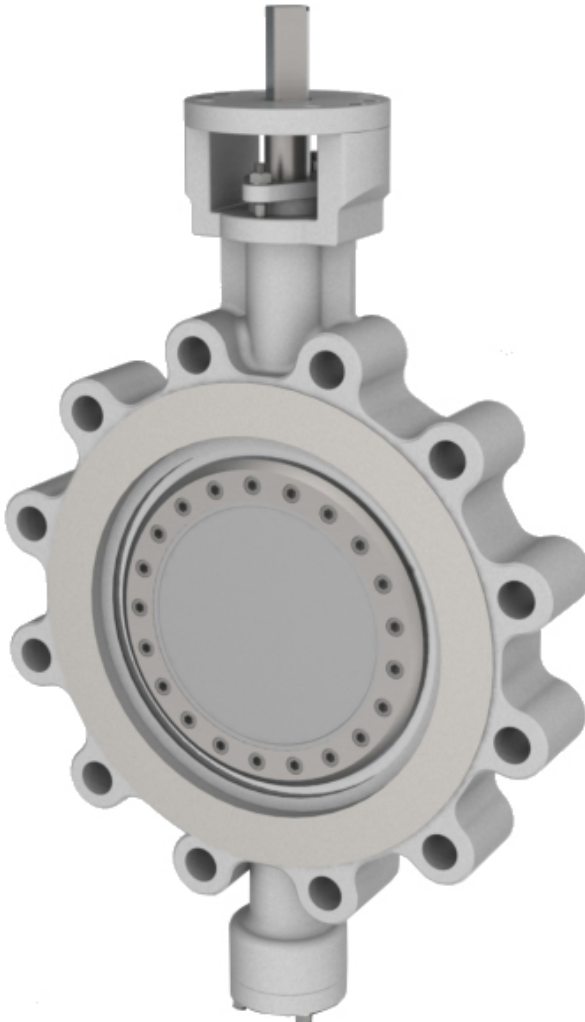


Wafer, Lug and Double Flanged Type



BUREAU
VERITAS



DNV

Lloyd's
Register

Description Product Group 600 Butterfly Valves

Tripple eccentric metal seated butterfly valves are widely used in plants and high pressure piping system.
The seat construction consists of a laminated or solid metal seat.

The valve is capable of bi-directional flow and bubble tight shut-off at full rated pressure.

AVAILABLE SERIES

Series 610 Tripple Eccentric Wafer Type Metal Seated Butterfly Valve
Series 640 Tripple Eccentric Lug Type Metal Seated Butterfly Valve
Series 650 Tripple Eccentric Double Flanged Type Metal Seated Butterfly Valve

STANDARD COMPLIANCE

Face to face dimensions in accordance with API 609, EN 558, ISO 5752,
DIN 3202, MSS-SP-68
Certified Fire Safe Design in accordance with API 607, API 6FA and BS 6755

PRODUCTION RANGE

Size range DN 50 (2") ~ DN 2000 (80")
Process Connections to ASME B16.5 / B16.47 Class 150~900 Lbs, DIN PN 10~PN 63
Working Temperature range -253°C to +815°C
Working Pressure Maximum 153 Barg (2220 psi)

APPLICABLE FLANGE

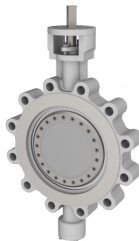
ASME B16.5 / B16.47, 150-300-600-900#, BS 3293
EN 1092 / DIN 2501, PN 10, 16, 25, 40, 63

