



TECHNICAL BULLETIN

Flowserve TX2 Butterfly Valves

Triple Offset

FCD DVENTB0400-00



Experience In Motion

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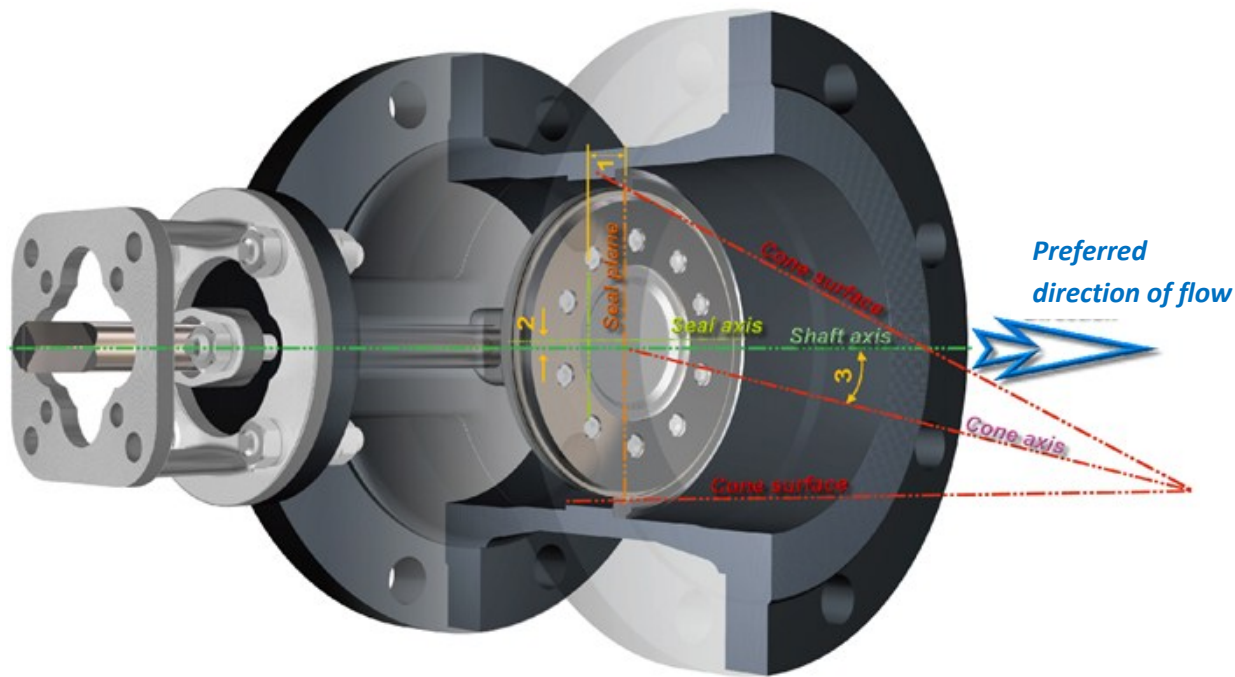
All dimensions shown within this technical bulletin are approximate values and for illustration purposes only. For exact dimensions, please request certified dimensional drawings from the factory

Theory of Operation

The valve design is based on a double eccentric geometry of the disc rotating center, utilizing a floating radius machined seal ring, in conjunction with an inclined cone seating surface of body. This design makes the disc cam back and away from body seat, eliminating wear between the seat and seal ring. It also compensates for deviations of the geometry caused by temperature or tolerance changes. (Fig. 1)

The disc seal of valve deflects from its regularly circular shape to an elliptic form when it reaches the closed position. This matches the inclined cone of body seat geometry, creating the sealing between disc seal and body seat. Dimension changes due to temperature fluctuations cause the seal ring to adjust its seating position within the inclined cone geometry, thus maintaining a positive seal as usual.

Due to the unique conical surface of the valve, there is a “preferred” and “non-preferred” flow direction. The preferred flow direction would be with the shaft upstream and the direction is marked on the body with a directional arrow. The shaft side is referred to as the high pressure side of the valve.



General Ordering Information

Valve size* Inch (mm)	
3	(80)
4	(100)
6	(150)
8	(200)
10	(250)
12	(300)
14	(350)
16	(400)
18	(450)
20	(500)
24	(600)
26	(650)
28	(700)
30	(750)
32	(800)
34	(850)
36	(900)
40	(1000)
44	(1100)
48	(1200)

Type	
TX2	Standard
TX2C	Cryogenic

End Connection	
F	Flange (short)
G	Flange (long)
L	Lug
W	Water

Pressure Class ***	
1	ASME Cl 150
3	ASME Cl 300
6	ASME Cl 600
9	ASME Cl 900

Body Material	Disc Material	Shaft Material			
8	A216 Gr. WCB	8	WCB	1	17-4 PH
A	WCC	A	WCC	N	Inconel
H	LCB	H	LCB	F	Duplex SS 2205
C	LCC	C	LCC	M	Super Duplex SS 2507
E	LC9	E	LC9	3	Monel
F	CA15	F	CA15	S	316 (de-rated)**
K	WC6	K	WC6	6	Hastalloy C
9	CF8	9	CF8	2	Alloy 20
Q	CF3	Q	CF3	R	Nitronic 50
1	A351 Gr. CF8M (316SS)	1	CF8M	7	Titanium
L	CF3M	L	CF3M	Q	316 Ti
G	CG8M	G	CG8M	Z	A 182 Gr F6a
J	CG3M	J	CG3M		
N	Inconel	N	Inconel		
O	Duplex SS CD4MCuN	O	Duplex SS CD4MCuN		
M	Super Dupl. SS CE3MN	M	Super Dupl. SS CE3MN		
3	Monel	3	Monel		
6	Hastelloy C	6	Hastelloy C		
2	Alloy 20	2	Alloy 20		
7	Titanium	7	Titanium		
Q	316 Ti	Q	316 Ti		

Options	
N	NACE MRO 175
O	O ₂ cleaned
C	Cl ₂ cleaned

Operator	
1	Enclosed gear
9	Bare stem

Body Seat Surface	
B	316SS / Stellite #21
N	Stellite #21
X	None
C	A240 Gr 316
M	Super Duplex SS
T	Ti2 + Ti5
D	13 Cr

Disc Seat	
A	Lam. 304 SS & Graphite
B	Lam. 304L SS & Graphite
C	Lam. 316 SS & Graphite
D	Lam. 316L SS & Graphite
E	Lam. 317 SS & Graphite
F	Lam. 317L SS & Graphite
W	Laminated Inconel & Graphite
H	Lam. Duplex UNS 32205 & Graphite
S	Lam. Super Duplex UNS 2507 & Graphite
J	Lam. Monel & Graphite
K	Lam. Hastalloy & Graphite
P	Lam. Alloy 20 & Graphite
9	304 SS
Q	304L SS
1	A240 Gr. 316 SS
L	316L SS
R	317 SS
V	317L SS
N	Inconel
Y	Duplex SS 2205
M	Super Duplex SS 2205
3	Monel
6	Hastelloy
2	Alloy 20
U	A182 Gr. F6a

Shaft Seal	
1	Single PTFE
2	Double PTFE
3	Live-loaded single PTFE
4	Live-loaded double PTFE
5	Single composite graphite
6	Double composite graphite
7	Single composite graphite live-loaded
8	Double composite graphite live-loaded

Note: The Smart Code shall use the Imperial units.
 For example: 8-TX2-L-6-A-1-1-1-A-N-1
 shall designate a: • 8" (200mm) (8) • TX2 triple offset butterfly valve (TX2) • lug style (L) • ASME Class 600 (6) • WCC body (A) • CF8M disc (1) • shaft in 17-4 PH (1) • single PTFE shaft seal (1) • laminated 304 SS & Graphite seat (A) • Stellite #21 disc coating (N) • enclosed gear (1).
 * For valves larger than 48" please contact factory.

