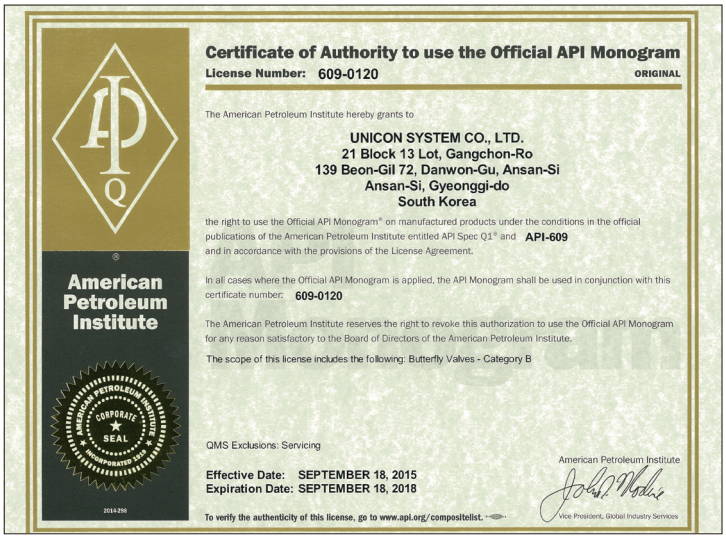
SPECIFICATION DATA
V600-2016-R0

TRIPLE – OFFSET BUTTERFLY VALVE

SERIES V600

UNICON

CONTENTS



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UNICON SYSTEM CO., LTD.
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The scope of this license includes the following: Butterfly Valves - Category B

QMS Exclusions: Servicing

Effective Date: SEPTEMBER 18, 2015
Expiration Date: SEPTEMBER 18, 2018

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Vice President, Global Industry Services

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CORPORATE SEAL

2014-258

V600 SERIES TRIPLE – OFFSET BUTTERFLY VALVE

- UNICON triple-offset butterfly valves are designed in accordance with API 609 with features of bi-directional, lightweight, cost-effective and low torque.

FEATURES

- **Triple shaft blowout protection conforms to API 609**
  The UNICON advanced design features three-way eccentricity and unique elliptical seat geometry ensuring compressive sealing around the entire seat and a tight, bubble free valve.
- **Standard laminated resilient disc seal**
  Graphite layers are carefully assembled between stainless steel rings and graphite using phenolic resin bond. Solid seal rings are available for abrasive services as well as high temperature applications.
- **Zero leakage seat tightness**
  The disc seal, evenly compressed around its circumference, produces a wedging effect which flexes the seal ring and reacts like a spring. The resilient seal assures zero leakage of liquids or gases to API 598 - resilient seat standard.
  Resiliency in the seal allows disc movement during thermal cycles while retaining tight shutoff.
- **One-piece shaft**
  Large diameter shaft for safety is connected to the disc close to the bearings to absorb loads with pin and/or key to allow for differential expansion due to temperature.
- **No – Friction**
  The triple offset eliminates all friction throughout the operating cycle and a vastly extended valve life.
- **No – Over travel**
  The triple offset is the geometry design of the angle cone disc sealing components. Contact is only made at the final point of closure with the 90 degrees acting as a mechanical stop : resulting in over travel over of the disc set.
- **Wide range**
  Non gelling design enable a wide variety of material options and wide range of applications from the low to high temperature & pressure.

TRIPLE – OFFSET BUTTERFLY VALVE DESIGN

The principle of operation incorporated in the UNICON triple offset valve is geometry in motion. Both the seat in the body and the seal on the disc are surfaces of a cone which is sectioned at an angle.
The valve shaft is located slightly to one side of the seat center and above the plane of the seat.
Its center of rotation is also somewhat offset from the axis of the imaginary cone which extends from the surface of the seat.
When the valve is closed, the surface of the seal and the seat are in full contact at all points. Any effort to try to further close the disc (rotating it into the seat) increases the sealing force and tightens the valve. This allows the valve to achieve a bi-directional seal.
Opening the valve, or rotating the disc away from its seat, results in the seal moving away from the seat at all points, eliminating rubbing or sliding of the seating surfaces, thus avoiding wear. UNICON valves feature true non-rubbing seating surfaces for long life and tight shutoff.

