

C-Series



DK T.M.I INT'L

BUTTERFLY VALVES CONCENTRIC TYPE

DK T.M.I INT'L BUTTERFLY
RAINBOW Series

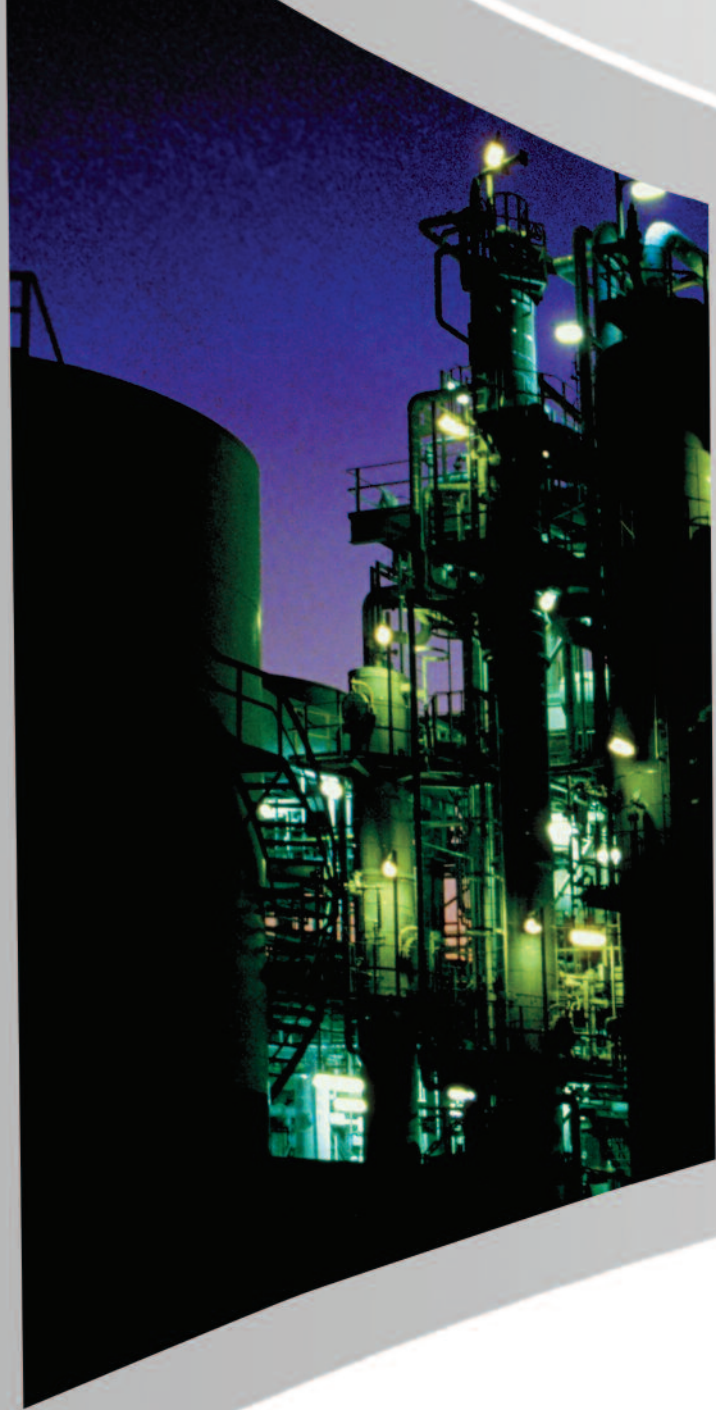
Model	Valve Type
C-sr	Concentric Type
H-sr	High Performance/Cargo
MT-sr	Triple Offset Metal Seat
W-sr	Water Works
M-sr	Marine Valves
Cr-sr	Cryogenic Valves

 **DK T.M.I INTERNATIONAL Co., Ltd.**

<http://www.dktmi.com>



ISO 9001 : 2000
KSA 9001 : 2001



DK T.M.I INT'L

Business philosophy to secure the newest and best quality products starts from the best facilities and systemized management!

Greetings



We are specialized in the production of the industrial and technical butterfly valves since our foundation, and thus have obligations and the strong will to develop the new phase of valve for the jump of Advanced Industrial Korea and have devoted our best efforts to the continuous technical innovation and the development of new products with accumulated knowledge and technology in consideration with the characteristics of pressure, temperature and fluid of all kinds of pipe line based on the high quality and the excellent technique upon the demand and request of user, and thus are already acknowledged in its quality and performance by domestic and foreign market. We promise you that we will manufacture the products with our eagerness and sincerity even a small quantity, by the attitude which we will assume responsibility of our products until end, taking our principle as the honesty and the trust, and moreover hope you to be prosperous and to have the endless development. We want your favorable encouragement and continuous guidance from now on. Thank you

President, H.B.Lee

Handwritten signature of H.B. Lee in black ink. The signature is stylized and includes the name 'H.B. Lee' written below the main signature.

Company History

1980

- 1986. 05. The foundation as named Dongkwang Precision Ind.
- 1989. 12. The production of Butterfly Valve

1990

- 1992. 10. The vendor registration of POSCO CO., LTD.
- 1992. 12. The vendor registration of Yechone Namhae Chemical Ltd.
- 1993. 06. The Establish of our own foundry
- 1995. 08. The turnover as named Dongkwang Valve Co., Ltd.
- 1998. 06. Acquired ISO 9001 Certificate
- 1998. 07. The establish of second factory
- 1999. 03. The vendor registration of HANJIN Heavy Ind., Ltd.

2000

- 2002. 03. The vendor registration of Daelim E&C
The vendor registration of Hyundai E&C
- 2006. 08. The vendor registration of Hyundai Samho Heavy Ltd.
- 2006. 10. Acquired "ABS Type Approval" Certificate
- 2006. 11. Acquired "CE" Certificate
- 2007. 03. Acquired "API" Certificate
- 2007. 04. The vendor registration of SK E&C.
- 2007. 05. The vendor registration of DONGYANG Chemical Co., Ltd.
- 2007. 06. The vendor registration of HONAM Petrochemical Ltd.
- 2008. 07. The Established of R&D Center
- 2008. 10. Acquired "Lloyd" s Type Approval Certificate
- 2008. 11. Acquired "Innobiz company certificate"
- 2008. 12. Acquired "DNV" Type Approval

Quality management Facilities and Equipments

DK T.M.I INT'L is always stepping ahead with the second to-none competitive power to make a difference from other rival companies thanks to the complete system by linking with the up-to-date equipments and the best quality management in a systematic way!



CERTIFICATE

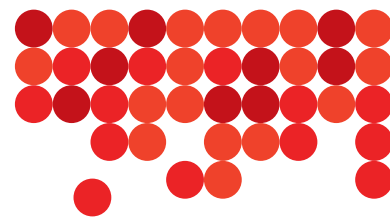
Received certification in outstanding technology and high quality



INDEX Butterfly Valves

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SPECIFICATIONS



- ✔ **Standard** according to ISO 5752 - BS 5155 - MSS SP 67 - API 609
- ✔ **Product range** 40mm up to 1200mm (1 1/2"~48")
- ✔ **Pressure range** designed for maximum working pressure of 10bar
- ✔ **Flange connections** The shape of valve body has been so designed as to allow flange bolt alignment onto following standards. Wafer type valve has been successfully developed to fit multi functional application onto either connection standard in the same configuration, mainly
 - ISO PN6, 10, 16 • ANSI B 16.1 CL. • BS 4504 PN6, PN10, PN16 • AS 2129 Table D and E
 - MSS SP 44 CL. 150 • ANSI B 16.5 CL. 150 • BS10 Table D and E • JIS B 2210 5K, 10K
- ✔ **Face to face dimensions** in accordance with ISO 5752, BS 5155, MSS SP67 and AP I609
- ✔ **Actuator connection** valves can be fitted with any 1/4 turn actuator equipped with a mounting plate meeting the standard ISO 5211
- ✔ **Test Inspection** DK valves are guaranteed to seal perfectly (no visible leakage) in both flow directions. The test conforms to API 598
 - **Body test** : 1.5times the maximum working pressure with water. The test is performed on the assembled valve with the disc in half open position.
 - **Seat and shaft seal test** : 1.1 times the maximum working pressure. The shaft seal test and inspection is conducted simultaneously with seat test.