Torque Values

30% safety factor included

TX2 CLASS 150

Differential Pressure			6.25 bar (90 psi)				12.5 bar (180psi)				25 bar (360 psi)			
DN	DN	Shaft position	CLOSE		OPEN		CLOSE		OPEN		CLOSE		OPEN	
(mm)	(In)		Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb
80	3	Upstream	79	58	79	58	79	58	79	58	79	58	89	66
80	3	Downstream	79	58	95	70	79	58	95	70	100	74	120	89
100	4	Upstream	108	80	108	80	108	80	108	80	108	80	132	97
100	4	Downstream	108	80	129	95	108	80	129	95	149	110	179	132
150	6	Upstream	187	138	187	138	187	138	187	138	187	138	236	174
150	6	Downstream	187	138	224	165	187	138	224	165	285	210	343	253
200	8	Upstream	205	151	205	151	205	151	205	151	205	151	338	250
200	8	Downstream	205	151	246	182	205	151	246	182	380	280	456	336
250	10	Upstream	380	280	380	280	380	280	380	280	380	280	600	443
250	10	Downstream	380	280	456	336	380	280	456	336	691	510	829	611
300	12	Upstream	541	399	541	399	541	399	541	399	541	399	898	662
300	12	Downstream	541	399	649	479	541	399	649	479	1030	760	1237	912
350	14	Upstream	654	483	654	483	654	483	666	491	654	483	1223	902
350	14	Downstream	654	483	785	579	688	507	826	609	1375	1014	1650	1217
400	16	Upstream	862	636	862	636	862	636	909	670	862	636	1679	1239
400	16	Downstream	862	636	1034	763	943	696	1132	835	1886	1391	2263	1669
450	18	Upstream	1097	809	1097	809	1097	809	1198	884	1097	809	2226	1642
450	18	Downstream	1097	809	1316	971	1247	920	1497	1104	2495	1840	2994	2208
500	20	Upstream	1192	879	1192	879	1192	879	1396	1030	1192	879	2622	1934
500	20	Downstream	1192	879	1430	1054	1464	1080	1757	1296	2927	2159	3513	2591
600	24	Upstream	1730	1276	1730	1276	1730	1276	2305	1700	1730	1276	4365	3219
600	24	Downstream	1730	1276	2075	1531	2406	1774	2886	2129	4811	3549	5774	4258
650	26	Upstream	3003	2215	3003	2215	3003	2215	4310	3179	3003	2215	8314	6132
650	26	Downstream	3003	2215	3604	2658	4605	3396	5526	4075	9210	6793	11051	8151
700	28	Upstream	4366	3220	4366	3220	4366	3220	7634	5631	4366	3220	14711	10850
700	28	Downstream	4366	3220	5240	3865	7950	5864	9541	7037	15901	11728	19082	14074
750	30	Upstream	5007	3693	5580	4116	5007	3693	10470	7722	5007	3693	20249	14935
750	30	Downstream	5390	3976	6468	4771	10781	7951	12937	9542	21561	15902	25873	19083
800	32	Upstream	5775	4260	5898	4350	5775	4260	11106	8191	5775	4260	21520	15872
800	32	Downstream	5785	4267	6942	5120	11570	8533	13884	10240	23140	17067	27768	20481
900	36	Upstream	8506	6273	8506	6273	8506	6273	14947	11024	8506	6273	29055	21430
900	36	Downstream	8506	6273	10207	7528	15809	11660	18971	13992	31618	23320	37942	27984
1000	40	Upstream	11185	8250	11185	8250	11185	8250	19627	14476	11185	8250	37986	28017
1000	40	Downstream	11185	8250	13422	9900	20596	15191	24715	18229	41193	30382	49431	36458
1050	42	Upstream	12419	9160	13174	9717	12419	9160	25081	18499	12419	9160	48980	36125
1050	42	Downstream	13149	9698	15779	11638	26297	19396	31557	23275	52595	38792	63114	46551
1100	44	Upstream	13630	10053	14459	10664	13630	10053	27526	20302	13630	10053	53755	39648
1100	44	Downstream	14431	10644	17317	12772	28861	21287	34634	25545	57724	42575	69268	51090
1200	48	Upstream	19425	14327	19425	14327	19425	14327	31177	22995	19425	14327	60045	44287
1200	48	Downstream	19425	14327	23310	17192	32753	24157	39304	28989	65506	48315	78607	57978

Torque Values

30% safety factor included

TX2 CLASS 300

Differential Pressure			12.5 bar (180psi)				25 bar (360 psi)				50 bar (725 psi)			
DN (mm)	DN (In)	Shaft position	CLOSE		OPEN		CLOSE		OPEN		CLOSE		OPEN	
			Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb
80	3	Upstream	134	99	134	99	134	99	134	99	134	99	154	114
80	3	Downstream	134	99	161	119	134	99	161	119	176	130	212	156
100	4	Upstream	188	139	188	139	188	139	188	139	188	139	236	174
100	4	Downstream	188	139	226	167	188	139	226	167	272	201	326	240
150	6	Upstream	358	264	358	264	356	263	358	264	358	264	533	393
150	6	Downstream	358	264	429	316	356	263	429	316	599	442	719	530
200	8	Upstream	420	310	420	310	420	310	486	358	420	310	842	621
200	8	Downstream	420	310	504	372	441	325	529	390	882	650	1058	781
250	10	Upstream	775	572	775	572	775	572	775	572	775	572	1379	1017
250	10	Downstream	775	572	930	686	775	572	930	686	1521	1122	1826	1346
300	12	Upstream	1097	809	1097	809	1097	809	1121	827	1097	809	2030	1497
300	12	Downstream	1097	809	1317	971	1128	832	1354	998	2256	1664	2707	1997
350	14	Upstream	1324	977	1324	977	1324	977	1445	1066	1324	977	2626	1937
350	14	Downstream	1324	977	1589	1172	1447	1067	1736	1280	2894	2134	3473	2561
400	16	Upstream	1749	1290	1749	1290	1749	1290	2434	1796	1749	1290	4490	3312
400	16	Downstream	1749	1290	2098	1548	2406	1775	2887	2129	4813	3550	5775	4260
450	18	Upstream	2216	1634	2216	1634	2216	1634	2784	2053	2216	1634	5124	3779
450	18	Downstream	2216	1634	2659	1961	2784	2053	3340	2463	5567	4106	6681	4927
500	20	Upstream	2399	1770	2399	1770	2399	1770	3588	2646	2399	1770	6662	4913
500	20	Downstream	2399	1770	2879	2124	3554	2621	4264	3145	7107	5242	8529	6291
600	24	Upstream	3459	2551	3459	2551	3459	2551	5464	4030	3459	2551	10257	7565
600	24	Downstream	3459	2551	4151	3062	5484	4045	6582	4854	10969	8090	13162	9708
650	26	Upstream	5803	4280	5803	4280	5803	4280	9171	6764	5803	4280	17160	12657
650	26	Downstream	5803	4280	6963	5136	9153	6751	10984	8101	15045	11097	18053	13315
700	28	Upstream	6730	4964	6730	4964	6730	4964	10636	7845	6730	4964	20172	14878
700	28	Downstream	6730	4964	8076	5957	10615	7829	12739	9396	21232	15660	25478	18792
750	30	Upstream	12425	9164	12425	9164	12425	9164	18681	13778	12425	9164	35752	26369
750	30	Downstream	12425	9164	14909	10996	19556	14424	23467	17308	39112	28847	46934	34617
800	32	Upstream	12425	9164	12425	9164	12425	9164	19581	14442	12425	9164	37242	27468
800	32	Downstream	12425	9164	14909	10996	20146	14859	24175	17831	40292	29718	48350	35661
900	36	Upstream	20605	15197	20605	15197	20604	15197	30373	22402	20604	15197	58114	42863
900	36	Downstream	20605	15197	24725	18236	31862	23500	38234	28200	63724	47000	76469	56401

Torque Values

30% safety factor included

TX2 CLASS 600

Differential Pressure			27.5 bar (400 psi)				55 bar (800 psi)				110 bar (1600 psi)			
DN (mm)	DN (In)	Shaft position	CLOSE		OPEN		CLOSE		OPEN		CLOSE		OPEN	
			Nm	ft-lb	Nm	ft-lb	Nm	ft-lb		ft-lb	Nm	ft-lb	Nm	ft-lb
80	3	Upstream	214	158	214	214	214	214	214	214	214	214	324	214
80	3	Downstream	214	158	256	214	214	214	256	214	380	214	456	214
100	4	Upstream	382	282	382	382	382	382	409	382	382	382	719	382
100	4	Downstream	382	282	458	382	387	382	464	382	774	382	929	382
150	6	Upstream	700	516	700	700	700	700	934	700	700	700	1691	700
150	6	Downstream	700	516	840	700	898	700	1077	700	1795	700	2154	700
200	8	Upstream	1333	983	1333	1333	1333	1333	1355	1333	1333	1333	2467	1333
200	8	Downstream	1333	983	1599	1333	1378	1333	1654	1333	2758	1333	3309	1333
250	10	Upstream	2142	1580	2142	2142	2142	2142	2266	2142	2142	2142	4234	2142
250	10	Downstream	2142	1580	2571	2142	2397	2142	2876	2142	4793	2142	5752	2142
300	12	Upstream	2775	2047	2775	2775	2775	2775	3300	2775	2775	2775	6169	2775
300	12	Downstream	2775	2047	3330	2775	3424	2775	4109	2775	6847	2775	8217	2775
350	14	Upstream	3622	2672	3622	3622	3622	3622	3953	3622	3622	3622	7371	3622
350	14	Downstream	3622	2672	4346	3622	4142	3622	4971	3622	8285	3622	9942	3622
400	16	Upstream	3990	2943	3990	3990	3990	3990	5699	3990	3990	3990	10724	3990
400	16	Downstream	3990	2943	4789	3990	5822	3990	6987	3990	11645	3990	13974	3990
450	18	Upstream	6339	4676	6339	6339	6339	6339	10582	6339	6339	6339	19346	6339
450	18	Downstream	6339	4676	7607	6339	10030	6339	12037	6339	20061	6339	24073	6339
500	20	Upstream	8448	6231	8448	8448	8448	8448	13634	8448	8448	8448	25023	8448
500	20	Downstream	8448	6231	10138	8448	13079	8448	15695	8448	26159	8448	31390	8448
600	24	Upstream	8931	6587	11536	8931	8931	8931	19298	8931	8931	8931	34822	8931
600	24	Downstream	8931	6587	11536	8931	17310	8931	20773	8931	34621	8931	41545	8931