Single Offset - 1st offset

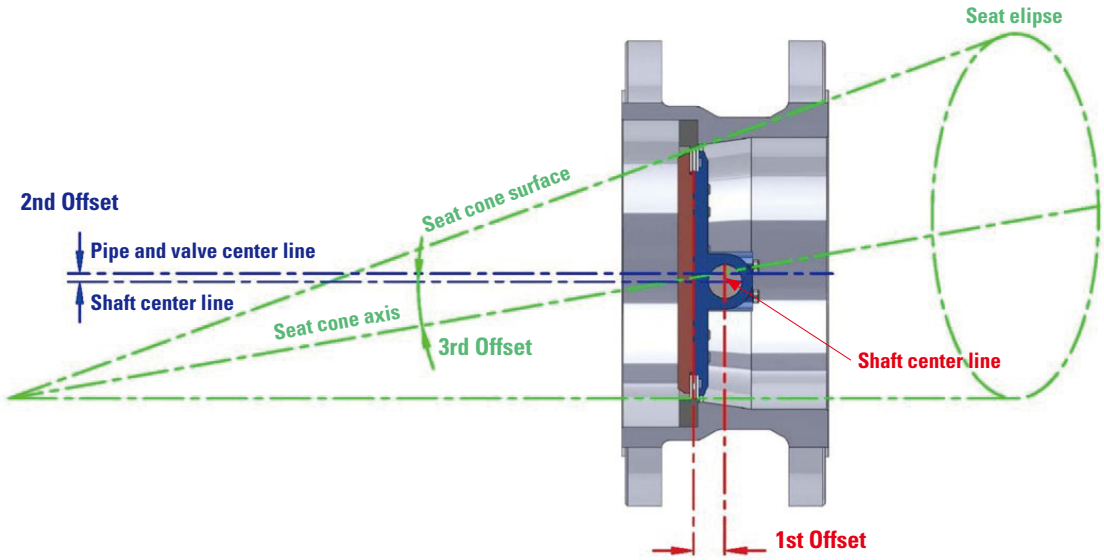
The shaft is offset behind the seat axis to allow complete sealing contact around the entire seat.
This offset was initially introduced as standard with the introduction of the high performance butterfly valve.

Double Offset - 2nd offset

The centerline of disc rotation was moved laterally from the centerline of the shaft.
This provided eccentric rotation of the disc which swung the seal ring completely off the seat upon opening. This also was introduced as standard on the high performance butterfly valves.

Triple Offset – 3rd offset

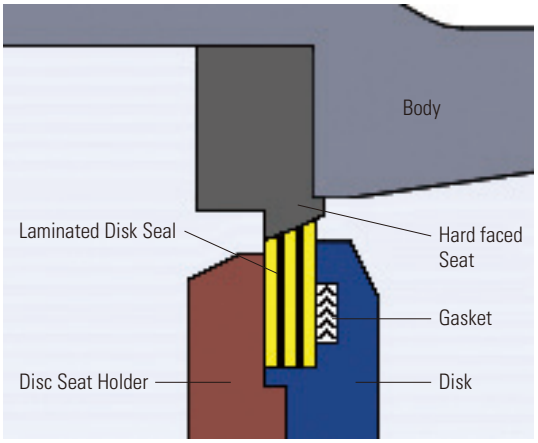
The seat cone axis is offset from the shaft centerline to eliminate friction during closing and opening and to achieve uniform compressive sealing around the entire seat. The centerline of the seat cone angle. This angle is identical to the cone angle of the laminated seal ring on the disc. Additionally the point of the centerline of cone rotation is moved laterally from the centerline of disc rotation. As stated the point of cone angle of the laminated seal ring on the disc does not used this offset for the placement of the cone angle.



TRIM ARRANGEMENT

Seat & Sealing

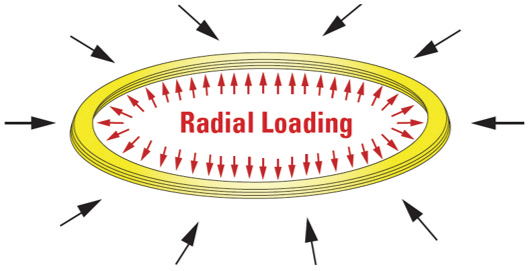
Metal & Graphite laminate body seat and secondary solid disc seat are machined geometrically and mirror finished to reduce friction on the sealing surface and to achieve the design goals: bi-directional tight shut off, long durability without rubbing and jamming of sealing parts during operation, all major parts incorporated with primary seats are specially designed and arranged to prevent interference between each part in metal-to-metal sealing mechanism. Replaceable seats ensure the client of easy and reliable field maintenance with extended lifetime of the valve.



