--	32	52.2	50/70	4	7/9	168.1	8	7/8	-	-	17.0	
4	100	197	148	254	127	16	11	--	32	80.7	50/70	4	7/9	200.2	8	7/8	-	-	26.8	
5	125	224	161	279	140	19	13	--	32	98.8	70/125	4	9/13	235.0	8	7/8	4	3/4	36.5	
6	150	245	181	318	140	22	16	--	32	127.0	70/125	4	9/13	269.7	12	7/8	4	3/4	47.6	
8	200	293	215	381	152	30	22	--	51	171.4	102/125	4	11/13	330.2	12	1	4	7/8	75.8	
10	250	339	247	444	165	35	24	--	51	220.0	102/125	4	11/13	387.4	16	1-1/8	4	1	111	
12	300	372	288	521	178	40	29	--	51	254.5	125/140	4	13/17	450.8	16	1-1/4	4	1-1/8	158	
14	350	445	325	584	190	50	--	14 x 9	62	288.2	140/165	4	17/21	514.4	20	1-1/4	4	1-1/8	233	
16	400	470	356	648	216	55	--	16 x 10	62	321.9	140/165	4	17/21	571.5	20	1-3/8	4	1-1/4	314	
18	450	550	404	711	222	60	--	18 x 11	110	377.5	165/254	4 / 8	21/17	628.6	24	1-3/8	4	1-1/4	412	
20	500	590	435	775	229	60	--	18 x 11	110	423.6	165/254	4 / 8	21/ 17	685.8	24	1-3/8	4	1-1/4	500	
24	600	690	510	914	267	80	--	22 x 14	132	515.1	254/298	8	17/ 21	812.8	24	1-5/8	4	1-1/2	797	

Note: All dimensions are in mm, weight in kg (approx).

VALVE TORQUE – (Nm)

CLASS 150

VALVE SIZE		SEAT TYPE		
NPS	DN	SOFT SEAT	FIRE SAFE SEAT	METAL SEAT
2	50	24	33	50
2½	65	32	49	74
3	80	39	75	90
4	100	60	121	145
5	125	82	165	198
6	150	120	244	293
8	200	225	378	454
10	250	330	711	853
12	300	472	1031	1237
14	350	850	1215	1458
16	400	1078	1514	1817
18	450	1450	2050	2460
20	500	1923	3340	4008
24	600	3064	4313	5176

CLASS 300

VALVE SIZE		SEAT TYPE		
NPS	DN	SOFT SEAT	FIRE SAFE SEAT	METAL SEAT
2	50	30	53	74
2½	65	42	71	89
3	80	63	82	107
4	100	100	155	186
5	125	168	218	262
6	150	270	357	428
8	200	542	640	768
10	250	780	992	1190
12	300	1167	1974	2369
14	350	2231	2516	3019
16	400	2564	2890	3468
18	450	3602	5583	6700
20	500	4806	7359	8831
24	600	8126	11252	13502

The published torque values are according to the preferred flow direction (Retainer ring side).

For non-preferred flow direction torque values of soft seat, multiply preferred values by 1.20.

For non-preferred flow direction torque values of fire safe seat and metal seat, multiply preferred values by 1.25.

The published torque values does not include the safety factor. For severe applications, an additional safety factor is required, for dry gas or slurry (1.5); clean service (liquid, steam, clean gas and non abrasive) (1.25); High temperature (1.5); low temperature (1.25); and other liquids and slurries, please contact KBL R&D valve department.