Flow Coefficients

Cv Flow Coefficient

DN		ASME Class150										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
80	3	0	3	8	15	24	36	50	65	82	97	100
100	4	0	6	17	34	54	80	112	143	180	213	220
150	6	0	21	62	121	193	285	400	511	642	759	785
200	8	0	52	157	305	488	720	1010	1290	1620	1915	1980
250	10	0	67	204	396	633	935	1311	1674	2103	2486	2570
300	12	0	104	313	608	974	1436	2015	2573	3232	3820	3950
350	14	0	139	420	816	1305	1925	2701	3450	4332	5121	5295
400	16	0	181	546	1061	1698	2505	3515	4489	5637	6664	6890
450	18	0	220	690	1340	2200	3345	4660	6200	7760	8898	9200
500	20	0	244	750	1460	2340	3800	5545	7616	9860	11306	11690
600	24	0	307	927	1801	2881	4600	7340	10800	14690	17072	17950
700	28	0	440	1220	2420	4110	6160	9390	14450	20100	26631	28000
750	30	0	642	1568	2994	5204	8413	12976	19748	27306	30500	31500
800	32	0	680	1662	3172	5514	8912	13746	20922	28928	34240	36000
900	36	0	788	2043	3924	7221	11451	17885	26682	38300	42610	44800
1000	40	0	1350	2750	5200	8900	14500	21900	29700	40015	55069	57900
1050	42	0	1200	2900	5600	9200	15000	23200	35500	50000	61800	65000
1100	44	0	1302	3145	6074	9978	16269	25163	38504	54231	67029	70500
1200	48	0	1505	3636	7022	11535	18808	29089	44512	62692	77488	81500

DN		ASME Class 300										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
80	3	0	3	8	15	25	36	51	65	82	97	100
100	4	0	6	17	33	53	78	110	140	176	208	215
150	6	0	20	60	117	187	276	388	495	622	735	760
200	8	0	33	100	194	311	459	644	822	1033	1221	1262
250	10	0	63	189	367	587	867	1216	1553	1950	2305	2383
300	12	0	94	284	551	882	1302	1790	2332	2950	3462	3580
350	14	0	126	381	739	1183	1745	2448	3127	3927	4642	4800
400	16	0	153	425	843	1432	2146	3272	4196	5269	6229	6440
450	18	0	169	511	992	1587	2342	3285	5035	7004	8206	8537
500	20	0	206	570	1131	1921	2980	4580	6753	9392	11006	11450
600	24	0	297	824	1635	2776	4161	6346	9761	13578	15908	16550
700	28	0	381	988	1898	3492	6000	9460	14320	20000	23550	24500
750	30	0	429	1111	2135	3929	6700	11100	17300	23800	28900	30300
800	32	0	500	1400	2700	4900	7800	12100	18600	26500	30900	32100
900	36	0	610	1580	3400	6400	11100	17600	26800	35100	40800	42500

DN		ASME Class 600										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
100	4	0	2	6	14	25	45	78	123	181	200	205
150	6	0	8	23	51	90	166	284	450	663	733	750
200	8	0	16	40	81	146	241	380	588	928	1055	1080
250	10	0	25	63	127	229	380	598	926	1461	1660	1700
300	12	0	37	95	191	345	572	900	1394	2200	2500	2560
350	14	0	40	120	290	510	880	1460	2530	3670	3980	4080
400	16	0	100	230	410	720	1220	2040	3330	4800	5310	5400
450	18	0	140	322	575	1009	1710	2860	4668	6729	7444	7570
500	20	0	183	421	751	1319	2234	3763	6099	8791	9725	9890
600	24	0	277	638	1137	1997	3384	5659	9238	13316	14730	14980

Kv Flow Coefficient

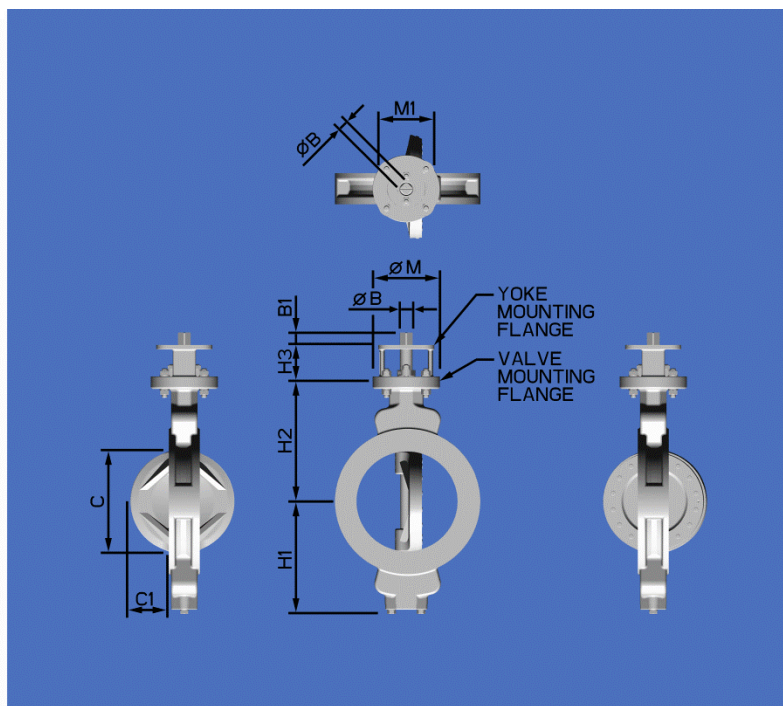
DN		ASME Class 150										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
80	3	0	3	7	13	21	31	43	56	71	83	86
100	4	0	5	15	29	46	69	96	123	155	183	189
150	6	0	18	53	104	166	245	344	440	552	653	675
200	8	0	45	135	262	420	619	869	1110	1394	1648	1704
250	10	0	58	176	341	545	804	1128	1440	1809	2139	2211
300	12	0	89	269	523	838	1235	1734	2214	2781	3287	3398
350	14	0	120	361	702	1123	1656	2324	2968	3727	4406	4556
400	16	0	156	470	913	1461	2155	3024	3862	4850	5733	5928
450	18	0	189	594	1153	1893	2878	4009	5334	6676	7656	7915
500	20	0	210	645	1256	2013	3269	4771	6553	8483	9727	10058
600	24	0	264	798	1550	2479	3958	6315	9292	12639	14688	15444
700	28	0	379	1050	2082	3536	5300	8079	12432	17293	22912	24090
750	30	0	552	1349	2576	4477	7238	11164	16990	23493	26241	27101
800	32	0	585	1430	2729	4744	7668	11827	18001	24889	29459	30973
900	36	0	678	1758	3376	6213	9852	15388	22956	32952	36660	38544
1000	40	0	1161	2366	4474	7657	12475	18842	25553	34427	47379	49815
1050	42	0	1032	2495	4818	7915	12905	19960	30543	43018	53170	55924
1100	44	0	1120	2706	5226	8585	13997	21649	33127	46658	57669	60656
1200	48	0	1295	3128	6041	9924	16182	25027	38296	53938	66668	70120

DN		ASME Class 300										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
80	3	0	3	7	13	22	31	44	56	71	83	86
100	4	0	5	15	28	46	67	95	120	151	179	185
150	6	0	17	52	101	161	237	334	426	535	632	654
200	8	0	28	86	167	268	395	554	707	889	1051	1086
250	10	0	54	163	316	505	746	1046	1336	1678	1983	2050
300	12	0	81	244	474	759	1120	1540	2006	2538	2979	3080
350	14	0	108	328	636	1018	1501	2106	2690	3379	3994	4130
400	16	0	132	366	725	1232	1847	2815	3610	4533	5359	5541
450	18	0	145	440	853	1365	2015	2826	4332	6026	7060	7345
500	20	0	177	490	973	1653	2564	3940	5810	8081	9469	9851
600	24	0	256	709	1407	2388	3580	5460	8398	11682	13687	14239
700	28	0	328	850	1633	3004	5162	8139	12320	17207	20262	21079
750	30	0	369	956	1837	3380	5764	9550	14884	20477	24864	26069
800	32	0	430	1205	2323	4216	6711	10410	16003	22800	26585	27618
900	36	0	525	1359	2925	5506	9550	15142	23058	30199	35103	36565

DN		ASME Class 600										
(mm)	(inch)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
100	4	0	2	5	12	22	39	67	106	156	172	176
150	6	0	7	20	44	77	143	244	387	570	631	645
200	8	0	14	34	70	126	207	327	506	798	908	929
250	10	0	22	54	109	197	327	514	797	1257	1428	1463
300	12	0	32	82	164	297	492	774	1199	1893	2151	2203
350	14	0	34	103	250	439	757	1256	2177	3158	3424	3510
400	16	0	86	198	353	619	1050	1755	2865	4130	4569	4646
450	18	0	120	277	495	868	1471	2461	4016	5789	6405	6513
500	20	0	157	362	646	1135	1922	3238	5247	7563	8367	8509
600	24	0	277	638	1137	1997	3384	5659	9238	13316	14730	14980

Dimensions-Wafer Valves

All dimensions are in mm.