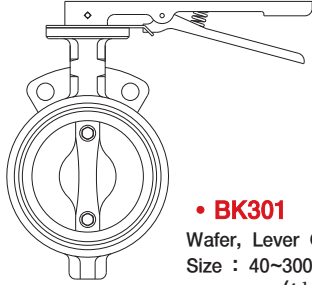
Standard materials

① Body	<ul style="list-style-type: none"> • Cast iron • Ductile iron • Carbon steel • Stainless steel • Bronze 	ASTM A126 Cl. B ASTM A 536 Gr. 65 - 45 - 12 ASTM A 216 WCB ASTM A 351 Gr. CF8 - CF8M ASTM B 62
② Disc	<ul style="list-style-type: none"> • Ductile iron • Stainless steel • Aluminum bronze • Coated 	ASTM A 536 Gr. 65-45-12 ASTM A 351 Gr. CF8-CF8M ASTM B 148 Cl. C95500 PFA-EPDM, Viton, Buna-N, etc
③ Stem	<ul style="list-style-type: none"> • Stainless steel • Stainless steel • Stainless steel • Stainless steel • K-Monel 	ASTM A 276 304 ASTM A 276 410 ASTM A 276 316 17-4PH ASTM A 564 TYPE 630 ASTM B 164
④ Seat	Elastomer <ul style="list-style-type: none"> • PTFE 	Working temperature -10°C ~ +100°C
⑤ Rubber ring	<ul style="list-style-type: none"> • Rubber 	
⑥ Disc bolt	<ul style="list-style-type: none"> • Stainless steel • Stainless steel 	304 SS 316 SS
⑦ Packing	<ul style="list-style-type: none"> • NBR • EPDM 	
⑧ Grand	<ul style="list-style-type: none"> • PP 	
⑨ Back up Ring	<ul style="list-style-type: none"> • PTFE 	

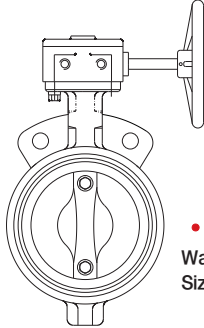
- ※ Coated disc will be one-piece disc and shaft
- ※ Self-locking feature, thread into the far side of the disc, and use an O-ring under the head for sealing

DK BUTTERFLY VALVES

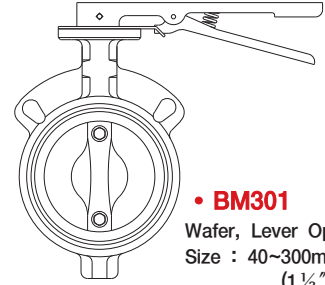
STANDARD MODEL SELECTION



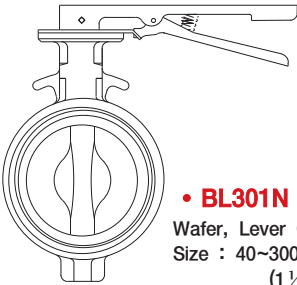
• **BK301**
Wafer, Lever Op
Size : 40~300mm
(1 1/4"~12")



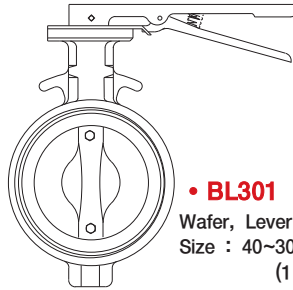
• **BK301G**
Wafer, Gear Op
Size : 40~150mm
(1 1/4"~6")



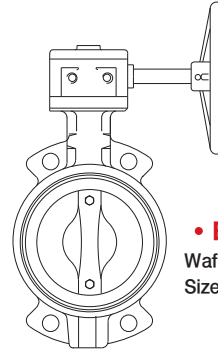
• **BM301**
Wafer, Lever Op
Size : 40~300mm
(1 1/2"~12")



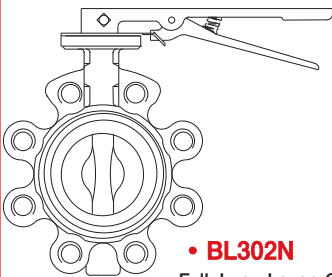
• **BL301N**
Wafer, Lever Op
Size : 40~300mm
(1 1/2"~12")



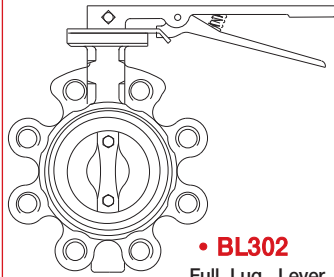
• **BL301**
Wafer, Lever Op
Size : 40~300mm
(1 1/2"~12")



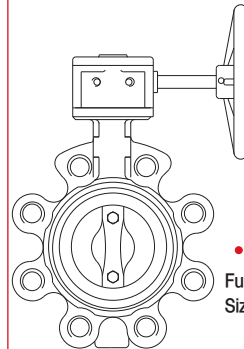
• **BG301**
Wafer, Gear Op
Size : 200~1000mm
(8"~40")



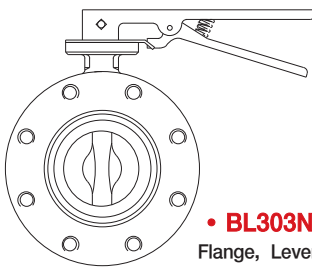
• **BL302N**
Full Lug, Lever Op
Size : 40~300mm
(1 1/2"~12")



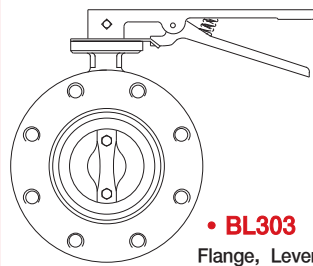
• **BL302**
Full Lug, Lever Op
Size : 40~300mm
(1 1/2"~12")



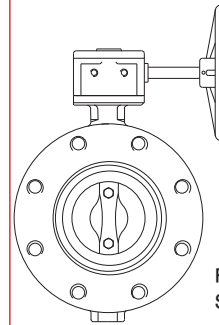
• **BG302**
Full Lug, Gear Op
Size : 40~1000mm
(1 1/4"~40")



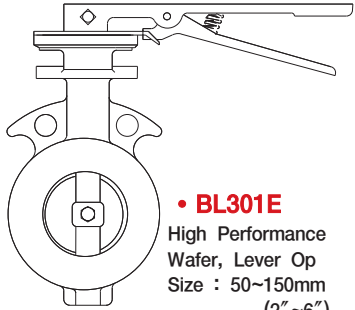
• **BL303N**
Flange, Lever Op
Size : 40~300mm
(1 1/2"~12")



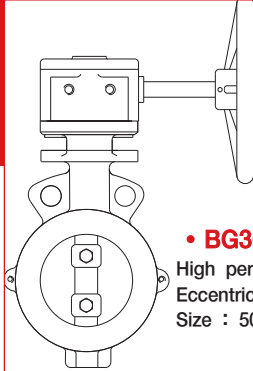
• **BL303**
Flange, Lever Op
Size : 40~300mm
(1 1/2"~12")



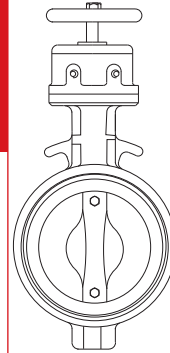
• **BG303**
Flange, Gear Op
Size : 40~1000mm
(1 1/4"~40")



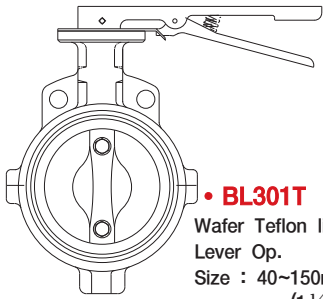
• **BL301E**
 High Performance
 Wafer, Lever Op
 Size : 50~150mm
 (2"~6")



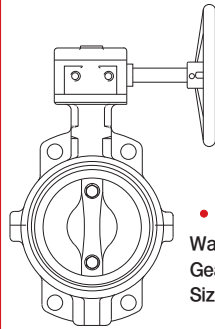
• **BG301E**
 High performance
 Eccentric, Gear Op
 Size : 50~1000mm
 (2"~40")



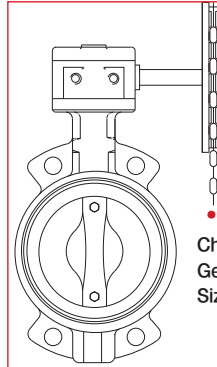
• **BC301**
 Wafer
 Center wheel Op
 Size : 40~300mm
 (1 1/2"~12")