VALVE FLOW DATA – Cv VALUES (USGPM)

VALVE FLOW DATA FOR CLASS 150

VALVE SIZE		ANGLE OF DISC OPENING (DEGREE)								
NPS	DN	10°	20°	30°	40°	50°	60°	70°	80°	90°
2	50	1	4	7	11	17	23	28	31	33
2½	65	2	7	12	20	31	42	50	56	60
3	80	7	18	33	53	83	111	134	149	159
4	100	16	43	82	130	206	274	332	369	394
5	125	23	61	114	183	289	384	464	518	552
6	150	45	121	227	363	574	763	922	1028	1096
8	200	96	257	483	773	1223	1626	1964	2189	2334
10	250	165	442	829	1326	2100	2791	3371	3758	4007
12	300	220	587	1102	1763	2791	3709	4480	4994	5325
14	350	281	750	1407	2250	3563	4735	5720	6375	6798
16	400	386	1032	1935	3096	4901	6514	7869	8770	9352
18	450	486	1297	2434	3893	6164	8192	9897	11030	11762
20	500	631	1685	3161	5057	8008	10642	12856	14329	15279
24	600	904	2413	4527	7242	11467	15239	18409	20518	21879

VALVE FLOW DATA FOR CLASS 300

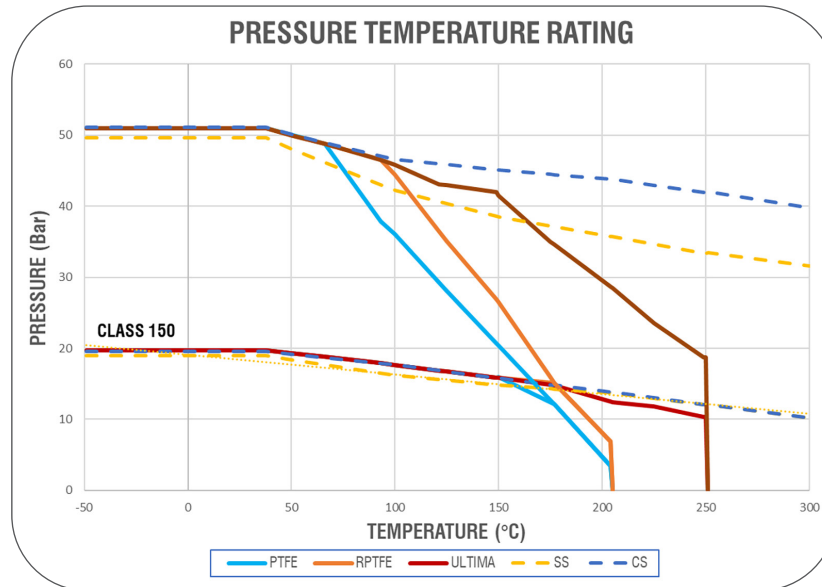
VALVE SIZE		ANGLE OF DISC OPENING (DEGREE)								
NPS	DN	10°	20°	30°	40°	50°	60°	70°	80°	90°
2	50	1	4	7	11	17	23	28	31	33
2½	65	2	7	12	20	31	42	50	56	60
3	80	7	18	33	53	83	111	134	149	159
4	100	16	43	82	130	206	274	332	369	394
5	125	23	61	114	183	289	384	464	518	552
6	150	46	122	228	365	578	768	928	1034	1103
8	200	79	212	397	635	1006	1337	1615	1800	1919
10	250	145	389	729	1166	1846	2454	2964	3304	3523
12	300	196	524	984	1574	2492	3312	4001	4459	4755
14	350	237	632	1185	1896	3002	3989	4819	5371	5727
16	400	297	794	1489	2382	3771	5012	6055	6748	7196
18	450	411	1097	2058	3292	5213	6928	8369	9328	9947
20	500	553	1477	2771	4434	7020	9330	11271	12562	13395
24	600	802	2141	4015	6424	10171	13517	16329	18200	19407

The Cv (US gallons per minute) values represents the flow of 16°C water through a 100% fully open valve at pressure drop is 1 PSI. The metric equivalent, Kv is the flow of water at 16°C through the valve in cubic meters/hour at a pressure drop of 1 kg/cm².

To convert Cv to Kv, multiply Cv by 0.857.