The Laminated Disc Seal

Torque seating during closing of the valve provides uniform forces around the entire circumference of the valve seat. The self-adjusting, resilient seal flexes and energizes, assuming the shape of the seat. The compression forces equally distributed around the perimeter provide a tight bidirectional shut off.

The resiliency of the seal allows the valve body and disc to contract or expand, without the risk of jamming due to temperature fluctuations.



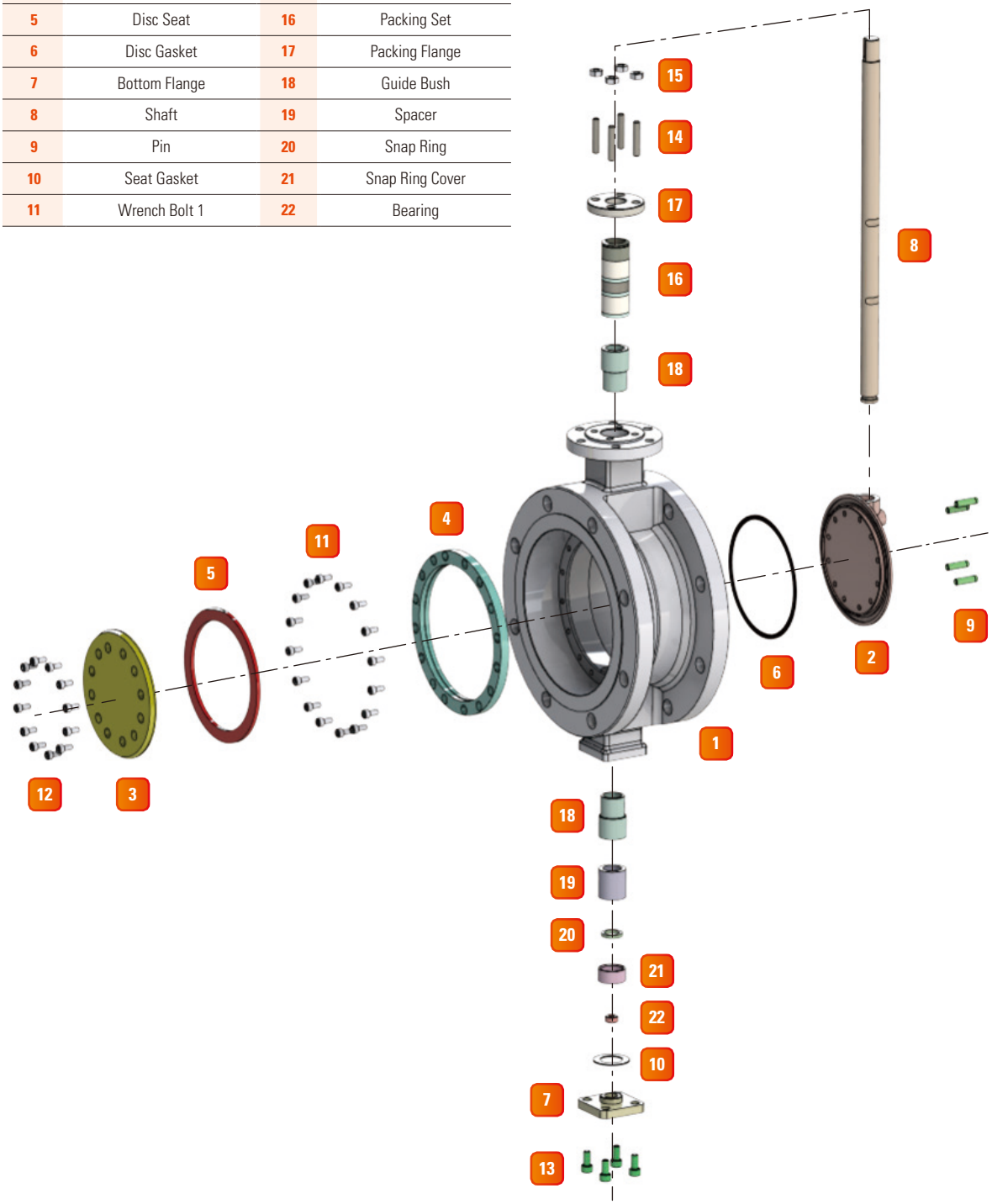
Shaft & Packing

One piece shaft enables the valve to stand against full rated pressure in both directions. A packing gland and a guide bush are designed to hold the groove of the shaft in order to keep the shaft from blowing out by unexpected force and inevitable situation.