Wafer Class 150

SIZE		Face to Face	Dimensions					Mounting flange (ISO 5211)				Shaft end			
								Valve		Yoke					
mm	Inch	L	H1	H2	H3	C	C1	Type	ØM	Type	M1	ØB	B1	Key	B*
80	3	47	137	145	60	52	12	F07	90	F07/F05	70	14	18	-	11
100	4	53	140	155	60	79	23	F07	90	F07/F05	70	14	18	-	11
150	6	56	177	200	70	129	42	F10	125	F10/F07	102	18	24	-	14
200	8	63	204	225	70	174	65	F10	125	F10/F07	102	25	28	-	19
250	10	69	252	270	80	220	85	F12	150	F12/F10	125	28	28	-	22
300	12	79	281	300	100	262	100	F14	175	F14/F12	140	35	37	-	27
350	14	79 / 92	317	355	100	318	124	F14	175	F14/F12	140	41.7	55	12*8	-
400	16	102	351	385	120	359	141	F16	210	F16/F14	165	44.7	55	12*8	-
450	18	114	376	415	120	404	161	F16	210	F16/F14	165	49.7	65	16*10	-
500	20	127	411	455	120	441	169	F16	210	F16/F14	165	54.7	65	16*10	-
600	24	154	476	540	150	537	207	F25	300	F16	300	64.7	80	18*12	-
600	24	154	476	540	150	537	207	F25	300	F25	300	64.7	80	18*12	-
650	26	165	479	543	150	578	229	F25	300	F25	300	69.7	110	18*12	-
700	28	165	534	590	150	636	247	F25	300	F25	300	74.7	110	20*12	-
750	30	190	574	620	150	664	258	F25	300	F25	300	79.5	110	24*16	-
800	32	190	598	655	150	713	281	F25	300	F25	300	89.5	110	25*14	-
900	36	203	641	695	150	816	327	F30	350	F30	350	99.3	150	28*16	-
1000	40	216	720	820	180	898	365	F35	415	F35	415	104.3	180	28*16	-
1050	42	216	755	840	180	952	394	F35	415	F35	415	114.3	180	32*18	-
1100	44	216	755	880	180	952	394	F35	415	F35	415	114.3	180	32*18	-
1200	48	254	814	930	180	1110	448	F35	415	F35	415	119.3	180	32*18	-

*Note: Cl. 150 valves 300mm (12") and smaller have square stem

Valves 24" and smaller have face-to-face dimensions per API 609 Category B Lug and Wafer Class 150

Valves 26" and larger have face-to-face dimensions per ISO 5752 Table 5 short

Wafer Class 300														
SIZE		Face to Face	Dimensions					Mounting flange (ISO 5211)				Shaft end		
								Valve		Yoke				
mm	inch	L	H1	H2	H3	C	C1	Type	ØM	Type	M1	ØB	B1	Key
80	3	48	137	145	60	59	16	F07	90	F07/F05	70	15.9	30	5*5
100	4	54	174	167	70	72	20	F10	125	F10/F07	102	18.9	30	6*6
150	6	61	204	210	70	124	40	F10	125	F10/F07	102	24.85	45	8*8
200	8	75	239	240	80	169	58	F12	150	F12/F10	125	31.85	55	8*8
250	10	83	272	310	100	221	80	F14	175	F14/F12	140	37.7	60	10*8
300	12	94	312	335	120	258	97	F16	210	F16/F14	165	44.7	80	12*8
350	14	117	352	368	120	295	94	F16	210	F16/F14	165	49.7	80	16*10
400	16	133	385	410	120	344	125	F16	210	F16/F14	165	59.7	80	18*12
450	18	149	406	450	120	386	138	F16	210	F16/F14	165	64.7	90	18*12
500	20	159	451	485	150	412	140	F25	300	F25	300	74.7	110	20*12
550	22	181	476	515	150	462	130	F25	300	F25	300	79.5	110	24*16
600	24	181	518	568	150	522	191	F30	350	F30	350	79.5	120	24*16
650	26	210	550	568	150	555	202	F30	350	F30	350	99.3	150	28*16
700	28	229	583	686	180	592	211	F35	415	F35	415	104.3	180	28*16
750	30	230	635	735	180	643	234	F35	415	F35	415	114.3	180	32*18
800	32	241	677	768	200	689	250	F40	475	F40	475	119.3	200	32*18
900	36	241	709	780	200	772	294	F40	475	F40	475	134.3	200	36*20

Valves 24" and smaller have face-to-face dimensions per API 609 Category B Lug and Wafer Class 300

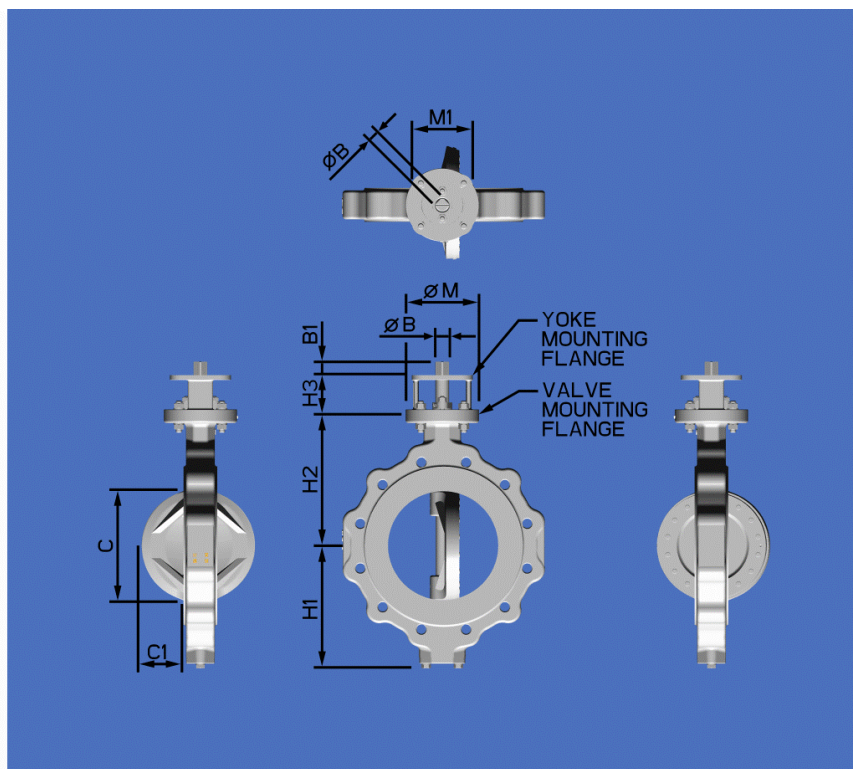
Valves 26" and larger have face-to-face dimensions per ISO 5752 Table 5 long

Wafer Class 600														
SIZE		Face to Face	Dimensions					Mounting flange (ISO 5211)				Shaft end		
								Valve		Yoke				
mm	inch	L	H1	H2	H3	C	C1	Type	ØM	Type	M1	ØB	B1	Key
100	4	64	181	200	80	69	17	F12	150	F12/F10	125	27.85	55	8*8
150	6	78	246	240	100	123	35	F14	175	F14/F12	140	31.85	65	8*8
200	8	102	259	310	120	153	42	F16	210	F16/F14	165	41.7	70	12*8
250	10	117	306	355	120	202	60	F16	210	F16/F14	165	44.7	80	12*8
300	12	140	341	405	150	244	72	F25	300	F25	300	59.7	110	18*12
350	14	155	375	450	150	277	80	F30	350	F30	350	69.7	110	18*12
400	16	178	409	495	180	324	99	F35	415	F35	415	79.5	150	24*16
450	18	200	446	520	180	369	114	F35	415	F35	415	89.5	180	25*14
500	20	216	489	581	200	411	107	F40	475	F40	475	99.3	180	28*16
600	24	232	566	620	200	503	166	F40	475	F40	475	119.3	200	32*18

Valves have face-to-face dimensions per API 609 Category B Lug and Wafer Class 600

Dimensions-Lug Valves

All dimensions are in mm.



Lug Class 150

SIZE		Face to Face L	Dimensions					Mounting range (ISO F211)				Shaft end			
mm	inch		H1	H2	H3	C	C1	Valve		Yoke		ØB	B1	Key	B*
								Type	ØM	Type	M1				
80	3	47	137	145	60	52	12	F07	90	F07/F05	70	14	18	-	11
100	4	53	140	155	60	79	23	F07	90	F07/F05	70	14	18	-	11
150	6	56	177	200	70	129	42	F10	125	F10/F07	102	18	24	-	14
200	8	63	204	225	70	174	65	F10	125	F10/F07	102	25	28	-	19
250	10	69	252	270	80	220	85	F12	150	F12/F10	125	28	28	-	22
300	12	79	281	300	100	262	100	F14	175	F14/F12	140	35	37	-	27
350	14	79 / 92	317	355	100	318	124	F14	175	F14/F12	140	41.7	55	12*8	-
400	16	102	351	385	120	359	141	F16	210	F16/F14	165	44.7	55	12*8	-
450	18	114	376	415	120	404	161	F16	210	F16/F14	165	49.7	65	16*10	-
500	20	127	411	455	120	441	169	F16	210	F16/F14	165	54.7	65	16*10	-
600	24	154	476	540	150	537	207	F25	300	F16	300	64.7	80	18*12	-
600	24	154	476	540	150	537	207	F25	300	F25	300	64.7	80	18*12	-
650	26	165	479	543	150	578	229	F25	300	F25	300	69.7	110	18*12	-
700	28	165	534	590	150	636	247	F25	300	F25	300	74.7	110	20*12	-
750	30	190	574	620	150	664	258	F25	300	F25	300	79.5	110	24*16	-
800	32	190	598	655	150	713	281	F25	300	F25	300	89.5	110	25*14	-
900	36	203	641	695	150	816	327	F30	350	F30	350	99.3	150	28*16	-
1000	40	216	720	820	180	898	365	F35	415	F35	415	104.3	180	28*16	-
1050	42	216	755	840	180	952	394	F35	415	F35	415	114.3	180	32*18	-
1100	44	216	755	880	180	952	394	F35	415	F35	415	114.3	180	32*18	-
1200	48	254	814	930	180	1110	448	F35	415	F35	415	119.3	180	32*18	-