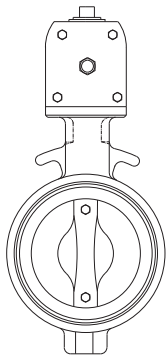
• **BL301T**
 Wafer Teflon lined
 Lever Op.
 Size : 40~150mm
 (1 1/4"~6")



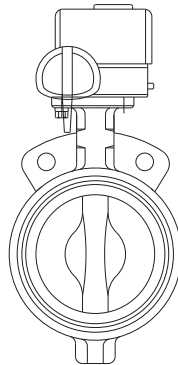
• **BG301T**
 Wafer Teflon Lined,
 Gear Op
 Size : 200~800mm
 (8"~32")



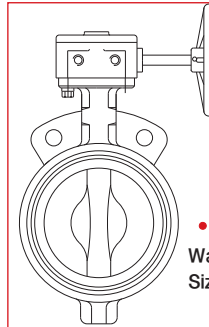
• **BW301**
 Chain wheel Op.
 Gear Op
 Size : 40~1000mm
 (1 1/4"~40")



• **BE301**
 Wafer
 Pneumatic Op
 Size : 40~1000mm
 (1 1/2"~40")



• **BP301**
 Wafer
 Electric Op
 Size : 40~1000mm
 (1 1/2"~40")



• **BG301N**
 Wafer Gear Op
 Size : 350~600mm
 (14"~24")

GENERAL FEATURES

KS B 2813

Wafer butterfly valve of which retentive elastomer liner can be replaced on site without extra tools Complete, permanent and continuous leak-tightness provided by spherical contact between the disc and the liner and shaft sealing provided by flatly raised seat surface and polished disc-hub area.

Leak-tightness at Line stream

A perfect zero leakage seal at bi-direction is obtained by the compression of the inner between the valve body and the edge of the disc. A perfect zero leakage seal is provide by means of flatted liner area around both up and down shaft passages and the spherically machined disc.

:: Heavy duty top bushing absorbs side thrust load

:: Mounting plate in accordance with ISO standard

:: Sealing

Hub seal provided by preloaded contact between flatted seat surface and spherically machined and polished disc-hub area for positive sealing at all disc positions.

:: Disc edge

Spherically machined and polished disc edge provide full concentric sealing, lower lever torques, seat life and positive shut-off closed at both directions.

:: Liner

Retained resilient seat to valve enable easy replacement and isolates the body and stem from the flow. Special design of built-in O-ring provides positive flange sealing with no pipeline gasket required.

:: Piping guide rib

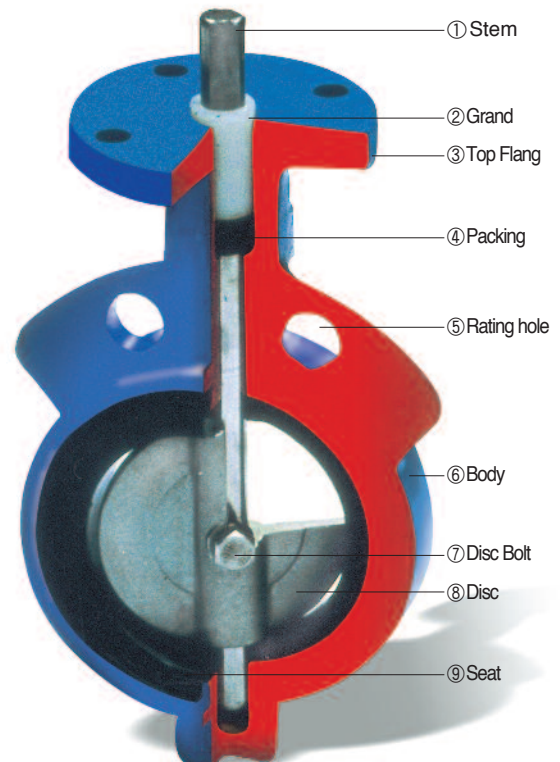
Flange bolt alignment and installation suit for multi-national standard such as JIS, DIN, ANSI and BS flange standard.

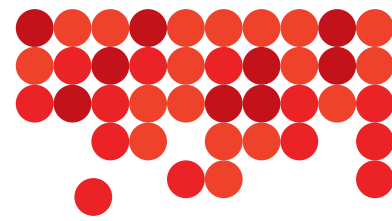
:: Body

Face to face dimension in accordance with API and ISO standard

:: Thru-shaft

provide high strength and absolutely BOLTED disc control and gives minimum obstruction to flow





SPECIFICATIONS

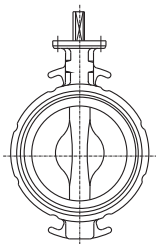
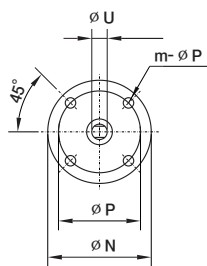
- ✓ **Standard** according to KS B 2813
- ✓ **Product range** 50mm up to 600mm
- ✓ **Pressure range** designed for maximum working pressure of 10k
- ✓ **Flange connections** KS B 1511 10k
- ✓ **Face to face dimensions** in accordance with KS B 2306, ISO 5752 - Series No. 46.
- ✓ **Actuator connection**
valves can be fitted with any 1/4 turn actuator equipped with a mounting plate meeting the standard ISO 5211
- ✓ **Test Inspection**
DK valves are guaranteed to seal perfectly (no visible leakage) in both flow directions. The test conforms to KS B 2813
 - **Body test** : 1.5 times the maximum working pressure with water. The test is performed on the assembled valve with the disc in half open position.
 - **Seat and shaft seal test** : 1.1 times the maximum working pressure. The shaft seal test and inspection is conducted simultaneously with seat test.

Standard materials

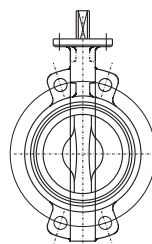
- 1 Body**
 - Cast iron
KS D 4301, FC 200 and up to, KS D 4302 FCD 370, FCD 400, FCD 450, KS B 6733, FCD-S, KS D 4303, FCMB 340 and up to
 - Forged steel
KS D 3710 SF 440 and up to, KS D 4122 SFVC 2A, SFVC 2B
 - Cast steel
KS D 4101, SC 480 and up to, KS D 4107 SCPH¹ and up to,
 - Stainless steel
KS D 4115, KS D 3706, SCS 300 series
 - Copper alloy
KS D 6002 BC⁶ and up to, KS D 6015 AL-BC² and up to,
 - Aluminum
KS D 6006 ADC 12 (only concentric)
- 2 Disk**
 - Cast iron
KS D 4301 FC 200 and up to, KS D 4302 FCD 370, FCD 400, FCD 450, KS B 6733 FCD-S, KS D 4303 FCMB 340 and up to
 - Forged steel
KS D 3710 SF 440 and up to, KS D 4122 SFVC 2A, SFVC 2B
 - Cast steel
KS D 4101 SC 480 and up to, KS D 4107 SCPH¹ and up to
 - steel plate
KS D 3503 SS 330 and up to
 - Stainless steel
KS D 4115, KS D 3706 SCS 300 series, STS 400 series.
 - Stainless steel plate
KS D 3705, KS D 3698 STS 300 series
 - Copper alloy
KS D 6002 BC⁶ and up to, KS D 6015 AIBC² and up to
- 3 Stem**
 - Stainless steel
KS D 3706 STS 304, STS 316, STS403, STS 420F, STS 431, STS 630
 - Copper alloy
KS D 5101 C 6161 and up to

4 Seat	Working pressure	Maximum permissible working pressure kgf/cm ²	Working temperature °C	Elastomer
	10K	10	0~70	NBR · CR
			0~80	EPDM
		7	100 and Below	

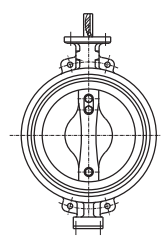
WAFER BODY



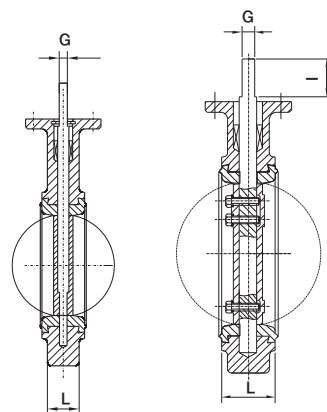
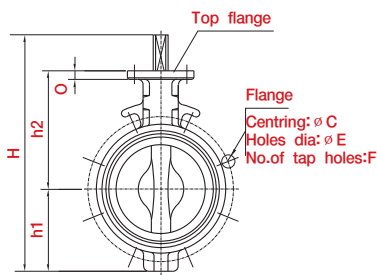
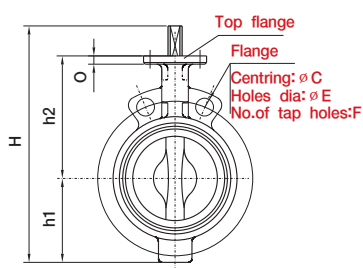
Size 10" ~ 12"