Packings are designed to give excellent resistance to pressure and effective at both low and high pressures with little of no gland adjustment required.

Valve Disassembly Description

No.	Part Name	No.	Part Name
1	Body	12	Wrench Bolt 2
2	Disc	13	Bottom Bolt
3	Disc Seat Holder	14	Packing Stud
4	Body Seat	15	Packing Nut
5	Disc Seat	16	Packing Set
6	Disc Gasket	17	Packing Flange
7	Bottom Flange	18	Guide Bush
8	Shaft	19	Spacer
9	Pin	20	Snap Ring
10	Seat Gasket	21	Snap Ring Cover
11	Wrench Bolt 1	22	Bearing

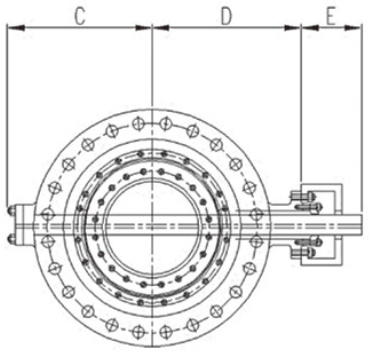


STANDARD SPECIFICATION

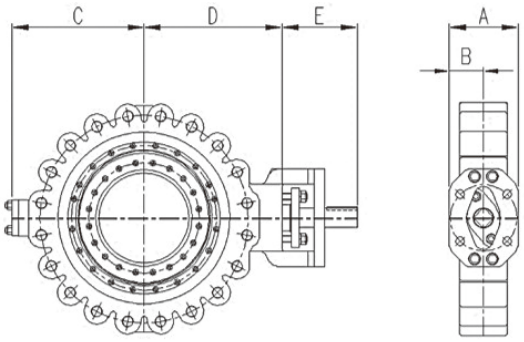
DESIGN STANDARD	API 609
SIZE	6" to 52" (DN 150 to 1300)
PRESSURE RATING	ANSI 150LBS to 1500LBS
LEAKAGE	FCI-70.2 Standard : ANSI Class V (Metal Seat) Option : ANSI Class VI
Cv RANGE	633 to 81,680
PRESSURE RANGE	Up to 3,700 psi (g) Up to 260 Kg/cm²
OPERATING TEMPERATURE RANGE	-58˚F to +1,050˚F -50˚C to +565˚C Option : -320˚F to +1,562˚F -192˚C to +850˚C
END CONNECTIONS	Wafer Flange less Lugged Double Flange
MATERIALS	Carbon Steel (WCB, WCC) Chrome-moly Steel (WC6, WC9, C12A) Stainless Steel (CF8, CF8M, CF3, CF3M) Other Alloys
ACTUATORS	Pneumatic Actuator Motor Actuator Gear Operating Level Handle Bare Stem
APPLICATIONS	Oil and Gas Storage, Transportation, Gathering Systems LPG and LNG Production, Storage, Transportation Petrochemical Industry Refining Industry Power Generation Pulp and Paper Industry

Note!
-Other standards and codes are applicable upon request.