*Note: Cl. 150 valves 300mm (12") and smaller have square stem

Valves 24" and smaller have face-to-face dimensions per API 609 Category B Lug and Wafer Class 150

Valves 26" and larger have face-to-face dimensions per ISO 5752 Table 5 short

Lug Class 300

SIZE		Face to Face L	Dimensions					Mounting range (ISO F311)				Shaft end		
								Valve		Yoke				
mm	inch	L	H1	H2	H3	C	C1	Type	ØM	Type	M1	ØB	B1	Key
80	3	48	137	145	60	59	16	F07	90	F07/F05	70	15.9	30	5*5
100	4	54	174	167	70	72	20	F10	125	F10/F07	102	18.9	30	6*6
150	6	61	204	210	70	124	40	F10	125	F10/F07	102	24.85	45	8*8
200	8	75	239	240	80	169	58	F12	150	F12/F10	125	31.85	55	8*8
250	10	83	272	310	100	221	80	F14	175	F14/F12	140	37.7	60	10*8
300	12	92	312	335	120	258	97	F16	210	F16/F14	165	44.7	80	12*8
350	14	117	352	368	120	295	94	F16	210	F16/F14	165	49.7	80	16*10
400	16	133	385	410	120	344	125	F16	210	F16/F14	165	59.7	80	18*12
450	18	149	406	450	120	386	138	F16	210	F16/F14	165	64.7	90	18*12
500	20	159	451	485	150	412	140	F25	300	F25	300	74.7	110	20*12
550	22	181	476	515	150	462	130	F25	300	F25	300	79.5	110	24*16
600	24	181	518	568	150	522	191	F30	350	F30	350	79.5	120	24*16
650	26	210	550	568	150	555	202	F30	350	F30	350	99.3	150	28*16
700	28	229	583	686	180	592	211	F35	415	F35	415	104.3	180	28*16
750	30	230	635	735	180	643	234	F35	415	F35	415	114.3	180	32*18
800	32	241	677	768	200	689	250	F40	475	F40	475	119.3	200	32*18
900	36	241	709	780	200	772	294	F40	475	F40	475	134.3	200	36*20

Valves 24" and smaller have face-to-face dimensions per API 609 Category B Lug and Wafer Class 300

Valves 26" and larger have face-to-face dimensions per ISO 5752 Table 5 long

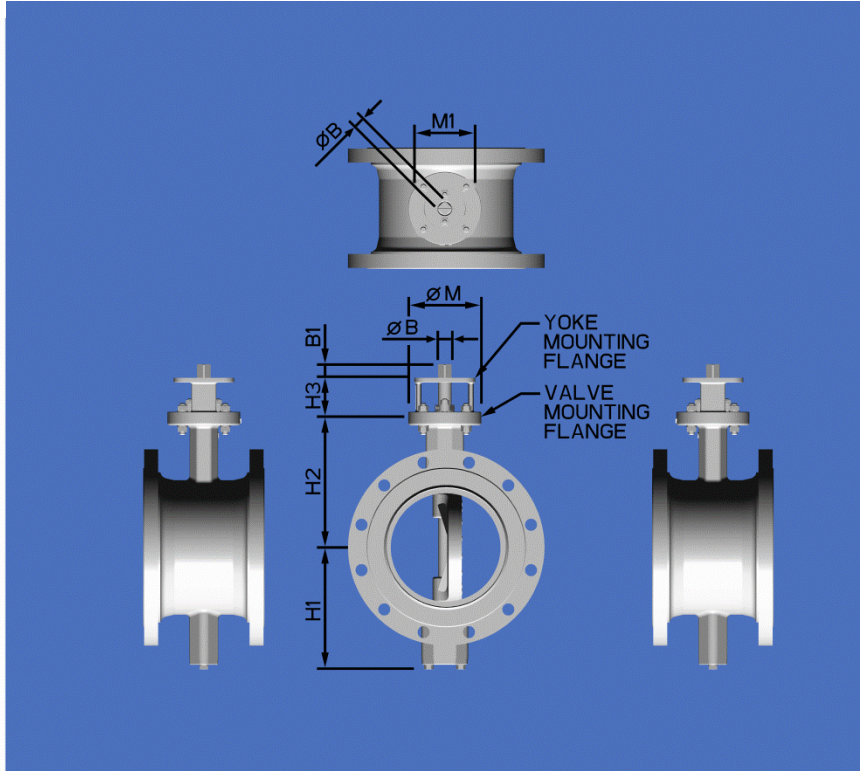
Lug Class 600

SIZE		Face to Face L	Dimensions					Mounting range (ISO F311)				Shaft end		
								Valve		Yoke				
mm	inch	L	H1	H2	H3	C	C1	Type	ØM	Type	M1	ØB	B1	Key
100	4	64	181	200	80	69	17	F12	150	F12/F10	125	27.85	55	8*8
150	6	78	246	240	100	123	35	F14	175	F14/F12	140	31.85	65	8*8
200	8	102	259	310	120	153	42	F16	210	F16/F14	165	41.7	70	12*8
250	10	117	306	355	120	202	60	F16	210	F16/F14	165	44.7	80	12*8
300	12	140	341	405	150	244	72	F25	300	F25	300	59.7	110	18*12
350	14	155	375	450	150	277	80	F30	350	F30	350	69.7	110	18*12
400	16	178	409	495	180	324	99	F35	415	F35	415	79.5	150	24*16
450	18	200	446	520	180	369	114	F35	415	F35	415	89.5	180	25*14
500	20	216	489	581	200	411	107	F40	475	F40	475	99.3	180	28*16
600	24	232	566	620	200	503	166	F40	475	F40	475	119.3	200	32*18

Valves have face-to-face dimensions per API 609 Category B Lug and Wafer Class 600

Dimensions-Flanged Valves

All dimensions are in mm.



Flanged Class 150 (End Connection F)

SIZE		Face to Face	Dimensions			Mounting flange (ISO 5211)				Shaft end			
						Valve		Yoke					
mm	inch	L	H1	H2	H3	Type	$\varnothing M$	Type	M1	$\varnothing B$	B1	Key	$\square B$
80	3	114	137	145	60	F07	90	F07/F05	70	14	18	-	11
100	4	127	140	155	60	F07	90	F07/F05	70	14	18	-	11
150	6	140	177	200	70	F10	125	F10/F07	102	18	24	-	14
200	8	152	204	225	70	F10	125	F10/F07	102	25	28	-	19
250	10	165	252	270	80	F12	150	F12/F10	125	28	28	-	22
300	12	178	281	300	100	F14	175	F14/F12	140	35	37	-	27
350	14	190	317	355	100	F14	175	F14/F12	140	41.7	55	12*8	-
400	16	216	351	385	120	F16	210	F16/F14	165	44.7	55	12*8	-
450	18	222	376	415	120	F16	210	F16/F14	165	49.7	65	16*10	-
500	20	229	411	455	120	F16	210	F16/F14	165	54.7	65	16*10	-
600	24	267	476	540	150	F25	300	F16	300	64.7	80	18*12	-
600	24	267	476	540	150	F25	300	F25	300	64.7	80	18*12	-
650	26	292	479	543	150	F25	300	F25	300	69.7	110	18*12	-
700	28	292	534	590	150	F25	300	F25	300	74.7	110	20*12	-
750	30	318	574	620	150	F25	300	F25	300	79.5	110	24*16	-
800	32	318	598	655	150	F25	300	F25	300	89.5	110	25*14	-
900	36	330	641	695	150	F30	350	F30	350	99.3	150	28*16	-
1000	40	410	720	820	180	F35	415	F35	415	104.3	180	28*16	-
1050	42	410	740	850	180	F35	415	F35	415	114.3	180	32*18	-
1100	44	470	755	880	180	F35	415	F35	415	114.3	180	32*18	-
1200	48	470	814	990	180	F35	415	F35	415	119.3	180	32*18	-

*Note: Cl. 150 valves 300mm (12") and smaller have square stem

Valves 48" and smaller have face-to-face dimensions per API 609 Category B Double Flanged (Short Pattern) Class 150c

Flanged Class 300 (End connection G)

SIZE		Face to Face	Dimensions			Mounting flange (ISO 5211)				Shaft end		
						Valve		Yoke				
mm	inch	L	H1	H2	H3	Type	ØM	Type	M1	ØB	B1	Key
80	3	180	137	145	60	F07	90	F07/F05	70	15.9	30	5*5
100	4	190	174	167	70	F10	125	F10/F07	102	18.9	30	6*6
150	6	210	204	210	70	F10	125	F10/F07	102	24.85	45	8*8
200	8	230	239	240	80	F12	150	F12/F10	125	31.85	55	8*8
250	10	250	272	310	100	F14	175	F14/F12	140	37.7	60	10*8
300	12	270	312	335	120	F16	210	F16/F14	165	44.7	80	12*8
350	14	290	352	368	120	F16	210	F16/F14	165	49.7	80	16*10
400	16	310	385	410	120	F16	210	F16/F14	165	59.7	80	18*12
450	18	330	406	450	120	F16	210	F16/F14	165	64.7	90	18*12
500	20	350	451	485	150	F25	300	F25	300	74.7	110	20*12
600	24	390	518	568	180	F30	350	F30	350	79.5	120	24*16
650	26	410	552	660	150	F30	350	F30	350	99.3	150	28*16
700	28	430	583	690	180	F35	415	F35	415	104.3	180	28*16
750	30	450	635	735	180	F35	415	F35	415	114.3	180	32*18
800	32	470	690	750	200	F40	475	F40	475	119.3	200	32*18
900	36	510	709	780	200	F40	475	F40	475	134.3	200	36*20