200A~300A



Size 400A~1000A



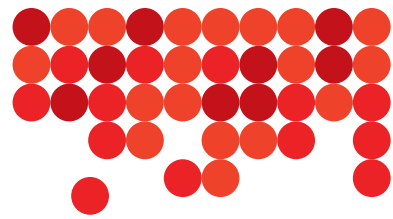
□ Valve dimensions

Unit(mm)

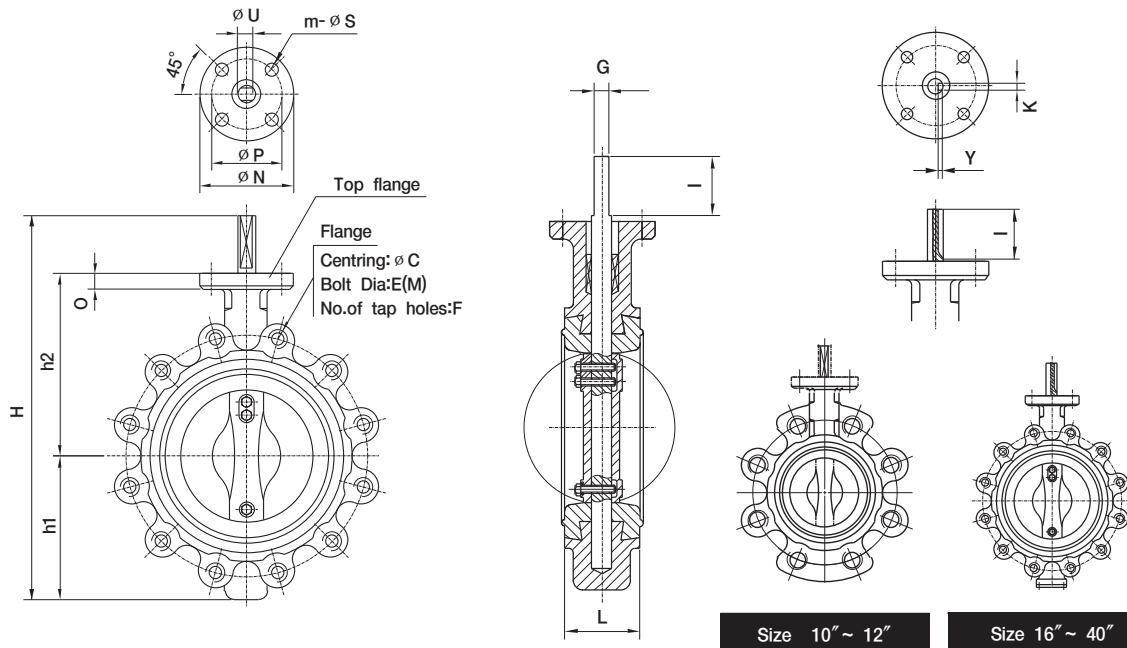
Size		L	H	h1	h2	Stem		Top flange to ISO 5211					O	W T (Kg)
Inch	mm					ø U	G	Type	ø N	ø P	m	ø S		
1 1/2"	40	41	205	58	124	10	8	F07	90	70	4	9	10	3.1
2"	50	43	227	66.5	130.5	14	10	F07	90	70	4	9	11	3.7
2 1/2"	65	46	241	71	140	14	10	F07	90	70	4	9	11	4
3"	80	46	263	83	150	14	10	F07	90	70	4	9	11	4.4
4"	100	52	290	95	163	16	12	F07	90	70	4	9	11	5.9
5"	125	56	319	110	178	19	15	F07	90	70	4	9	12	8.9
6"	150	56	347	124	191	19	15	F07	90	70	4	9	12	9
8"	200	60	433	163	238	22	18	F07	90	70	4	9	13	11
10"	250	68	546	227	285	28	20	F10	125	102	4	12	15	20
12"	300	78	601	252	315	28	20	F10	125	102	4	12	15	31.5

□ Flange drilling

Size		L	H	h1	h2	Stem					Top flange to ISO 5211					O	W T (kg)
Inch	mm					ø U	G	I	Y	K	Type	ø N	ø P	m	ø S		
14"	350	78	675	271	324	32	19.5	45	-	-	F10	125	102	4	12	20	43
16"	400	102	817	343	369	35	-	60	5	10	F14	175	140	4	18	23	63.5
18"	450	114	877	366	406	38	-	60	5	10	F14	175	140	4	18	23	99
20"	500	127	1008	421	485	45	-	60	5	10	F16	210	165	4	22	34	114.5
22"	550	140	1050	450	530	45	-	60	5	10	F16	210	165	4	22	34	152
24"	600	154	1180	493	570	50	-	60	5	10	F16	210	165	4	22	34	214.5
26"	650	165	1260	540	570	50	-	120	5	10	F16	210	165	4	22	34	270
28"	700	165	1355	580	574	70	-	120	5	10	F25	300	254	8	18	35	377
30"	750	180	1445	656	615	70	-	120	5	10	F25	300	254	8	18	35	460
32"	800	180	1495	630	669	80	-	140	5.5	14	F25	300	254	8	18	35	542
36"	900	180	1625	690	671	80	-	140	5.5	14	F30	350	298	8	22	38	699
38"	950	200	1650	710	800	90	-	140	5.5	14	F30	350	298	8	22	38	840
40"	988	200	1802	790	842	90	-	140	5.5	14	F30	350	298	8	22	40	977
48"	1200	276	2130	910	1070	120	-	150	7	22	F30	415	356	8	33	40	1680



FULL LUG BODY



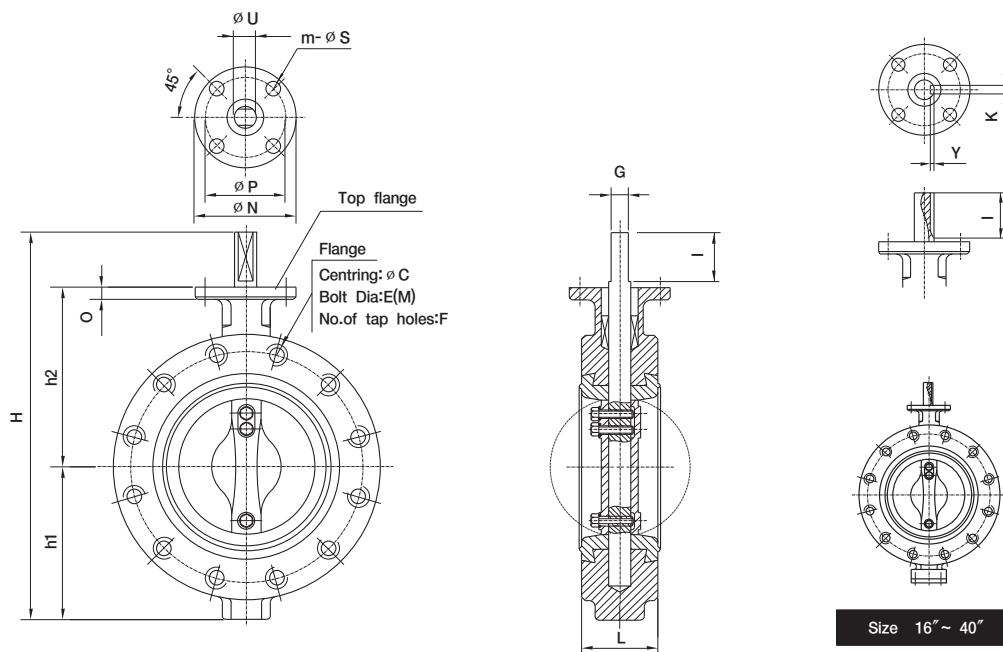
□ Valve dimensions

Size		L	H	h1	h2	Stem		Top flange to ISO 5211				O	W T (Kg)	
Inch	mm					Ø U	G	Type	Ø N	Ø P	m			Ø S
1 1/2"	40	41	205	58	124	10	8	F07	90	70	4	9	10	3.5
2"	50	43	235	72.5	130.5	14	10	F07	90	70	4	9	11	4.1
2 1/2"	65	46	237	75.5	129.5	14	10	F07	90	70	4	9	11	5.5
3"	80	46	255	82	143	14	10	F07	90	70	4	9	11	6.8
4"	100	52	292	99.5	160.5	16	12	F07	90	70	4	9	11	8.6
5"	125	56	317	111	177	19	15	F07	90	70	4	9	12	10.5
6"	150	56	357	134	191	19	15	F07	90	70	4	9	12	12.5
8"	200	60	412	163	217	22	18	F07	90	70	4	9	13	21.4
10"	250	68	519	218	267	28	20	F10	125	102	4	12	15	29.3
12"	300	78	588	249	295	28	20	F10	125	102	4	12	15	44