ANSI CLASS 150LBS, 300LBS, 600LBS DIMENSION



Double Flange Design



Wafer Lugged Design

mm

Valve Size		150 LBS						300 LBS						600LBS					
		Double Flange Design			Wafer Lugged Design			Double Flange Design			Wafer Lugged Design			Double Flange Design			Wafer Lugged Design		
Inch	mm	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
6	150	140	168	297	57	168	297	140	194	322	59	194	322	210	230	400	78	230	400
8	200	152	202	341	64	202	341	152	230	385	73	230	385	230	265	460	102	265	460
10	250	165	235	390	71	235	390	165	260	444	83	282	444	250	300	520	117	300	520
12	300	178	285	450	81	285	450	178	305	490	92	312	490	270	325	545	140	325	545
14	350	190	287	492	92	315	492	190	332	562	117	332	562	290	360	605	155	360	605
16	400	216	360	520	102	380	520	216	365	620	133	387	620	310	400	680	175	400	680
18	450	222	386	581	114	386	581	222	408	732	149	431	732	330	420	770	200	420	770
20	500	229	402	608	127	402	608	229	453	768	159	464	768	350	465	810	216	465	810
24	600	267	489	741	154	489	741	267	520	915	181	557	915	390	530	930	232	530	930
26	650	292	485	780	229	485	780	292	535	950	229	535	950	430	485	975	292	560	975
28	700	292	515	810	229	515	810	292	580	985	229	580	985	430	515	1010	292	585	1010
30	750	318	545	859	229	597	930	318	605	1040	229	651	1040	430	545	1060	318	615	1060
32	800	318	580	905	229	636	930	318	635	1060	241	695	1060	470	580	1095	318	655	1095
34	850	330	610	950	241	610	950	330	665	1090	241	665	1090	470	610	1120	330	685	1120
36	900	330	635	975	241	635	975	330	695	1120	241	695	1120	510	635	1150	330	720	1150
38	950	410	670	1025	300	670	1025	410	670	1095	300	670	1095	550	670	1130	410	700	1130
40	1000	410	695	1050	300	695	1050	410	695	1135	300	695	1135	550	695	1175	410	725	1175
42	1050	410	725	1080	300	725	1080	410	725	1165	300	725	1165	550	725	1215	410	765	1215
44	1100	410	750	1105	300	750	1105	410	750	1190	300	750	1190	550	750	1240	410	795	1240
46	1150	470	780	1150	350	780	1150	470	780	1220	350	780	1220	630	780	1280	470	825	1280
48	1200	470	815	1195	350	815	1205	470	815	1275	350	815	1275	630	815	1320	470	865	1320

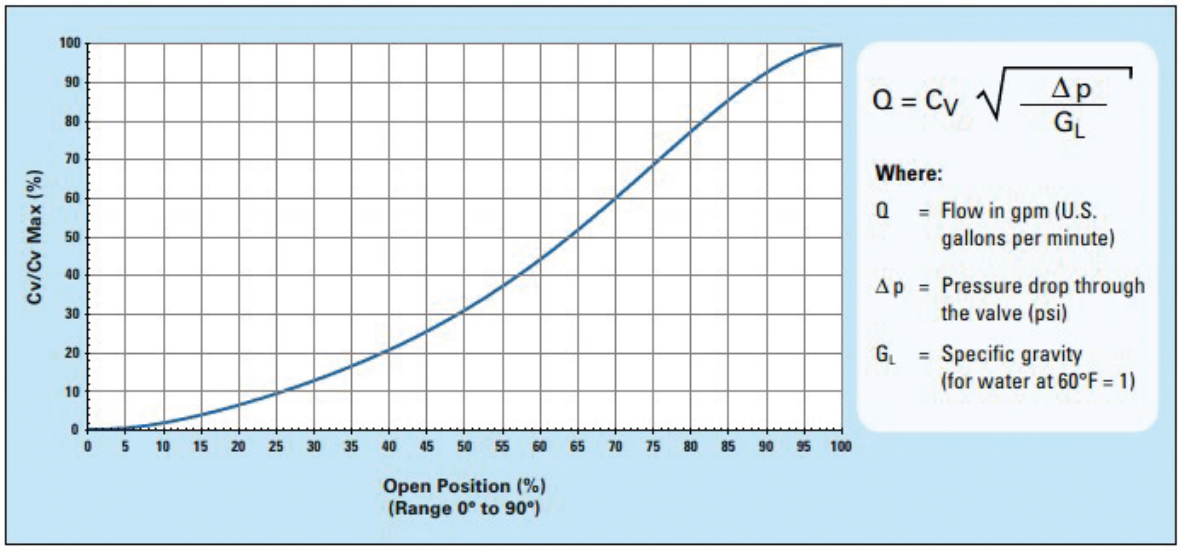
Note!
All dimensions are approximate and subject to change. Consult sales offices for other size requirements.