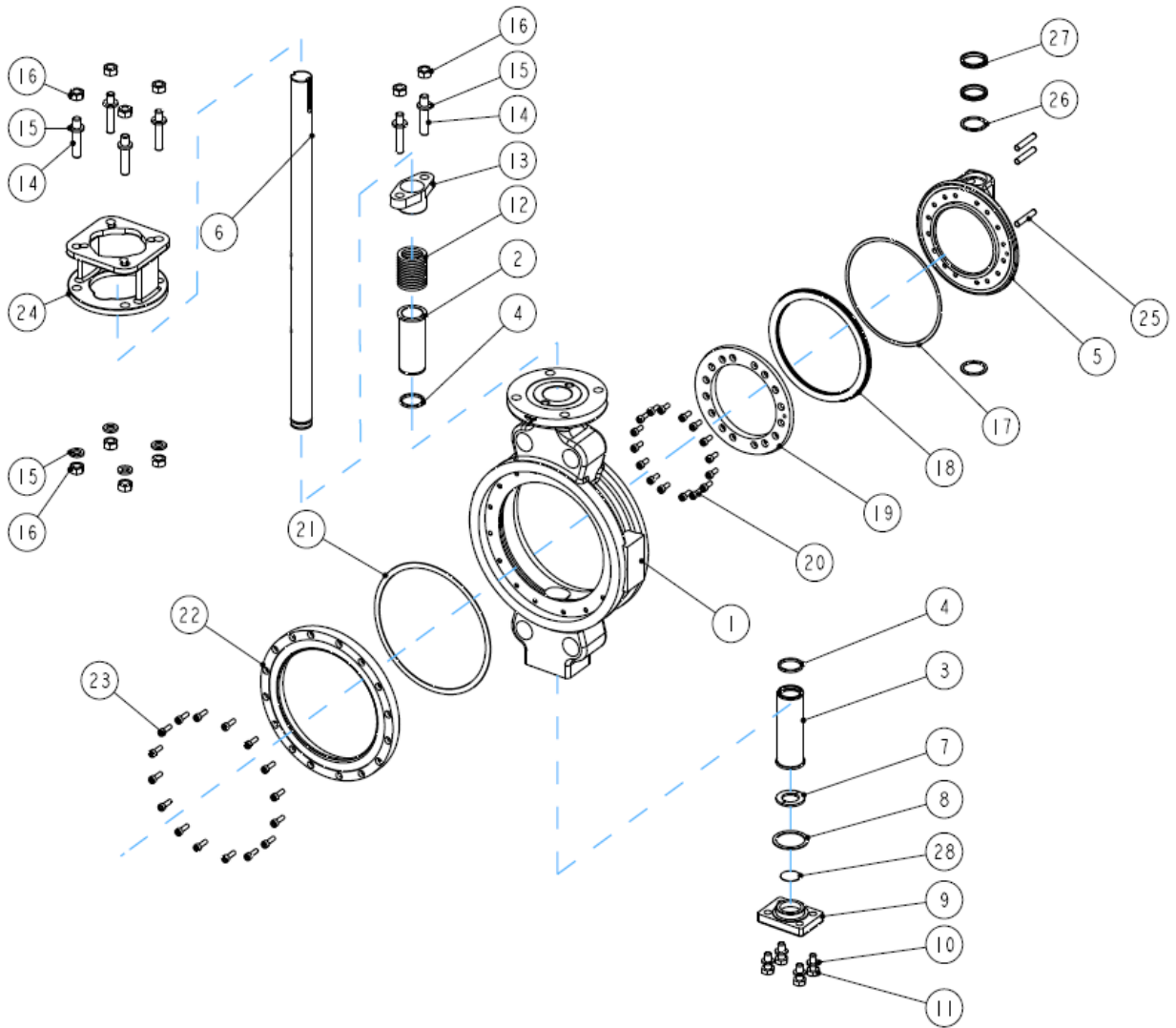
Valves have face-to-face dimensions per API 609 Category B Double Flanged (Short Pattern) Class 300d

Flanged Class 600 (End connection G)

SIZE		Face to Face	Dimensions			Mounting flange (ISO 5211)				Shaft end		
						Valve		Yoke				
mm	inch	L	H1	H2	H3	Type	ØM	Type	M1	ØB	B1	Key
100	4	-	184	200	80	F12	150	F12/F10	125	27.85	55	8*8
150	6	559	246	240	100	F14	175	F14/F12	140	31.85	65	8*8
200	8	660	256	310	120	F16	210	F16/F14	165	41.7	70	12*8
250	10	787	306	355	120	F16	210	F16/F14	165	44.7	80	12*8
300	12	838	341	405	150	F25	300	F25	300	59.7	110	18*12
350	14	889	375	450	150	F30	350	F30	350	69.7	110	18*12
400	16	991	407	495	180	F35	415	F35	415	79.5	150	24*16
450	18	1092	446	520	180	F35	415	F35	415	89.5	180	25*14
500	20	1194	484	581	200	F40	475	F40	475	99.3	180	28*16
600	24	1397	553	645	200	F40	475	F40	475	119.3	200	32*18