□ Flange drilling

Size		L	H	h1	h2	Stem					Top flange to ISO 5211				O	W T (Kg)	
Inch	mm					Ø U	G	I	Y	K	Type	Ø N	Ø P	m			Ø S
14"	350	78	675	271	324	32	19.5	45	-	-	F10	125	102	4	12	20	62.2
16"	400	102	817	343	369	35	-	60	5	10	F14	175	140	4	18	23	112
18"	450	114	877	366	406	38	-	60	5	10	F14	175	140	4	18	23	153
20"	500	127	1008	421	485	45	-	60	5	10	F16	210	165	4	22	34	199
22"	550	140	1050	450	530	45	-	60	5	10	F16	210	165	4	22	34	241
24"	600	154	1180	493	570	50	-	60	5	10	F16	210	165	4	22	34	283
26"	650	165	1260	540	570	50	-	120	5	10	F16	210	165	4	22	34	362
28"	700	165	1355	580	574	70	-	120	5	10	F25	300	254	8	18	35	490
30"	750	180	1445	656	615	70	-	120	5	10	F25	300	254	8	18	35	598
32"	800	180	1495	630	669	80	-	140	5.5	14	F25	300	254	8	18	35	677
36"	900	180	1625	690	671	80	-	140	5.5	14	F30	350	298	8	22	38	874
38"	950	200	1650	710	800	90	-	140	5.5	14	F30	350	298	8	22	38	1140
40"	988	200	1802	790	842	90	-	140	5.5	14	F30	350	298	8	22	40	1221
48"	1200	276	2130	910	1070	120	-	150	7	22	F30	415	356	8	33	40	1940

DOUBLE FLANGE BODY



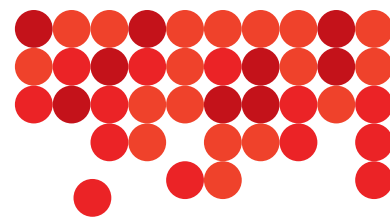
□ Valve dimensions

Unit(mm)

Size		L	H	h1	h2	Stem		Top flange to ISO 5211					O	W T (Kg)
Inch	mm					ø U	G	Type	ø N	ø P	m	ø S		
1 1/2"	40	41	205	58	124	10	8	F07	90	70	4	9	10	6.2
2"	50	43	240	77.5	130.5	14	10	F07	90	70	4	9	11	6.8
2 1/2"	65	46	247	87.5	129.5	14	10	F07	90	70	4	9	11	8.9
3"	80	46	266	92.5	143	14	10	F07	90	70	4	9	11	10.2
4"	100	52	298	105	160.5	16	12	F07	90	70	4	9	11	14.5
5"	125	56	331	125	177	19	15	F07	90	70	4	9	12	16.8
6"	150	56	363	140	191	19	15	F07	90	70	4	9	12	19.8
8"	200	60	412	163	217	22	18	F07	90	70	4	9	13	31.2
10"	250	68	506	205	267	28	20	F10	125	102	4	12	15	46.2
12"	300	78	538	248.5	295	28	20	F10	125	102	4	12	15	58.8

□ Flange drilling

Size		L	H	h1	h2	Stem					Top flange to ISO 5211					O	W T (Kg)
Inch	mm					ø U	G	I	Y	K	Type	ø N	ø P	m	ø S		
14"	350	78	675	271	324	32	19.5	45	-	-	F10	125	102	4	12	20	66.6
16"	400	102	817	343	369	35	-	60	5	10	F14	175	140	4	18	23	96
18"	450	114	877	366	406	38	-	60	5	10	F14	175	140	4	18	23	147
20"	500	127	1008	421	485	45	-	60	5	10	F16	210	165	4	22	34	161
22"	550	140	1050	450	530	45	-	60	5	10	F16	210	165	4	22	34	268
24"	600	154	1180	493	570	50	-	60	5	10	F16	210	165	4	22	34	292
26"	650	165	1260	540	570	50	-	120	5	10	F16	210	165	4	22	34	410
28"	700	165	1355	580	574	70	-	120	5	10	F25	300	254	8	18	35	539
30"	750	180	1445	656	615	70	-	120	5	10	F25	300	254	8	18	35	658
32"	800	180	1495	630	669	80	-	140	5.5	14	F25	300	254	8	18	35	745
36"	900	180	1625	690	671	80	-	140	5.5	14	F30	350	298	8	22	38	944
38"	950	200	1650	710	800	90	-	140	5.5	14	F30	350	298	8	22	38	1260
40"	988	200	1802	790	842	90	-	140	5.5	14	F30	350	298	8	22	40	1307
48"	1200	276	2130	910	1070	120	-	150	7	22	F30	415	356	8	33	40	1990



ELASTOMER PROPERTIES

Elastomer's characteristic and properties are derived from the manufactures and purely indicative. It means that actual working conditions and limit may differ from the values referred. Since many factors influence corrosion and abrasion due to type of fluid, concentration, temperature, turbulence, impurities and etc, the final choice is to be taken care by the customer.

Elastomers	Chemical group	General Application	Service Temperature
EPDM Ethyene propylene	Ethlens Propylene Terpolymer	Water–Steam Sea Water Brine Esters Alkalis Ozone Ketones Alcohols Brake Fluid Treated Water With Caustic soda	-15°C to + 100°C
NBR/ BUNA–N Nitrile rubber	Butadien Acrylontrile Copolymer	Hydrocarbons Natural Gas Oil and Fat Air Gasoline	-10°C to + 80°C
SBR		Acids and Alkalis	-20°C to + 80°C
FPM Viton	Fluorocarbon polymer Viton	Acids Oils Hydrocarbon	-20°C to + 140°C
SI Silicone	Organic silicon polymer	Food Beverage	-20°C to + 120°C
PTFE Teflon	Polyflon TFE	Solvents Corrosive Products	-10°C to + 120°C
CR Neoprene	Chloroprene polymer	Acid, Ozone, Oils Fats Solvents	-10°C to + 90°C

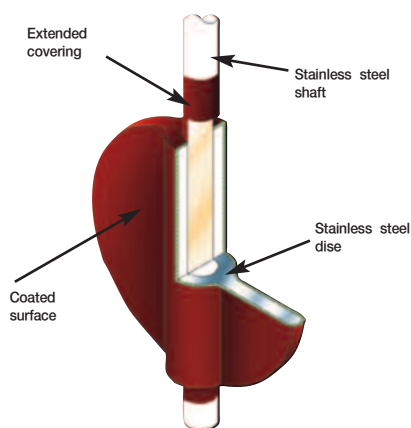
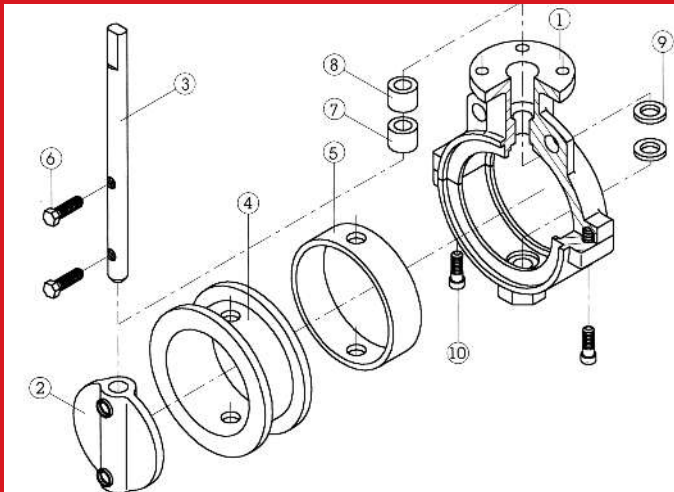
TWO PIECE SPILT BODY TEFLON® LINED

Teflon® covered one-piece stainless steel disc and shaft

The seat configuration of the resiliency of elastomer back-up ring and the chemical resistance of a Teflon® provide the valve with more suitable application to toxic and corrosive media where elastomers are unsuitable.