Wafer Type



Series 610

Lug Type



Series 640

Double Flanged Type



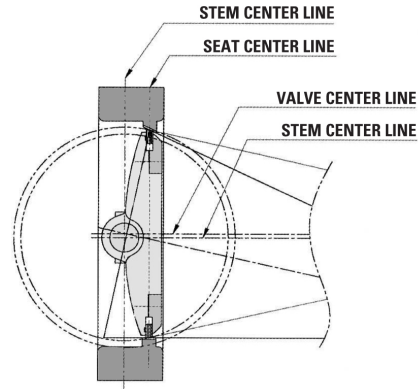
Series 650

Design Principle & Seat Configurations

Triple eccentric design principle

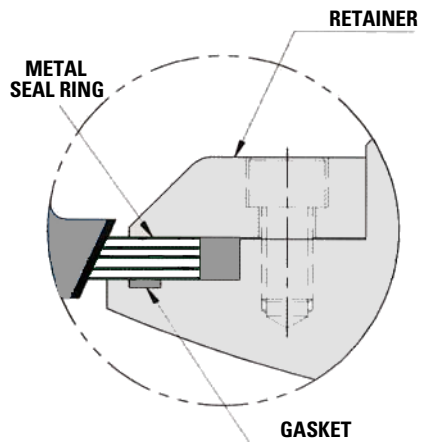
Product Group 600 metal seated high pressure butterfly valves provide bi-directional bubble tight shut off using tripple eccentric disc geometry. The valve shaft is off set against the seat and the centre line of the valve body.

The seating edges are machined with a continuously changing slope from an angle on top of the oval seat ring to an angle at the opposite side. This geometry ensures that the seat ring stays clear of the seat except at the final shut off position which results in long life seat.



Metal to metal seat

Various disc seals are available to comply with each temperature and pressure service applications. Solid metal seals are often used for temperatures above 510°C and up to 815°C or low temperature service. The laminated metal seal consisting of stainless steel with intermediate material of graphite or ceramic fiber layers is used widely. The laminated seal is secured to the disc with a bolt-on stainless steel clamp ring, and easily accessible for replacement. The graphite laminated seal is suitable for temperatures between -40°C and 650°C in general. The seal leakage meets API 598 or API 6D. The solid metal seating valve can be operated in a temperature range of -253°C to +815°C. Valves for cryogenic applications will be executed with an extended stem.



Application in major industries

- Petroleum refinery
- Fossil power plants
- Petrochemical plants
- Fire safe line
- Nuclear power plants
- Cryogenic services
- Exhaust gas line & Steam line

Classification by Connection

Series 610 Wafer

To be installed between flanges using long bolts. Valve body with centering lugs for easy installation.

Series 640 Lug

To be installed between flanges. Valve body with full pattern threaded bolt holes, suitable for end-of-line service.

Series 650 Double flanged

To be installed between flanges. Valve body with 2 complete flanges suitable to connect with pipe flanges. Suitable for end-of-line service.

Operations

In general the following operation possibilities are available.

- Manual operation, handlever or gearbox.
- Pneumatic actuators.
- Electric actuators.
- Hydraulic actuators.

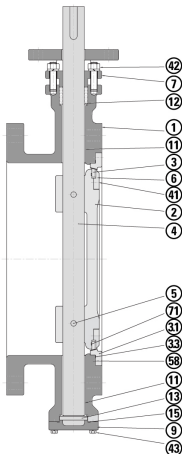
Approvals, Certification

PG 600 butterfly valves have the following approvals, certification.

- CE / PED.
- BV, DNV, LRS type approvals.