Valves have face-to-face dimensions per ISO 5752 Table 1 Col. 19

Parts for Wafer and Lug Designs



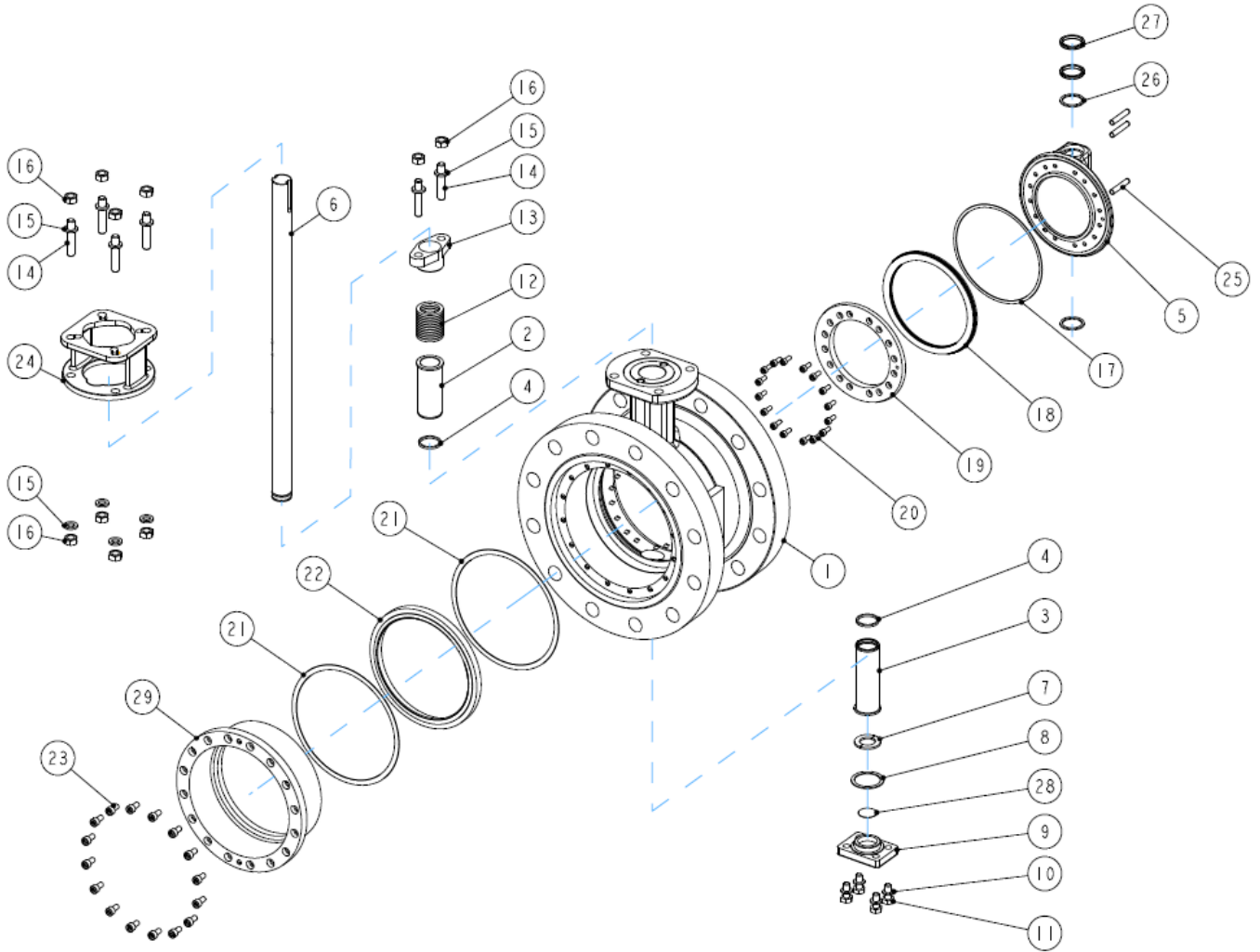
Parts List for Wafer and Lug Designs

No.	Name	Materials	Spare parts	No.	Name	Materials	Spare parts
1	BODY	A216 Gr. WCB A351 Gr. CF8M		15	SPRING WASHER	A240 Gr. 304	
2	BEARING	A182 Gr. F316		16	NUT	A194 Gr. 8	
3	BEARING	A182 Gr. F316		17	GASKET	GRAPHITE	*
4	DUST-PROOF SEAL	GRAPHITE		18	SOLID SEAL RING	A240 Gr. 316 INCO 718	*
5	DISC	A216 Gr. WCB A351 Gr. CF8M			LAMINATED SEAL RING	UNS S32205 INCO 718	
6	SHAFT	A182 Gr. F6a A479 XM-19 UNS 32205		19	SEAL RING RETAINER	A351 Gr. CF8 A351 Gr. CF8M	
7	THRUST RING	A240 Gr. 316		20	SOCKET HEAD CAP BOLT	A913 Gr. B8	
8	BOTTOM COVER GASKET	GRAPHITE	*	21	GASKET	GRAPHITE	* ⁽¹⁾
9	BOTTOM COVER	A216 Gr. WCB A351 Gr. CF8M		22	BODY SEAT	A240 Gr. 304+Stellite hard face A240 Gr. 316+Stellite hard face	* ⁽¹⁾
10	SPRING WASHER	A240 Gr. 304		23	SOCKET HEAD CAP BOLT	A913 Gr. B8	
11	BOLT	A913 Gr. B8		24	YOKE	A536 65-45-12 A216 Gr. WCB	* ⁽²⁾
12	GLAND PACKING	GRAPHITE	*	25	PIN	A182 Gr. F316	
13	GLAND	A351 Gr. CF8 A351 Gr. CF8M		26	DUST-PROOF SEAL	GRAPHITE	
14	STUD	A913 Gr. B8		27	BEARING	A182 Gr. F316	
				28	LOCK PLATE	PTFE+316SS	

Notes:

- Part numbers 21, 22, 23 are only available for model Class 300 and 600 designs
Class150 valve bodies are one-piece design.
- For part No. 24, A216 Gr. WCB is used on the following ISO 5211 sizes: F07/F05, F10/F07, 12/F10, F14/F12, F16/F14
A536 65-45-12 is used on the following sizes: F16, F25, F30, F35, F40.
- We can supply different materials of construction to suit specific customer requirements

Parts for Flanged Designs



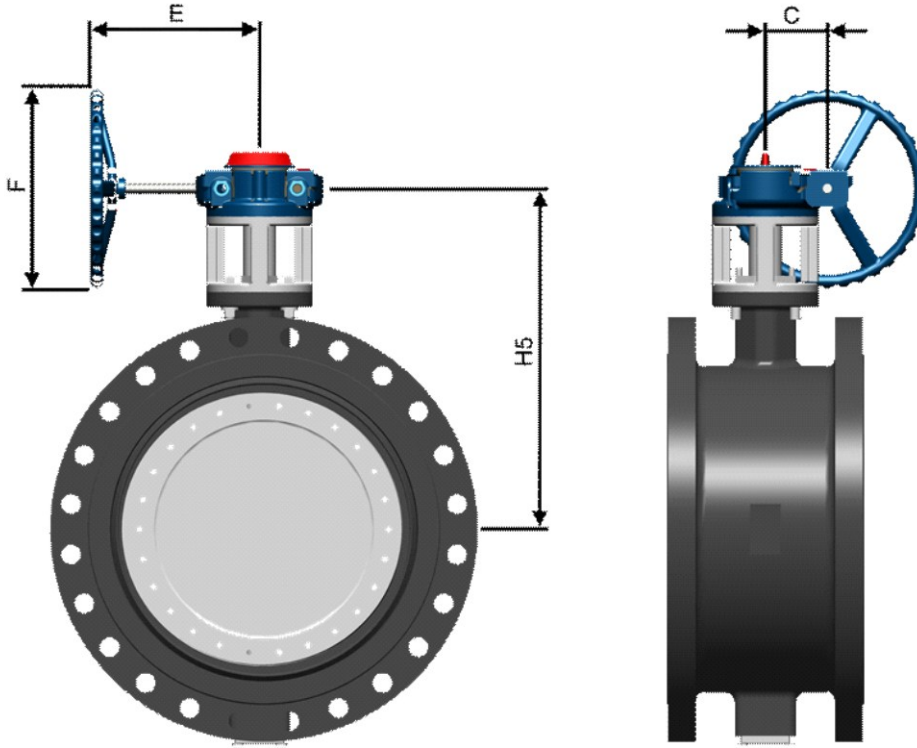
Parts List for Flanged Designs

No.	Name	Materials	Spare parts
1	BODY	A216 Gr. WCB A351 Gr. CF8M	
2	BEARING	A182 Gr. F316	
3	BEARING	A182 Gr. F316	
4	DUST-PROOF SEAL	GRAPHITE	
5	DISC	A216 Gr. WCB A351 Gr. CF8M	
6	SHAFT	A182 Gr. F6a A479 XM-19 UNS 32205	
7	THRUST RING	A240 Gr. 316	
8	BOTTOM COVER GASKET	GRAPHITE	*
9	BOTTOM COVER	A216 Gr. WCB A351 Gr. CF8M	
10	SPRING WASHER	A240 Gr. 304	
11	BOLT	A913 Gr. B8	
12	GLAND PACKING	GRAPHITE	*
13	GLAND	A351 Gr. CF8 A351 Gr. CF8M	
14	STUD	A913 Gr. B8	
15	SPRING WASHER	A240 Gr. 304	
16	NUT	A194 Gr. 8	
17	GASKET	GRAPHITE	*
18	SOLID SEAL RING	A240 Gr. 316 INCO 718	*
	LAMINATED SEAL RING	UNS S32205 INCO 718	
19	SEAL RING RETAINER	A351 Gr. CF8 A351 Gr. CF8M	
20	SOCKET HEAD CAP BOLT	A913 Gr. B8	
21	GASKET	GRAPHITE	* ⁽¹⁾
22	BODY SEAT	A240 Gr. 304+Stellite hard face	* ⁽¹⁾
		A240 Gr. 316+Stellite hard face	
23	SOCKET HEAD CAP BOLT	A913 Gr. B8	
24	YOKE	A536 65-45-12 A216 Gr. WCB	* ⁽²⁾
25	PIN	A182 Gr. F316	
26	DUST-PROOF SEAL	GRAPHITE	
27	BEARING	A182 Gr. F316	
28	LOCK PLATE	PTFE+316SS	
29	BODY RETAINER	A351 Gr. CF8	
		A351 Gr. CF8M	

Notes:

- Part numbers 21, 22, 23 are only available for model Class 300 and 600 designs
Class150 valve bodies are one-piece design.
- For part No. 24, A216 Gr. WCB is used on the following ISO 5211 sizes: F07/F05, F10/F07, 12/F10, F14/F12, F16/F14
A536 65-45-12 is used on the following sizes: F16, F25, F30, F35, F40.
- We can supply different materials of construction to suit specific customer requirements.

GEAR OPERATOR DIMENSIONS



All dimensions are in mm.

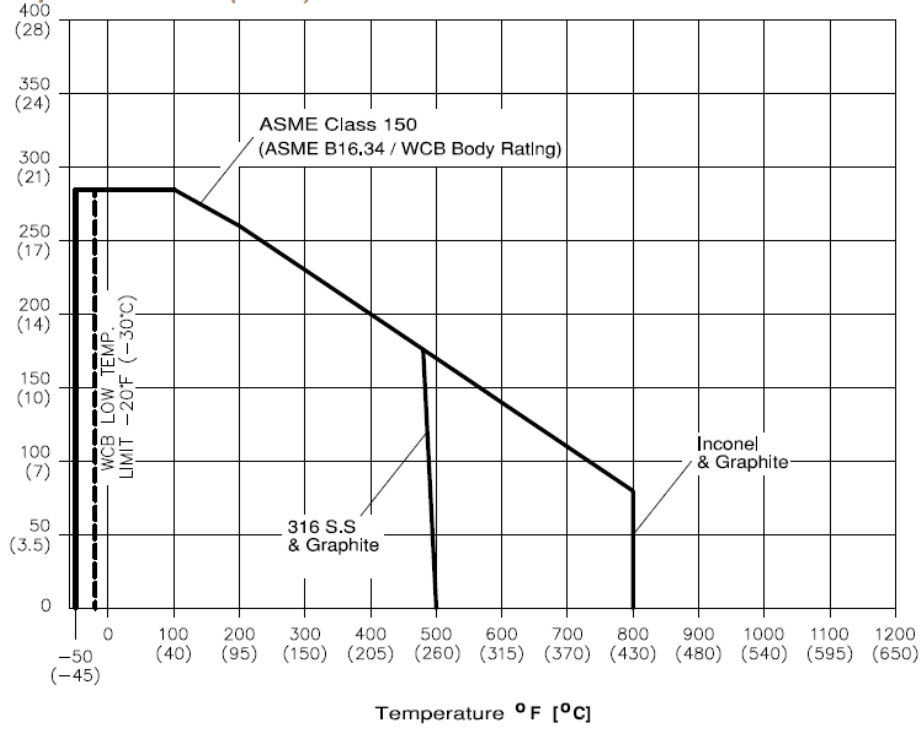
ASME Cl. 150						
SIZE		Operated Series no.	Dimensions			
mm	inch		H5	C	E	F
80	3	AB	241	51	195	150
100	4	AB	251	51	195	150
150	6	AB	306	51	195	150
200	8	AA	331	51	212	200
250	10	A0	388	60	285	310
300	12	A0	438	60	285	310
350	14	A1	492	84	341	400
400	16	A2	546	123	319	400
450	18	A2	606	123	319	400
500	20	A2	631	123	319	400
550	22	-	-	-	-	-
600	24	A2	746	123	319	400
600	24	A3+S3	835	160	383	400
650	26	A3+S3	838	160	383	400
700	28	A3+S3	885	160	383	400
750	30	A3+S3	915	160	383	400
800	32	A3+S3	950	160	383	400
900	36	A4+S4	1041	197	489	600
1000	40	A5+S5+S3	1130	247	582	600
1050	42	A5+S5+S3	1160	247	582	600
1100	44	A5+S5+S3	1190	247	582	600
1200	48	A5+S5+S3	1240	247	582	600