One-piece disc/shaft provide the very minimum obstruction to fluid flow since shaft-attachment obstruction eliminated. This results in excellent flow characteristics and a valve particularly is suited for the processing industries because fluid contact is limited to the seat and disc only

Teflon® is inert to almost all chemical agents and solvent and has simultaneously excellent properties such as resistance to corrosion and heat and non-adhesive. The valves fully utilize this property in food industry disliking contamination as well as chemical industries. Non-adhesive Teflon® and smooth surface prevent adhesion or stagnation of foreign matters and quality changes of flow.



One-piece Stainless steel disc/shaft

Cut away PFA coated Disc-Stem

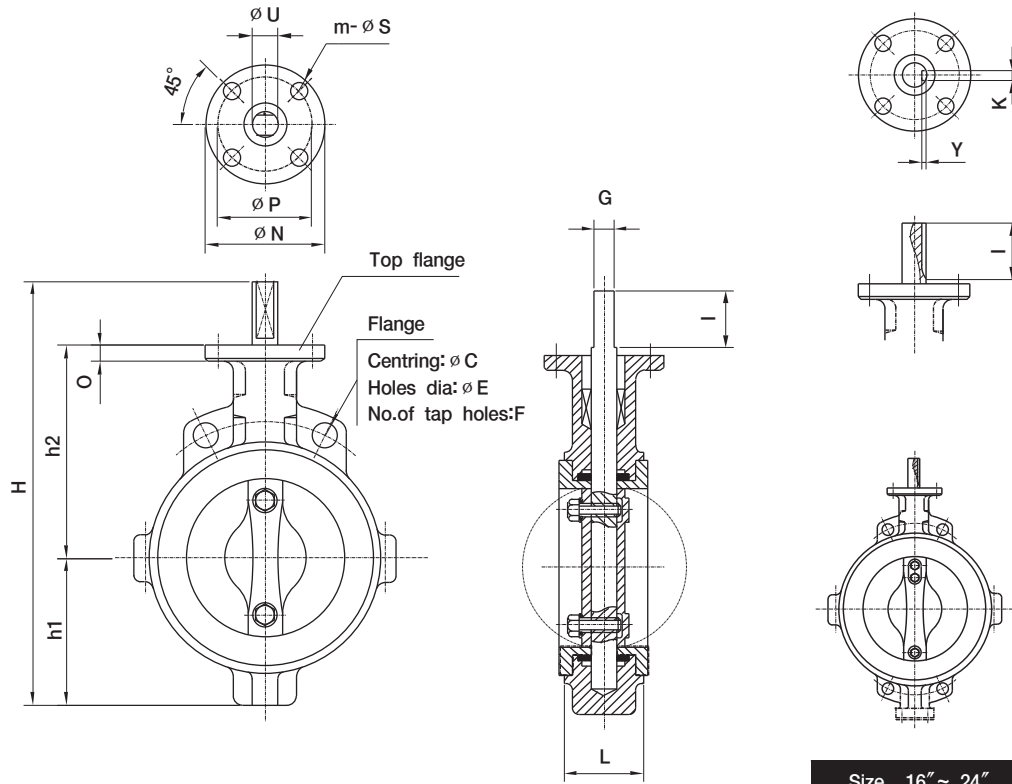
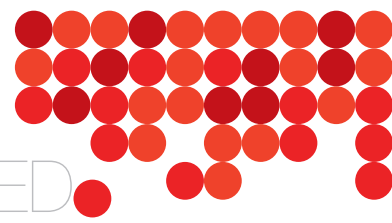
Stainless steel with finish allows proper secondary seal and bearing conditions at seat hole

Extended covering from primary seal through secondary seal into seat hole area assures stem isolation

Complete encapsulation affords complete isolation of steel disc

PFA-covered disc suitable not only for chemically resistant but to handle abrasives in the processing industries

TWO PIECE BODY TEFLON LINED



Size 16" ~ 24"

□ Valve dimensions

Unit(mm)

Size		L	H	h1	h2	Stem			Top flange to ISO 5211				O	W T (Kg)	
Inch	mm					Ø U	G	I	Type	Ø N	Ø P	m			Ø S
2"	50	43	227	66.5	130.5	14	10	38	F07	90	70	4	9	11	4.3
2 1/2"	65	46	241	71	140	14	10	38	F07	90	70	4	9	11	4.5
3"	80	46	263	83	150	14	10	38	F07	90	70	4	9	11	4.9
4"	100	52	290	95	163	16	12	38	F07	90	70	4	9	11	6.3
5"	125	56	319	110	178	19	15	38	F07	90	70	4	9	12	8.9
6"	150	56	347	124	191	19	15	38	F07	90	70	4	9	12	9.4
8"	200	60	433	163	238	22	18	38	F07	90	70	4	9	13	11.5

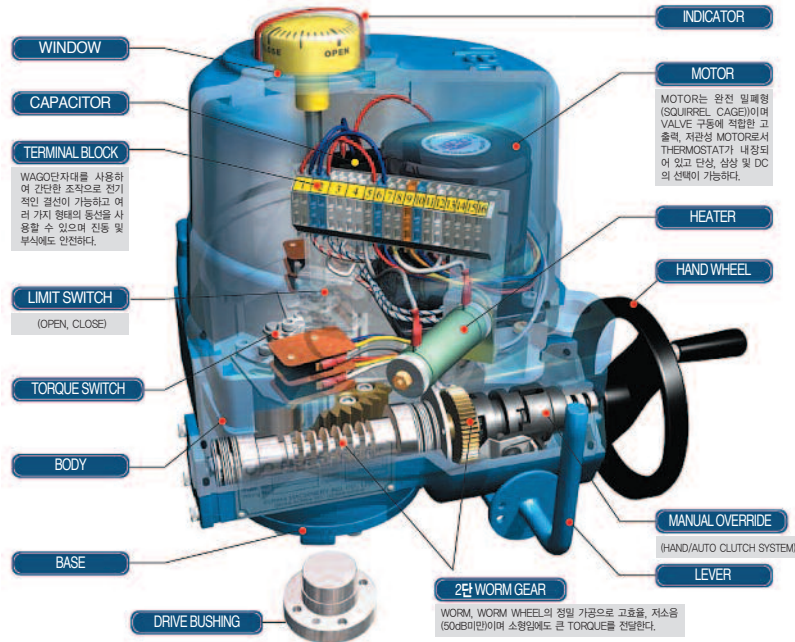
□ Valve dimensions

Unit(mm)

Size		L	H	h1	h2	Stem				Top flange to ISO 5211				O	W T (Kg)		
Inch	mm					Ø U	G	I	Y	K	Type	Ø N	Ø P			m	Ø S
10"	250	68	546	227	285	28	20	45	-	-	F10	125	102	4	12	15	21
12"	300	78	601	252	315	28	20	45	-	-	F10	125	102	4	12	15	32
14"	350	78	675	271	324	32	19.5	45	-	-	F10	125	102	4	12	20	43.6
16"	400	102	817	343	369	35	-	60	5	10	F14	175	140	4	18	23	64
18"	450	114	877	366	406	38	-	60	5	10	F14	175	140	4	18	23	99.7
20"	500	127	1008	421	485	45	-	60	5	10	F16	210	165	6	19	34	115

DK BUTTERFLY VALVE

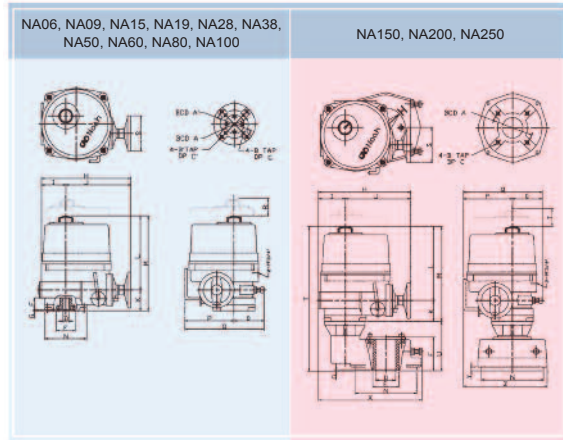
■ CONFIGURATION



■ PERFORMANCE

TYPE	Max Output Torque Kg/m	Operating Time 60/50Hz 90 Deg.	Max Stem Dia mm	Motor Class F W	Rated Current (ma)				Number of Hand Wheel Turns	Weight (kgf)
					110V	220V	380V	440V		
NA 06	6	14/17	22	18	750	450	130	125	8.5	11
NA 09	9	14/17	22	25	1200	580	170	160	8.5	11
NA 15	15	17/20	22	40	1600	950	300	300	10	12
NA 19	19	17/20	22	40	1600	950	300	300	10	13
NA 28	28	20/24	32	40	1800	950	330	340	12.5	17
NA 38	38	20/24	32	60	2300	1300	360	340	12.5	18
NA 50	50	20/24	32	90	3900	1500	260	570	12.5	19
NA 60	60	24/29	42	90	3900	1500	560	570	14.5	22
NA 80	80	24/29	42	180	4700	2150	840	780	14.5	23
NA 100	100	24/29	42	180	4700	2150	840	780	14.5	25
NA 150	150	72/87	75	90	3900	1500	560	570	43.5	68
NA 200	200	72/87	75	180	4700	2150	840	780	43.5	70
NA 250	250	72/87	75	180	4700	2150	840	780	43.5	70