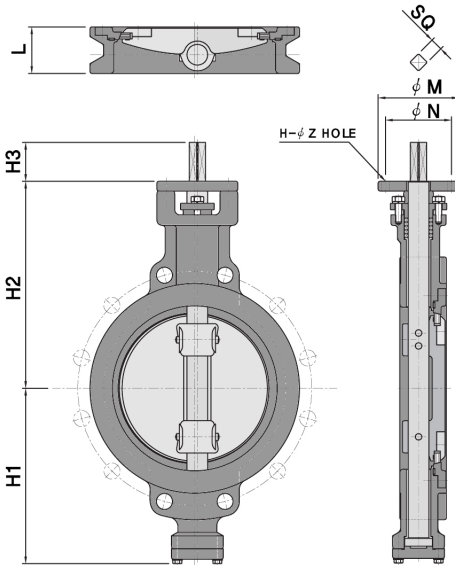


Construction and material

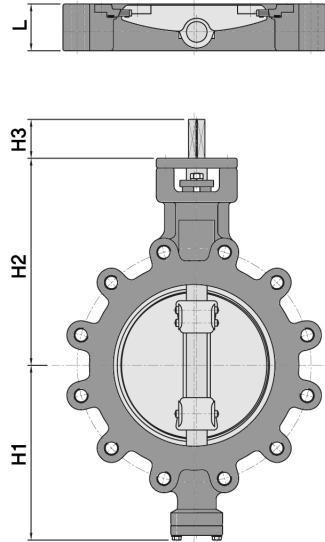


P.NO.	PART NAME	MATERIAL
1	BODY	WCB, Stainless steel, NiAlBr.
2	DISC	WCB, Stainless steel, NiAlBr.
3	SEAT	316 stst +Graphite laminated, Solid stainless steel
3.1	BODY SEAT	Stainless steel
3.3	BODY SEAT GASKET	Graphite
4	STEM	Stainless steel, monel
5	DISC PIN	Stainless steel, monel
6	RETAINER	Stainless steel, monel
7	PACKING GLAND	Stainless steel, monel
9	BOTTOM COVER	WCB, Stainless steel, NiAlBr.
11	STEM BEARING	Stainless steel + PTFE
12	PACKING	Graphite
13	THRUST PLATE	Stainless steel
15	BOTTOM GASKET	Graphite
41	RETAINER BOLT	Stainless steel
42	PACKING GLAND BOLT	A307 Gr. B (G)
58	BODY SEAT BOLT	Stainless steel
43	BOTTOM COVER BOLT	A307 Gr.B (G) Stainless steel
71	SEAT GASKET	Graphite

Series 610
 Wafer Class 150#



Series 640
 Lug Class 150#

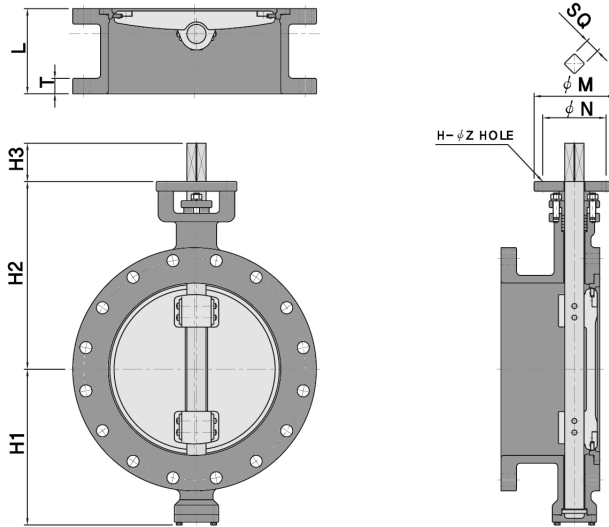


Dimensions [mm]

SIZE			L	H1	H2	STEM		TOP FLANGE			
WAFER (inch)	LUG (inch)	mm				SQUARE		TYPE	b	a	N-Z
						SQ	H3				
2"	2"	50	43	118	170	12	45	F07	70	90	4 - 9
2.5"	2.5"	65	46	129	177	12	45	F07	70	90	4 - 9
3"	3"	80	48	141	185	12	45	F07	70	90	4 - 9
4"	4"	100	54	164	200	12	45	F07	70	90	4 - 9
5"	5"	125	57	187	217	12	45	F07	70	90	4 - 9
6"	6"	150	57	203	240	12	45	F07	70	90	4 - 9
8"	8"	200	64	223	270	17	60	F10	102	125	4 - 12
10"	10"	250	71	270	320	22	60	F10	102	125	4 - 12
12"	12"	300	81	308	353	27	60	F10	102	125	4 - 12
14"	14"	350	92	340	390	27	75	F14	140	175	4 - 18
16"	16"	400	102	381	445	27	75	F14	140	175	4 - 18
18"	18"	450	114	410	490	36	100	F16	165	210	4 - 22
20"	20"	500	127	444	500	36	100	F16	165	210	4 - 22
22"	22"	550	154	484	535	50	100	F16	165	210	4 - 22
24"	24"	600	154	509	570	50	100	F25	254	300	8 - 18
	26"	650	165	545	635	50	100	F25	254	300	8 - 18
	28"	700	165	568	670	50	100	F30	298	350	8 - 23
	30"	750	190	620	695	50	150	F30	298	350	8 - 23
	32"	800	190	645	740	61	150	F30	298	350	8 - 23
	36"	900	203	710	805	68	150	F35	356	415	8 - 33
	40"	1000	216	770	870	68	150	F35	356	415	8 - 33
	44"	1100	240	835	930	90	180	F35	356	415	8 - 33
	48"	1200	254	895	995	90	180	F35	356	415	8 - 33