Cv FLOW COEFFICIENT

CLASS	Size							
	6"	8"	10"	12"	14"	16"	18"	20"
150	633	1511	2467	4024	5200	6870	9255	11718
300	622	1273	2295	3580	4801	6442	8622	11463
600	591	1090	1686	2559	3421	4719	6112	8366

CLASS	Size						
	24"	28"	30"	36"	40"	42"	48"
150	18621	25694	30507	44626	58541	62536	81680
300	16545	24061	29750	43993	-	-	-
600	12737	-	-	-	-	-	-

Note!
Cv at 90° fully open valve



CV CURVE

CLOSING TORQUE - NM

ASME Class 150

DN	ISO/ MSS	RUN TORQUE[1]	HP SIDE[2]						BI-DIRECTIONAL						MAST(3)		
			6 bar (90 PSI)[4]		10 bar (150 PSI)		20 bar (285 PSI)		6 bar (90 PSI)		10 bar (150 PSI)		20 bar (285 PSI)		Nm		
			BTO[5]	ETC[6]	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	S/S 410	S/S 660	S/S 630
80	FA07/10	45	22	24	28	28	42	41	22	33	28	33	42	50	219	196	265
100	FA07/10	49	31	35	43	45	69	66	31	50	43	50	69	80	383	342	463
150	FA10	85	68	74	100	76	174	121	68	108	100	108	174	186	619	554	750
200	FA14	141	123	182	198	182	353	298	123	247	198	247	353	433	947	847	1147
250	FA14	215	283	397	447	397	788	633	283	507	447	507	788	866	1366	1222	1654
300	FA14	321	483	590	758	590	1329	930	483	805	758	805	1329	1376	2095	1874	2536
350	FA16	526	517	510	842	510	1519	824	517	894	842	894	1519	1571	3005	2689	3638
400	FA16	969	730	754	1090	754	1900	1184	730	1185	1090	1185	1900	2049	4918	4400	5953
450	FA25	1280	1220	1578	2068	1578	3703	2541	1220	2205	2068	2205	3703	3821	7559	6763	9151
500	FA25	2321	1504	1485	2640	1485	4751	2385	1504	2755	2640	2755	4751	4833	10929	9779	13230
600	FA30	3373	2793	2818	4838	2818	8779	4572	2793	6432	4838	6432	8779	9013	19126	17112	23152
700	FA35	8521	5462	3748	9120	3748	16178	5607	5462	8624	9120	8624	16178	15149	30601	27380	37043
750	FA35	9838	5497	3572	9748	3572	17947	5653	5497	9404	9748	9404	17947	16946	30601	27380	37043
900	FA40	16241	9986	4922	16882	4922	31199	7758	9986	15449	16882	15449	31199	28052	56922	50930	68905
1000	FA40	22484	14845	9034	23653	9037	43468	13217	14845	22238	23653	22238	43468	39081	86976	77821	105287
1050	FA48	26123	14992	10342	25299	10342	46711	17293	14992	22785	25299	22785	46711	41382	121494	108705	147071
1200	FA48	35181	21887	13639	36749	13639	67626	23611	21887	32469	36749	32469	67626	58884	164025	146760	198557

ASME Class 300

DN	ISO/ MSS	RUN TORQUE[1]	HP SIDE[2]						BI-DIRECTIONAL						MAST[3]		
			10 bar (150 PSI)		20 bar (285 PSI)		50 bar (725 PSI)		10 bar (150 PSI)(4)		20 bar (285 PSI)		50 bar (725 PSI)		Nm		
			BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	S/S 410	S/S 660	S/S 630
80	FA07/10	45	28	41	42	41	89	87	28	33	42	50	89	113	219	196	265
100	FA07/10	49	43	66	69	66	153	146	43	50	69	80	153	187	383	342	463
150	FA14	99	114	140	193	140	452	320	114	121	193	202	452	484	947	847	1147
200	FA14	219	247	373	426	373	1009	868	247	292	426	491	1009	1184	2095	1874	2536
250	FA16	319	447	633	788	633	1900	1490	447	507	788	866	1900	2106	3005	2689	3638
300	FA16	510	758	930	1329	930	3189	2160	758	805	1329	1376	3189	3332	4918	4400	5953
350	FA25	727	1037	1143	1843	1143	4471	2666	1037	1060	1843	1835	4471	4469	7559	6763	9151
400	FA25	1267	1565	1886	2791	1886	6783	4431	1565	1700	2791	2936	6783	7168	10929	9779	13230
450	FA30	1675	2068	2541	3703	2541	9031	6008	2068	2205	3703	3821	9031	9348	14025	12549	16978
500	FA30	2913	3356	3379	5827	3379	13881	7657	3356	3338	5827	5687	13881	13694	19126	17112	23152
600	FA35	4701	4833	4742	8780	4742	21624	11172	4833	4690	8780	9148	21624	22537	30601	27380	37043
700	FA40	10872	9750	7111	17652	7111	43419	16465	9750	9454	17652	16336	43419	40238	56922	50930	68905
750	FA40	11632	12132	8788	21305	8788	51208	19426	12132	11309	21305	19502	51208	47187	56922	50930	68905
900	FA48	18803	16881	8023	31202	8023	77874	18759	16881	16035	31202	28263	77874	70536	99089	88659	119950