■ DIMENSION



■ STANDARD SPECIFICATION

Enclosure	Watertight Ingress Protection 67 Nema 4 and 6
Ambient Temperature	-20°C to +70°C, 150°C / 1hr
Power Supply	110 / 220 VAC, 1 Phase (60 / 50 Hz)
Control Power	110 / 220 VAC, 1 Phase, 60 / 50Hz
Torque Switches	2 Open / Close (Except NA 06, NA 09)
Limit Switches	2 Open / Close, 250 VAC 15A Rating
Stall Protection	Built-in Thermal Protection (Open 150°C ± 5°C / Close 97°C ± 15°C)
Travel Angle	90° ± 5°
Indicator	Continuous Position Indicator
Manual Override	Hand / Auto Decoupling Mechanism
Self Locking	Provided by means of Worm Gearing
Mechanical Stops	External Adjustable Screws
Space Heater	20 W (110 / 220 VAC, 24 VDC)
Conduit Entries	Two PF 3/4" (NPT 3/4")
Lubrication	Grease Moly (EP Type)
Materials	Steel, Aluminium Alloy, All Bronze
Surface Treatment	Anodizing
External Coating	Dry Powder, Epoxy - Polyester, Polyester(TGIC-Free)

■ OPTIONAL SPECIFICATION

E X P	Explosion Proof & Watertight Enclosure
D C M	Ex d II B T4 IP 67, Eex d II B T4 (NEMKO)
A L S	24 V DC Motor
E X T	Additional Auxiliary Limit Switches
L C U	Travel Angle 120°, 135° ve., 180°, 270°, 300°
P I U	Local Control Unit
C P T	Local / Remote Selector Switch
P C U	Open / Stop / Close Selector Switch or Push button type
I M S	Potentiometer Unit 1K Ohm
	Current Position Transmitter
	Output : DC 4-20ma
	Proportional Control Unit
	Power : AC 110/220V 1PH, DC 24V
	Input : DC 4-20mA, DC 1-5 V, DC 2-10 V
	Output : DC 4-20 mA
	Integral Motor Starter
	Reversing Magnet Contacts and Transformer

TYPE	NA06	NA09	NA15	NA19	NA28	NA38	NA50	NA60	NA80	NA100	NA150	NA200	NA250
Flange	F07	F07	F07	F10	F12	F12	F12	F12	F14	F14	F16	F16	F16
ISO 5211	-	-	F10	F12	F12	F12	F12	F12	F14	F14	F16	F16	F16
A	70	70	102	102	125	125	125	125	140	140	*140	*140	*140
A'	-	-	102	102	125	125	125	125	140	140	*140	*140	*140
B	M8	M8	M8	M10	M10	M10	M10	M10	M12	M12	*M12	*M12	*M12
B'	-	-	M10	M10	M12	M12	M12	M12	M16	M16	*M14	*M16	*M16
C	12	15	18	18	22	22	22	22	22	22	30	30	30
D(MAX)	22	22	22	22	32	32	32	32	42	42	75	75	75
E	55	57	75	75	85	85	85	85	100	100	126	126	126
F	43	43	52	52	59	59	59	59	78	78	116	116	116
G	2	2	2	2	2	2	2	2	2	2	7	7	7
H	231	261	285	285	325	325	325	325	361	361	456	456	456
I	56	77	83	83	99	99	99	99	116	116	151	151	151
J	175	184	202	202	226	226	226	226	261	261	330	330	330
K	60	60	70	70	78	78	78	78	91	91	116	116	116
L	213	213	250	250	283	283	283	283	330	330	414	414	414
M	273	273	320	320	361	361	361	361	426	426	531	531	531
N	102	120	145	145	175	175	175	175	202	202	256	256	256
O	68	85	99	99	116	116	116	116	136	136	171	171	171
P	113	139	159	159	191	191	191	191	226	226	281	281	281
Q	181	224	258	258	307	307	307	307	361	361	456	456	456
R	108	108	130	130	151	151	151	151	181	181	226	226	226
S	102	102	125	125	151	151	151	151	181	181	226	226	226
T	-	-	-	-	-	-	-	-	-	-	-	-	-
U	-	-	-	-	-	-	-	-	-	-	-	-	-
Y	-	-	-	-	-	-	-	-	-	-	-	-	-
Z	-	-	-	-	-	-	-	-	-	-	-	-	-

* : for optional alternative flanges
 품질개선을 위해서 예고없이 사양과 구조 등을 변경할 수 있습니다.

PNEUMATIC CYLINDER

□ Features & Technical Date

Actuator Feature and Advantage

1. Scotch-yoke type.
2. No Metal to metal touch
3. Torque curve \approx Rotating valve torque It produces great torque at the beginning and the end position of rotating valves.
4. Double piston ring(EPDM and Teflon).The drive shaft is guided by protect seal of drive shaft.
5. Perfect weather proof.
6. No fitting & tube necessary - "namur" standard.
7. paint:surface-Anodized internal-Double coating.
8. Easy maintenance- "ISO" standard.
9. High quality and low price

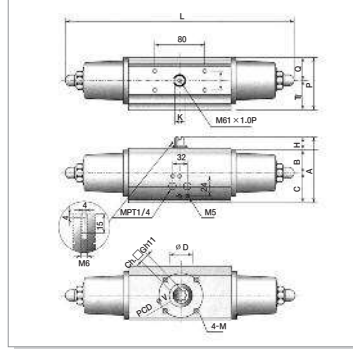
Torque ratings for double acting actuators, type SD in NM

TYPE	ISO	Airstorke, operateing pressure(bar)							
		3	3.5	4	4.5	5	6	7	8
50	F04	15	17.5	20	22.5	25	30	35	40
50	F04	30	35	40	45	50	60	70	80
65	F05	60	70	80	90	100	120	140	160
80	F07	120	140	160	180	200	240	280	320
100	F10	240	280	320	360	400	480	560	640
140	F12	480	560	640	720	800	960	1120	1280
165	F14	960	1120	1280	1440	1600	1920	2240	2560
200	F16	2030	2370	2710	3050	3390	4070	4750	5420

Torque ratings for double acting actuators, type SA in NM

Type	ISO	Airstorke, operateing pressure(bar)								Spring-Stroke							
		3	3.5	4	4.5	5	6	7	8								
50	F05	23	17	28	22	33	27	38	32	-	-	-	-	7	13		
50-1	F05	17	13	22	18	27	23	32	28	37	33	47	43	-	-	13	17
65	F05	50	40	60	50	70	60	80	70	-	-	-	-	-	-	10	20
65-1	F05	35	20	45	30	55	40	65	50	75	60	95	80	-	-	25	40
80	F07	95	80	115	100	135	120	155	140	-	-	-	-	-	-	25	40
80-1	F07	70	40	90	60	110	80	130	100	150	120	190	160	-	-	50	80
100	F10	180	145	220	185	260	225	300	265	-	-	-	-	-	-	60	95
100-1	F10	100	35	140	75	180	115	220	155	260	195	340	295	-	-	140	205
140	F12	360	290	440	370	520	450	600	530	-	-	-	-	-	-	120	190
140-1	F12	200	85	280	165	360	245	440	325	520	405	680	565	-	-	280	395
165	F14	720	595	880	755	1040	915	1200	1075	-	-	-	-	-	-	240	365
165-1	F14	400	185	560	345	720	505	880	665	1040	825	1036	1145	-	-	560	775
200	F16	1680	1330	2020	1670	2360	2010	2700	2350	-	-	-	-	-	-	350	700
200-1	F16	1330	630	1670	970	2010	1310	2350	1650	2690	1990	3370	2670	-	-	700	1400