* Flange dimensions in accordance with ASME 150#, BS PN6/PN10/PN16, DIN PN6/PN10/PN16, ISO PN6/PN10/PN16, JIS 5K/10K/16K

Series 650
 Double Flanged Class 150#

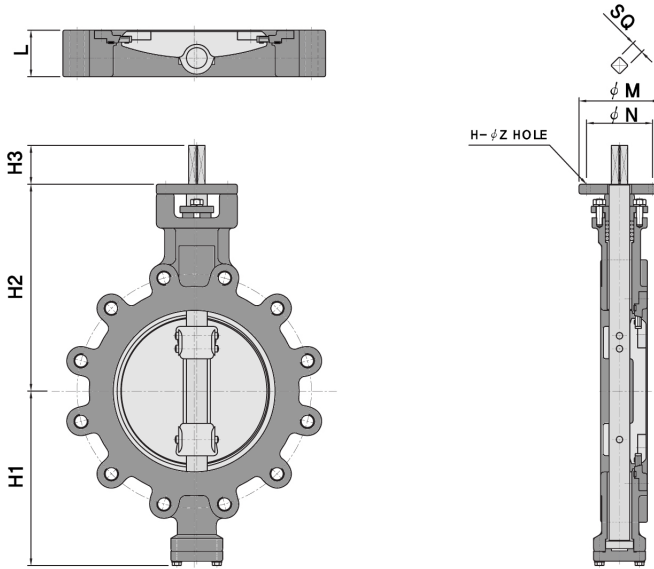


Dimensions [mm]

SIZE		L	H1	H2	STEM		TYPE	TOP FLANGE		
inch	mm				SQUARE			b	a	N-Z
					SQ	H3				
2"	50	108	118	170	12	45	F07	70	90	4 - 9
2.5"	65	112	129	177	12	45	F07	70	90	4 - 9
3"	80	114	141	185	12	45	F07	70	90	4 - 9
4"	100	127	164	200	12	45	F07	70	90	4 - 9
5"	125	140	187	217	12	45	F07	70	90	4 - 9
6"	150	140	203	240	12	45	F07	70	90	4 - 9
8"	200	152	223	270	17	60	F10	102	125	4 - 12
10"	250	165	270	320	22	60	F10	102	125	4 - 12
12"	300	178	308	353	27	60	F10	102	125	4 - 12
14"	350	190	340	390	27	75	F14	140	175	4 - 18
16"	400	216	381	445	27	75	F14	140	175	4 - 18
18"	450	222	410	490	36	100	F16	165	210	4 - 22
20"	500	229	444	500	36	100	F16	165	210	4 - 22
24"	600	267	509	570	50	100	F25	254	300	8 - 18
26"	650	292	545	635	50	100	F25	254	300	8 - 18
28"	700	292	568	670	50	100	F30	298	350	8 - 23
30"	750	318	620	695	61	150	F30	298	350	8 - 23
32"	800	318	645	740	61	150	F30	298	350	8 - 23
36"	900	330	710	805	68	150	F35	356	415	8 - 33
40"	1000	410	770	870	68	150	F35	356	415	8 - 33
44"	1100	470	835	930	90	180	F35	356	415	8 - 33
48"	1200	470	895	995	90	180	F35	356	415	8 - 33
54"	1350	470	1050	1200	90	230	F48	483	560	12 - 39
60"	1500	530	1100	1310	90	230	F48	483	560	12 - 39
72"	1800	670	1230	1510	100	230	F48	483	560	12 - 39
80"	2000	760	1290	1600	100	230	F48	483	560	12 - 39
96"	2400	760	1622	1950	150	260	F60	603	686	20 - 39
120"	3000	760	2005	2225	180	260	F60	603	686	20 - 39