PRESSURE/TEMPERATURE RATINGS FOR MATERIALS

As temperature increases, the pressure retaining capability of materials decreases. Below graph illustrates pressure-temperature rating for class 150 and 300. Seat ratings are based on differential pressure with the disc in fully closed condition. Mentioned below graph of carbon steel (CS) and stainless steel (SS) valve body are in compliances with ASME B16.34.



Ratings shown in the above graphs are conservative guide for general service. Please consult R&D-Valve office for specific recommendations.

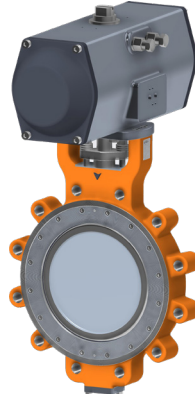
ULTIMA Seat

The special fluorocarbon-based polymer, rated for 250°C at 19.6 bar. Excellent for handling aggressive fluids at high pressure. The ultima seat has excellent thermal stability and chemical compatibility, and is ideal for hot gases and steam applications. Ultima seats offer longer service life.

OPERATORS



Depending on the torque, the valves can be equipped with a Hand-Lever for manual operation. The spring loaded rigid handle with notch plate allows the valve to be placed at angular stops between the fully open and fully closed positions. Pad locking arrangement may be provided to prevent unauthorized operations.



All valves can be mounted with Pneumatic actuator and various automation accessories for fully on-off or modulating control.

Manual override can be providing as per requirement for manual operation.