ASME CI. 300						
SIZE		Operated Series no.	Dimensions			
mm	inch		H5	C	E	F
80	3	AB	241	51	195	150
100	4	AB	273	51	195	150
150	6	AA	316	51	212	200
200	8	A0	358	60	285	310
250	10	A1	447	84	341	400
300	12	A2	511	123	319	400
350	14	A2	544	123	319	400
400	16	A2	586	123	319	400
450	18	A2	626	123	319	400
500	20	A3+S3	780	160	383	400
550	22	A3+S3	810	160	383	400
600	24	A4+S4	944	197	489	600
650	26	A4+S4	1006	197	489	600
700	28	A5+S5+S3	1000	247	582	600
750	30	A5+S5+S3	1045	247	582	600
800	32	A6+S6+S4	1111	330	754	600
900	36	A6+S6+S4	1141	330	754	600

ASME CI. 900						
SIZE		Operated Series no.	Dimensions			
mm	inch		H5	C	E	F
80	3	-	-	-	-	-
100	4	A0	318	60	285	310
150	6	A1	377	84	341	400
200	8	A2	486	123	319	400
250	10	A2	531	123	319	400
300	12	A3+S3	700	160	383	400
350	14	A4+S4	796	197	489	600
400	16	A5+S5+S3	805	247	582	600
450	18	A5+S5+S3	830	247	582	600
500	20	A6+S6+S4	942	330	754	600
550	22	-	-	-	-	-
600	24	A6+S6+S4	1006	330	754	600
650	26	A6+S6+S4	1044	330	754	600
700	28	A6+S6+S4	1073	330	754	600
750	30	A6+S6+S4	1101	330	754	600
800	32	A7+S7.8+S4	1336	336	877	600
900	36	A7+S7.8+S4	1396	336	877	600

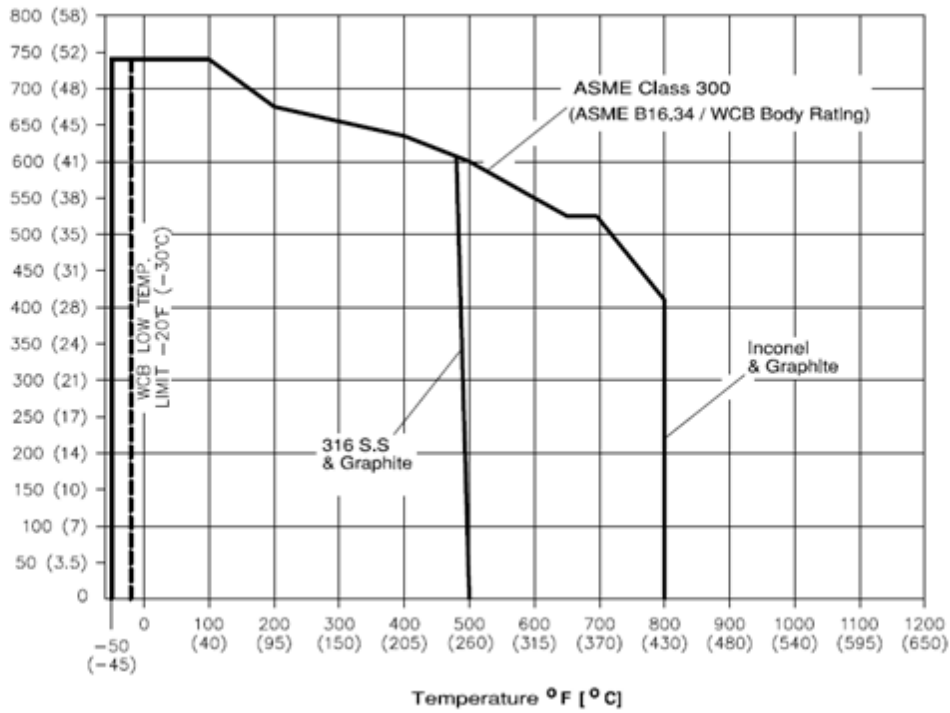
Seat Rating. ASME Class 150

Max. differential pressure PsiG (BarG)



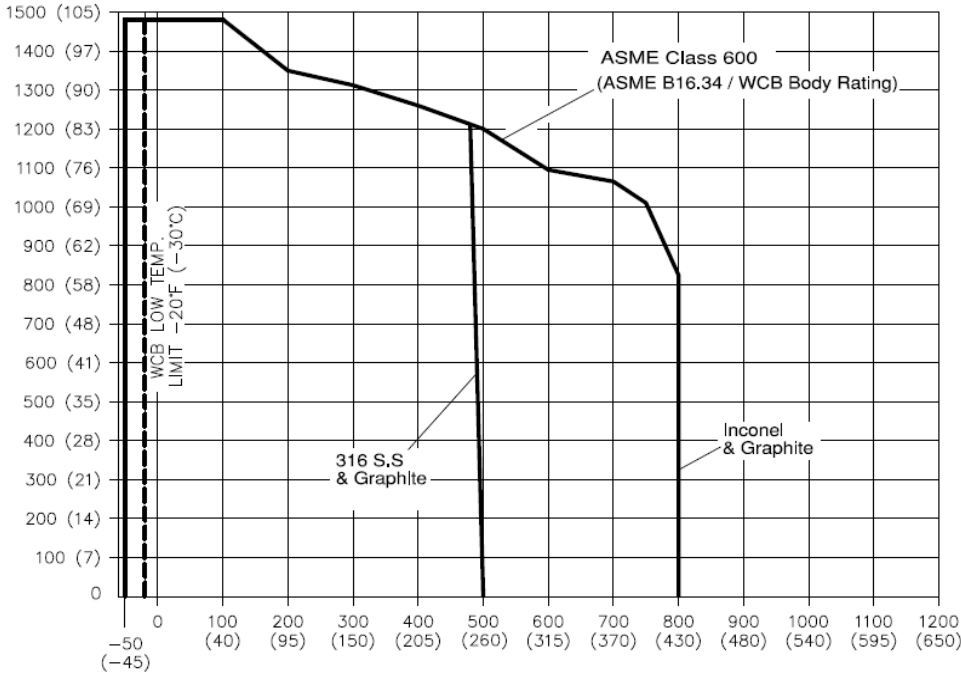
Seat Rating. ASME Class 300

Max. differential pressure PsiG (BarG)



Seat Rating. ASME Class 600

Max. differential pressure PsiG (BarG)



Valve Standards

Pressure Rating	ANSI 150 / 300 / 600 / 900			
End Connection	Wafer / Lugged / Flanged			
Applicable Standards	ASME B16.34 (Design)			
	API 607 / ISO 10497 (Fire Safe Approval)			
	BS 6364 (Cryogenic)			
	API 598 (Pressure Test)			
	VOC:ANSI/ISA-SP-93, TA LUFT, ISO 15848-1/ -2			
	Standard Marking system:MSS-SP-25			
	EX certificate: ATEX			
	ISO 5208 (Pressure Test)			
Face to Face Design	Wafer Type (Not available for Cryogenic Service)	Class 150	24": API 609 Category B Lug and Wafer Type Class 150 26": ISO 5752 Table 5 short	
		Class 300	24": API 609 Category B Lug and Wafer Type Class 300 26": ISO 5752 Table 5 long	
		Class 600	API 609 Category B Lug and Wafer Type Class 600	
	Lugged Type	Class 150	24": API 609 Category B Lug and Wafer Type 26": ISO 5752 Table 5 short	
		Class 300	24": API 609 Category B Lug and Wafer Type Class 300 26": ISO 5752 Table 5 long	
		Class 600	API 609 Category B Lug and Wafer Type Class 600	
	Flanged Type	Class 150	short	48": API 609 Category B Double Flanged (Short Pattern) Class 150c
			long	54": API 609 Category B Double Flanged (Short Pattern) Class 300d
		Class 300	short	API 609 Category B Double Flanged (Short Pattern) Class 300e
			long	API 609 Category B Double Flanged (Short Pattern) Class 300d
		Class 600	short	API 609 Category B Double Flanged (Short Pattern) Class 600f
			long	24": ISO 5752 Table 1 COL.19



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