* Flange dimensions in accordance with ASME 150#, BS PN6/PN10/PN16, DIN PN6/PN10/PN16, ISO PN6/PN10/PN16, JIS 5K/10K/16K

Series 640
 Lug Class 300#

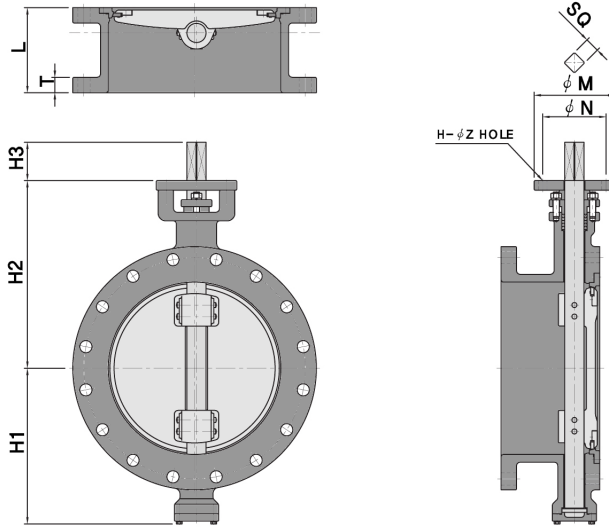


Dimensions [mm]

SIZE		L	H1	H2	STEM		TYPE	TOP FLANGE		
inch	mm				SQUARE			b	a	N-Z
					SQ	H3				
2"	50	43	121	171	12	45	F07	70	90	4 - 9
2.5"	65	46	137	180	12	45	F07	70	90	4 - 9
3"	80	48	151	191	12	45	F07	70	90	4 - 9
4"	100	54	176	215	12	45	F07	70	90	4 - 9
5"	125	59	194	225	12	45	F07	70	90	4 - 9
6"	150	61	223	252	12	45	F07	70	90	4 - 9
8"	200	73	250	305	17	60	F10	102	125	4 - 12
10"	250	83	290	340	22	60	F10	102	125	4 - 12
12"	300	92	317	385	27	60	F10	102	125	4 - 12
14"	350	117	365	400	27	75	F14	140	175	4 - 18
16"	400	133	396	481	27	75	F14	140	175	4 - 18
18"	450	149	435	516	36	100	F16	165	210	4 - 22
20"	500	159	473	576	36	100	F16	165	210	4 - 22
22"	550	171	490	601	50	100	F16	165	210	4 - 22
24"	600	182	551	642	50	100	F25	254	300	8 - 18
26"	650	182	579	670	50	100	F25	254	300	8 - 18
28"	700	182	606	708	50	100	F30	298	350	8 - 23
30"	750	210	661	736	50	150	F30	298	350	8 - 23
32"	800	210	683	778	61	150	F30	298	350	8 - 23
34"	850	223	708	808	61	150	F35	356	415	8 - 33
36"	900	227	751	846	68	150	F35	356	415	8 - 33
40"	1000	245	770	870	68	150	F35	356	415	8 - 33
44"	1100	305	843	938	90	180	F35	356	415	8 - 33
48"	1200	308	914	1014	90	180	F35	356	415	8 - 33
52"	1300	315	939	1119	90	230	F48	483	560	12 - 39
54"	1350	315	960	1220	90	230	F48	483	560	12 - 39
56"	1400	322	989	1269	90	230	F48	483	560	12 - 39
60"	1500	329	1081	1342	90	230	F48	483	560	12 - 39

* Flange dimensions in accordance with ASME 300#, BS PN25, DIN PN25, ISO PN20/PN25, JIS 20K.