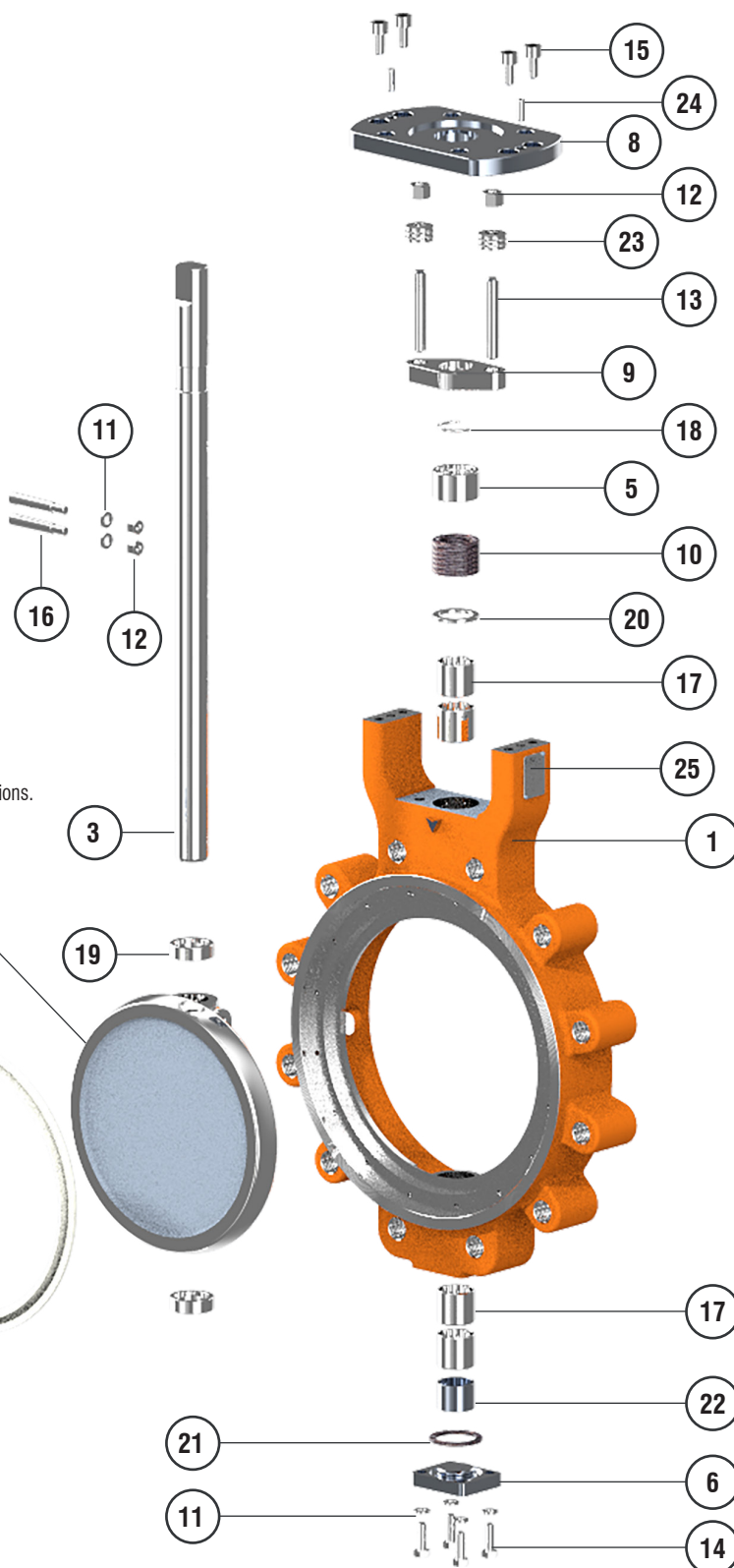


Valves can be directly mounted with gearbox for manual operation and also used for electric actuator.

EXPLODED VIEW & MATERIAL OF CONSTRUCTION

PART NO.	PART NAME	SOFT SEAT	FIRE SAFE SEAT	METAL SEAT
1	BODY	ASTM A216 - WCB/WCC, ASTM A352 - LCC/LCB, ASTM A351 - CF8/CF8M/CF3/CF3M		
2	DISC	ASTM A216-WCB + OVERLAY ASTM A351-CF8M/CF8/CF3/CF3M,		
3	STEM	ASTM A564 TYPE 630 (17-4-PH), ASTM A479 - 316 SH2, ASTM A479 - 410 CON. 2,		
4	SEAT**	PTFE, RPTFE, ULTIMA	SS316+ULTIMA, INCONEL + ULTIMA	SS316, INCONEL 625
5	GLAND	CARBON STEEL, STAINLESS STEEL		
6	NON DRIVE END COVER	CARBON STEEL, STAINLESS STEEL		
7	RETAINER RING	CARBON STEEL, STAINLESS STEEL		
8	ISO TOP PLATE	CARBON STEEL, STAINLESS STEEL		
9	GLAND FLANGE	CARBON STEEL, STAINLESS STEEL		
10	STEM PACKING**	PTFE	GRAPHITE	
11	SPRING WASHER	SPRING STEEL		
12	HEX NUT	ASTM A194 - 2H/2HM/8/8M/7,		
13	STUD	ASTM A193 - B7/B7M/B8 CL.2/B8M CL.2, ASTM A320 - L7, ISO 3506-1 A2-70/A4-70		
14	HEX SCREW			
15	SOCKET HEAD CAP SCREW			
16	TAPER PIN**	ASTM A564 TYPE 630 (17-4-PH) / Same shaft material		
17	BEARING**	SS Backed PTFE, BRG-X	SS+HT Kev	
18	SNAP RING**	ASTM A313 - 302		
19	DISC SPACER	ASTM A479 – 316/316L		
20	SUPPORT PACKING RING	ASTM A479 – 316/316L		
21	NDE GASKET**	PTFE/GRAPHITE	GRAPHITE	
22	SPACER	PTFE	ASTM A479 - 316	
23	DISC SPRING**	SPRING STEEL		
24	DOWEL PIN	ASTM A479 – 316, ASTM A564 TYPE 630 (17-4-PH)		
25	NAME PLATE & SCREW	STAINLESS STEEL		

Note: 1. Other materials available upon request.
2. Gland packing & NDE cover gasket can be changed according to various applications.
3. ** Recommended spare.
4. Stem and Seat material may vary suitable to pressure-temperature rating.