ASME Class 600

DN	ISO/ MSS	RUN TORQUE[1]	HP SIDE[2]						BI-DIRECTIONAL						MAST[3]		
			20 bar (285 PSI)		50 bar (725 PSI)		100 bar (1450 PSI)		20 bar (285 PSI)		50 bar (725 PSI)		100 bar (1450 PSI)		Nm		
			BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	S/S 410	S/S 660	S/S 630
100	FA14	43	95	183	205	183	384	434	95	221	205	211	384	420	947	847	1147
150	FA14	72	244	551	546	551	1045	1063	244	282	546	282	1045	1261	2095	1874	2536
200	FA16	178	589	1279	1306	1279	2488	2458	589	624	1306	624	2488	2743	4918	4400	5953
250	FA25	665	1029	2025	2399	2025	4655	3938	1029	1066	2399	1066	4655	4895	7559	6763	9151
300	FA30	1102	1643	3406	3865	3406	7523	6654	1643	1802	3865	1802	7523	8351	10929	9779	13230
350	FA30	1803	2590	4529	5881	4529	11304	8684	2590	2563	5881	2563	11304	11458	19126	17112	23152
400	FA35	3033	3955	6356	9137	6356	17402	12219	3955	3775	9137	3775	17402	17130	30601	27380	37043
450	FA35	4153	5321	8181	12391	8181	23499	15754	5321	4987	12391	4987	23499	22801	43625	39033	52809
500	FA40	6495	7726	12684	18158	12684	35343	24594	7726	7461	18158	7461	35343	24457	56922	50930	68905
600	FA48	9760	14551	12382	34677	19891	67842	38562	14551	17762	34677	17762	67842	62292	121494	108705	147071

Note!

(1) Operating torque to open and close the valve between 0-90 for precess flows up to 4.5 m/s for liquids and 45 m/s for gases.

(2) Preferred installation (designated by HP stamp on corresponding valve flange) - Flow direction : Inlet on HP side - Isolation : High pressure on HP side.

(3) MAST : Maximum allowabe stem torque

(4) BTO : Break-to-open

(5) ETC : End-to-close

NUMBERING SYSTEM

V	1	2	3	-	4	5	6	7

Valve Constructions

000. VALVE SERIES	
600	TRIPLE-OFFSET BUTTERFLY VALVE

1. SERVICE	
S	STANDARD
J	JACKET
C	CRYOGENIC
Y	SPECIAL

2. CONNECTION	
W	WAFER
L	LUGGED
D	DOUBLE
Y	SPECIAL

3. TYPE OF BALL	
R	RUBBER
T	TEFLON
M	METAL
L	LAMINATE SEAL
Y	SPECIAL

Body Constructions

4,5. BODY SIZE (INCH)			
CODE	INCH	CODE	INCH
A5	6	G5	30
B0	8	H0	32
B5	10	I0	36
C0	12	I5	38
C5	14	J0	40
D0	16	J5	42
D5	18	K0	44
E0	20	K5	46
E5	22	L0	48
F0	24	L5	50
F5	26	M0	52
G0	28	YY	SPECIAL

6. PRESSURE RATING	
B	ANSI 150LB
E	ANSI 300LB
H	ANSI 600LB
K	ANSI 900LB
L	ANSI 1500LB
Y	SPECIAL
Y	SPECIAL

Operator

10. OPERATOR	
P	PNEUMATIC ACTUATOR
M	MOTOR ACTUATOR
G	GEAR OPERATOR
L	LEVEL HANDLE
B	BARE STEM
Y	SPECIAL

UNICON

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