Series 650
 Double Flanged Class 300#

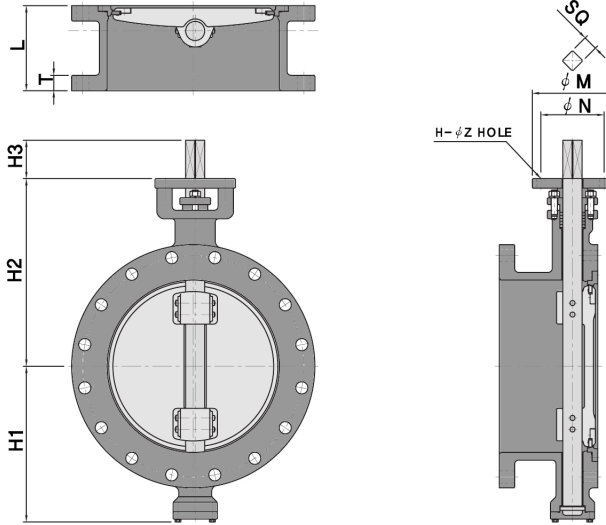


Dimensions [mm]

SIZE		L	H1	H2	STEM		TYPE	TOP FLANGE		
inch	mm				SQUARE			b	a	N-Z
					SQ	H3				
2"	50	193	121	171	12	45	F07	70	90	4 - 9
2.5"	65	177	137	180	12	45	F07	70	90	4 - 9
3"	80	180	151	191	12	45	F07	70	90	4 - 9
4"	100	190	176	215	12	45	F07	70	90	4 - 9
5"	125	210	194	225	12	45	F07	70	90	4 - 9
6"	150	210	223	252	12	45	F07	70	90	4 - 9
8"	200	230	250	305	17	60	F10	102	125	4 - 12
10"	250	250	290	340	22	60	F10	102	125	4 - 12
12"	300	270	317	385	27	60	F10	102	125	4 - 12
14"	350	290	365	400	27	75	F14	140	175	4 - 18
16"	400	310	396	481	27	75	F14	140	175	4 - 18
18"	450	330	435	516	36	100	F16	165	210	4 - 22
20"	500	350	473	576	36	100	F16	165	210	4 - 22
22"	550	390	465	575	50	100	F16	165	210	4 - 22
24"	600	390	546	642	50	100	F25	254	300	8 - 18
26"	650	410	579	670	50	100	F25	254	300	8 - 18
28"	700	430	606	708	50	100	F30	298	350	8 - 23
30"	750	450	661	736	61	150	F30	298	350	8 - 23
32"	800	470	683	778	61	150	F30	298	350	8 - 23
36"	900	510	751	846	68	150	F35	356	415	8 - 33
40"	1000	550	770	870	68	150	F35	356	415	8 - 33
48"	1200	630	924	1024	90	180	F35	356	415	8 - 33
52"	1300	650	939	1199	90	230	F48	483	560	12 - 39
54"	1350	670	940	1200	90	230	F48	483	560	12 - 39
56"	1400	680	970	1250	90	230	F48	483	560	12 - 39
60"	1500	700	1081	1342	90	230	F48	483	560	12 - 39
80"	2000	1250	1430	1600	120	260	F60	603	686	20 - 39
96"	2400	1250	1622	1950	150	260	F60	603	686	20 - 39
120"	3000	1250	2005	2225	180	260	F60	603	686	20 - 39

* Flange dimensions in accordance with ASME 300#, BS PN25, DIN PN25, ISO PN20/PN25, JIS 20K.

Series 650
 Double Flanged Class 600#

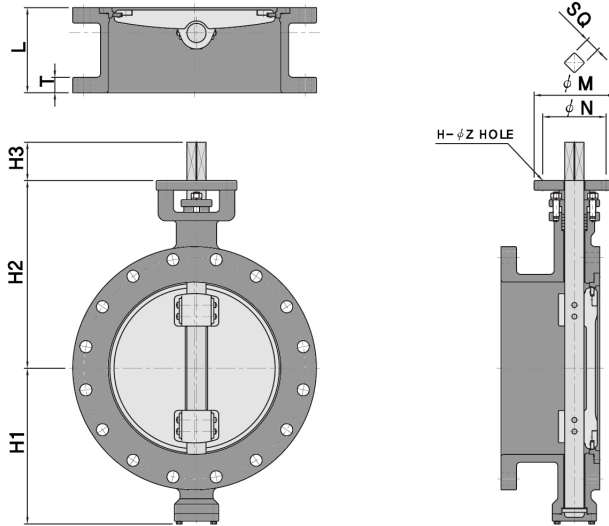


Dimensions [mm]