ORDERING INFORMATION

SERIES	VALVE SIZE	MATERIAL				DRILLING STANDARD	OPERATOR	SPECIAL	ADDITIONAL REQUIREMENT
		BODY	DISC	SEAT	STEM				
2TN	08	01	05	4	1	1	G	0	00

Example:

To order 8" Class 150, Lug type with WCB body, CF8M Disc, Ultima Seat, 17-4 PH stem, drilling as per ASME B16.5, Gearbox operator with no special requirement, enter code "2TN-08-01-05-4-1-1-G-0-00"

SERIES	VALVE SIZE	BODY	DISC
2TK - Class 150, Wafer	02 - DN50 (2")	01 - WCB	01 - WCB
2TL - Class 300, Wafer	2X - DN65 (2½")	02 - WCC	05 - CF8M
2TN - Class 150, Lug	03 - DN80 (3")	03 - LCC	06 - CF8
2TP - Class 300, Lug	04 - DN100 (4")	04 - LCB	07 - CF3
2TR - Class 150, Flange (Short)	05 - DN125 (5")	05 - CF8M	08 - CF3M
2TS - Class 300, Flange (Short)	06 - DN150 (6")	06 - CF8	09 - CD3MN (4A)
	08 - DN200 (8")	07 - CF3	10 - CE3MN (5A)
	10 - DN250 (10")	08 - CF3M	11 - CD3MWCuN (6A)
	12 - DN300 (12")	09 - CD3MN (4A)	12 - CG3M
	14 - DN350 (14")	10 - CE3MN (5A)	14 - WCB + Weld Overlay
	16 - DN400 (16")	11 - CD3MWCuN (6A)	
	18 - DN450 (18")	12 - CG3M	
	20 - DN500 (20")	13 - CN7M	
	24 - DN600 (24")		
SEAT*	STEM*	DRILLING STANDARD	SPECIAL
1 - PTFE	1 - 17-4PH	1 - ASME B16.5	0 - Standard
2 - RPTFE (CFT)	2 - SS316 SH		
3 - RPTFE (GFT)	3 - SS410 CON.2		
4 - ULTIMA	4 - SS431	OPERATOR	
5 - SS316 + ULTIMA	5 - F53	B - Bare	
6 - INCONEL + ULTIMA	6 - F55	L - Hand Lever	
7 - SS316	7 - INCONEL 725	E - Electric Actuator	
8 - INCONEL 625	8 - NO5500 (Monel K500)	G - Gear Box with Hand Wheel	
	9 - INCONEL 718	H - Gear Box with Electric Actuator	
		P - Pneumatic Actuator	
			ADDITIONAL REQUIREMENTS
			00 - No Any Requirement
			02 - With Companion flange
			05 - With Companion flange + Fasteners
			09 - With Companion flange + Fasteners + Spiral Wound Gasket
			10 - Locking arrangement

Note:

1. Additional materials available upon request.
2. Material for sour environment, NACE MR0175 or NACE MR0103, available upon request.
3. *Stem and Seat material may vary suitable to pressure temperature rating

WARRANTY AND LIMITATION OF LIABILITY

Kirloskar Brothers Limited warrants that its products shipped to its initial purchaser will be free of all defects in material and workmanship for a period of one year from the date of delivery.

Should any failure to conform to this warranty appear before the one year delivery period, and the product[s] stored, installed and maintained in accordance with published Kirloskar Brothers Ltd. literature recommendations, and standard industry practice, Kirloskar Brothers Limited. will replace the product as per purchase agreement.

Kirloskar Brothers Ltd. shall not be liable for consequential damages to loss of other equipment or property, loss of profits or revenue, except the price of the Kirloskar Brothers Ltd. goods, which this liability is based.

The customer is expected to check the received goods upon arrival at its premises. Any evident damage to the product or severe damage to its packaging that could affect the functionality of the received item should be reported immediately and no later than 10 days after delivery, possibly with pictures, to sales@kbl.co.in.

* It is the end user's responsibility to confirm that items intended for use satisfy local codes and standards.

NOTES

NOTES



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