SIZE		L	H1	H2	STEM		TOP FLANGE			
inch	mm				SQUARE		TYPE	b	a	N-Z
					SQ	H3				
2"	50	173	121	171	12	45	F07	70	90	4 - 9
2.5"	65	177	137	180	12	45	F07	70	90	4 - 9
3"	80	180	151	191	12	45	F07	70	90	4 - 9
4"	100	190	176	211	12	45	F07	70	90	4 - 9
5"	125	210	210	241	12	45	F07	70	90	4 - 9
6"	150	210	234	264	12	45	F07	70	90	4 - 9
8"	200	230	248	321	17	60	F10	102	125	4 - 12
10"	250	250	307	390	22	60	F10	102	125	4 - 12
12"	300	270	336	414	27	60	F10	102	125	4 - 12
14"	350	290	371	469	27	75	F14	140	175	4 - 18
16"	400	310	412	497	27	75	F14	140	175	4 - 18
18"	450	330	457	539	36	100	F16	165	210	4 - 22
20"	500	350	492	595	36	100	F16	165	210	4 - 22
24"	600	390	559	655	50	100	F30	298	350	8 - 23
28"	700	502	598	690	50	100	F30	298	350	8 - 23
30"	750	518	619	721	61	150	F35	356	415	8 - 33
32"	800	531	674	749	61	150	F35	356	415	8 - 33
36"	900	574	696	791	68	150	F35	356	415	8 - 33
40"	1000	667	764	859	68	150	F48	483	560	12 - 39

* Flange dimensions in accordance with ASME 600#, BS PN40, DIN PN40, ISO PN40/PN40, JIS 40K.

Series 650
 Double Flanged Class 900#



Dimensions [mm]

SIZE		L	H1	H2	STEM		TOP FLANGE			
inch	mm				SQUARE		TAPE	b	a	N-Z
					SQ	H3				
2"	50	201	140	191	12	45	F07	70	90	4 - 9
2.5"	65	205	157	201	12	45	F07	70	90	4 - 9
3"	80	205	171	212	12	45	F07	70	90	4 - 9
4"	100	205	185	221	12	45	F10	102	125	4 - 12
5"	125	225	216	248	12	45	F10	102	125	4 - 12
6"	150	230	246	277	12	45	F10	102	125	4 - 12
8"	200	251	270	434	17	60	F14	140	175	4 - 18
10"	250	270	326	405	22	60	F14	140	175	4 - 18
12"	300	303	358	437	27	60	F14	140	175	4 - 18
14"	350	330	387	485	27	75	F30	298	350	8 - 23
16"	400	343	418	503	27	75	F30	298	350	8 - 23
18"	450	378	473	555	36	100	F30	298	350	8 - 23
20"	500	399	505	608	36	100	F35	356	415	8 - 33
24"	600	479	590	687	50	100	F35	356	415	8 - 33
28"	700	619	626	719	50	100	F40	406	475	8 - 39
30"	750	661	650	753	61	150	F40	406	475	8 - 39
32"	800	701	712	787	61	150	F40	406	475	8 - 39
36"	900	784	754	829	68	150	F40	406	475	8 - 39
40"	1000	881	827	923	68	150	F40	406	475	8 - 39
44"	1100	978	863	964	90	180	F48	483	560	12 - 39
48"	1200	1065	987	1089	90	180	F48	483	560	12 - 39

* Flange dimensions in accordance with ASME 900#, DIN PN100, ISO PN100.

CV Values Table

CV Values Table for PG600 Tripple Eccentric Butterfly Valves

Size		DISC OPENING								
Inch	mm	10 °	20 °	30 °	40 °	50 °	60 °	70 °	80 °	90 °
3"	80	11	26	45	76	116	156	207	277	292
4"	100	17	39	66	112	171	230	305	408	431
6"	150	41	95	163	276	422	568	752	1,006	1,063
8"	200	73	182	327	432	723	1,035	1,336	1,890	2,070
10"	250	119	296	534	704	1,179	1,688	2,179	3,082	3,376
12"	300	175	433	781	1,030	1,726	2,471	3,189	3,858	4,334
14"	350	249	616	1,111	1,466	2,455	3,515	4,537	5,489	6,165
16"	400	313	776	1,399	1,845	3,090	4,424	5,711	6,909	7,760
18"	450	407	1,008	1,818	2,397	4,015	5,749	7,422	8,978	10,084
20"	500	477	1,181	2,129	2,808	4,703	6,733	8,693	10,516	11,811
22"	550	613	1,520	2,740	3,613	6,052	8,664	11,186	13,532	15,198
24"	600	727	1,800	3,245	4,280	7,168	10,263	13,250	16,028	18,003
26"	650	830	2,056	3,707	4,888	8,187	11,721	15,132	18,306	20,561
28"	700	971	2,406	4,338	5,721	9,581	13,718	17,709	21,423	24,062
30"	750	1,133	2,808	5,062	6,676	11,180	16,007	20,666	24,999	28,079
32"	800	1,301	3,223	5,811	7,663	12,834	18,376	23,723	28,698	32,234
36"	900	1,720	4,261	7,681	10,130	16,966	24,291	31,359	37,936	42,609
40"	1000	2,136	5,292	9,541	12,582	21,072	30,170	38,949	47,117	52,921

Torque Values Table

Torque Values Table for PG600 Tripple Eccentric Butterfly Valves (Excl. Safety Factor)

Please consult us for advise on Safety Factors.

Size		Working Pressure			
Inch	mm	5 Barg	10 Barg	16 Barg	19.6 Barg
3"	80	25 Nm	33 Nm	45 Nm	55 Nm
4"	100	42 Nm	55 Nm	70 Nm	90 Nm
5"	125	72 Nm	88 Nm	120 Nm	150 Nm
6"	150	125 Nm	175 Nm	240 Nm	285 Nm
8"	200	272 Nm	315 Nm	380 Nm	475 Nm
10"	250	350 Nm	488 Nm	600 Nm	745 Nm
12"	300	475 Nm	660 Nm	1,000 Nm	1,270 Nm
14"	350	670 Nm	940 Nm	1,390 Nm	1,770 Nm
16"	400	885 Nm	1,250 Nm	1,885 Nm	2,380 Nm
18"	450	1,070 Nm	1,850 Nm	2,480 Nm	3,150 Nm
20"	500	1,515 Nm	2,340 Nm	3,200 Nm	4,100 Nm
22"	550	1,880 Nm	2,950 Nm	4,360 Nm	5,600 Nm
24"	600	2,430 Nm	3,570 Nm	5,360 Nm	6,700 Nm
26"	650	2,900 Nm	3,850 Nm	5,770 Nm	7,190 Nm
28"	700	3,100 Nm	4,350 Nm	6,900 Nm	8,300 Nm
30"	750	3,445 Nm	5,600 Nm	8,900 Nm	10,880 Nm
32"	800	3,900 Nm	6,400 Nm	10,100 Nm	12,580 Nm
36"	900	4,800 Nm	8,000 Nm	14,400 Nm	17,900 Nm
40"	1000	6,000 Nm	10,300 Nm	18,500 Nm	23,000 Nm

*Product Group 100
Bonded Rubber Liner Butterfly Valves*

*Product Group 200
Replaceable Rubber Liner Butterfly Valves*

*Product Group 300
Cassette Type Rubber Liner Butterfly Valves*

*Product Group 400
Double Eccentric Replaceable Seat Ring
Type Butterfly Valves*

*Product Group 500
High Performance Butterfly Valves*

*Product Group 600
Tripple Eccentric Metal Seated Butterfly Valves*

*Product Group 700
Disc Seated Butterfly Valves*

*Product Group 800
Cryogenic Butterfly Valves (LPG, LNG)*

*Product Group 900
Damper Butterfly Valves*



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