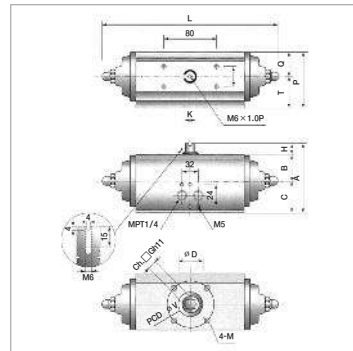
□ Dimension



Dimensions Table

NO.	SIZE	L	A	B	C	H	P	Q
F05	SA50	175	80	31	33	10	69	29
F05	SA65	254	104.5	39	47	19	82.5	36.5
F07	SA80	275	125	48	52	20	98	42.5
F10	SA100	382	143	58	64.5	21	114	53.7
F12	SA140	450	190	75	80	28	146	70
F14	SA165	580	230	100	105	25	182	91
F16	SA200	700	230	115	125	30	240	120

NO.	SIZE	T	K	G	V	M	D
F05	SA50	40	13	11 × 11	50	M6	35
F05	SA65	46	17	14 × 14	50	M6	35
F07	SA80	55.5	22	17 × 17	70	M8	55
F10	SA100	60	29	22 × 22	102	M10	70
F12	SA140	76	35	27 × 27	125	M12	85
F14	SA165	91	35	36 × 36	140	M16	100
F16	SA200	120	50	46 × 50	165	M20	130

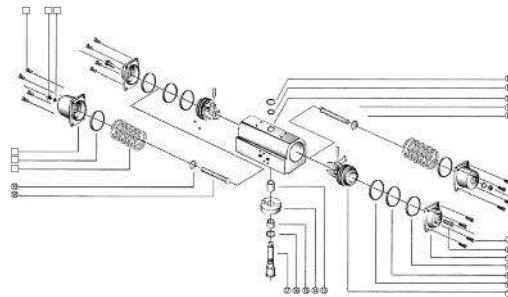


Dimensions Table

NO.	SIZE	L1	A	B	C	H	P	Q
F05	SA50	255	80	31	33	10	69	29
F05	SA65	340	104.5	39	47	19	82.5	36.5
F07	SA80	400	125	48	52	20	98	42.5
F10	SA100	504	143	58	64.5	21	114	53.7
F12	SA140	600	190	75	80	28	146	70
F14	SA165	880	230	100	105	25	182	91
F16	SA200	1200	230	115	125	30	240	120

NO.	SIZE	T	K	G	V	M	D
F05	SA50	40	13	11 × 11	50	M6	35
F05	SA65	46	17	14 × 14	50	M6	35
F07	SA80	55.5	22	17 × 17	70	M8	55
F10	SA100	60	29	22 × 22	102	M10	70
F12	SA140	76	35	27 × 27	125	M12	85
F14	SA165	91	35	36 × 36	140	M16	100
F16	SA200	120	50	46 × 50	165	M20	130

□ Actuator Assembly



Part Name

NO.	DESCRIPTION
1	SOCKET SCREW
2	END BOLT
3	DA COP
4	VITON O-RING
5	DYNAMIC SEAL
6	VITON O-RING
7	PISTON
8	PISTON'S SUPPORT
9	ROTATING SLLEEVE
10	CYLINDER
11	VITON
12	SNAP-RING
13	SHAFT SUPPORT

NO.	DESCRIPTION
14	SCOTCH YOKE
15	SHAFT SUPPORT
16	VITON
17	SHAFT
18	SCREW
19	WASHER
20	SPRING
21	PISTON O-RING
22	END CAP(SR)
23	O-RING
24	NUT
25	SCREW

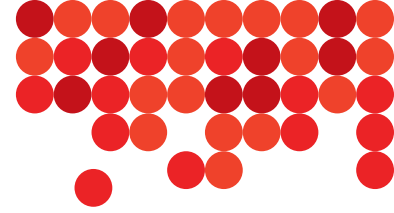
MATERIAL SELECTION GUIDE

E-Excellent
G-Good
F-Fair
U-Unsatisfactory

Metal Elastomer

Metal Elastomer

Chemical agents	Metal Elastomer							Chemical agents	Metal Elastomer								
	Iron	316SS	AL Bronze	Monel	EPDM	NBR	Viton		Natural Rubber	Iron	316SS	AL Bronze	Monel	EPDM	NBR	Viton	Natural Rubber
Hydrochloric Acid 37% 60° F	U	U	U	U	U	U	U	U	Propane	F	E	E	-	U	E	E	-
Hydrochloric Acid 20%	U	U	U	F	-	U	E	U	Resins	U	E	E	-	-	-	G	F
Hydrochloric Acid 20-60%	U	U	U	U	-	U	E	U	Sea Water 70° F	U	G	G	E	E	G	E	-
Hydrogen	F	E	F	-	E	E	E	E	Soap Solution(Slearate)	U	E	E	G	E	E	E	-
Hydrogen Peroxide 90%	U	G	U	E	-	U	G	U	Sodium Acetate 5%	U	E	E	G	E	G	U	-
Hydrogen Sulfide	F	G	F	-	E	U	U	U	Sodium Bisulfate	U	E	-	-	-	E	E	-
Iodine Solution	U	U	U	E	-	U	F	U	Sodium Carbonate	U	E	G	E	E	E	E	E
Iso-octane	F	E	E	E	U	E	E	-	Sodium Chloride 30% 180° F	U	E	E	E	E	E	E	E
Isopropyl Alcohol	F	E	E	E	-	G	E	-	Sodium Cyanide	U	E	U	-	-	E	E	-
Sopropyl Ether	F	E	E	E	U	E	E	U	Sodium Fluoride 5% 60° F	U	-	F	G	-	-	E	-
Kerosene	E	E	E	E	U	E	E	U	Sodium Hydroxide 50% 122° F	U	G	U	G	E	U	U	G
Lactic Acid 5%	U	G	U	G	-	F	-	-	Sodium Hydroxide 50% 176° F	U	G	U	G	G	U	U	U
Lubricating Oil	E	E	E	E	U	E	E	U	Sodium Hypochlorite 50% 60° F	U	G	U	E	G	U	E	U
Magnesium Chloride 4%	F	G	F	G	E	E	E	E	Sodium Nitrate	U	E	G	G	E	G	-	G
Magnesium Hydroxide	F	E	G	-	E	G	E	G	Sodium Perborate	U	E	-	-	-	G	E	-
Magnesium Sulphate	F	E	E	E	E	E	E	G	Sodium Peroxide	U	E	U	-	E	G	E	G
Mercuric Chloride 3%	U	F	U	G	E	E	-	-	Sodium Phosphate 5%	U	E	-	G	E	E	E	E
Mercuriy	E	E	U	E	E	E	E	E	Sodium Sillicate	U	E	G	E	E	E	E	E
Methane	U	E	E	-	U	E	E	U	Sodium Sulfitde 70%	U	E	U	-	-	-	-	-
Methyl Acetate	F	E	E	-	F	U	U	U	Sodium Sulfite	U	-	U	G	G	E	E	-
Methyl Acetone	F	E	E	-	G	U	U	U	Sodium Sulphate 80% 60° F	U	F	G	G	E	E	E	G
Methyl Chloride	G	E	E	-	U	U	E	U	Steam 300° F	U	E	G	E	E	U	U	U
Methyl Etherl Kotone	E	E	E	-	U	U	U	U	Steraric Acid 90% 200° F	U	E	F	F	-	G	-	-
Milk(food)	U	E	-	-	E	E	E	E	Sulphur (Molten)	U	G	U	U	E	-	E	-
Mineral Oil	F	F	-	-	U	E	E	U	Sulphur Dioxide	U	E	F	E	G	U	E	U
Molasses(food)	U	E	U	-	E	-	-	-	Sulphur Trioxide	U	E	-	-	-	U	E	U
Napthalene	F	E	E	-	U	G	U	U	Sulfuric Acid 10%	U	G	U	U	E	U	E	F
Natural gas	G	E	E	-	U	E	E	U	Sulfuric Acid 50%	U	U	U	U	F	U	E	U
Nickel Chloride	U	F	-	-	-	E	-	-	Sulfuric Acid 93% 70° F	U	U	U	U	U	U	E	U
Nitric acid less 40% 70° F	U	-	U	U	U	U	E	U	Sulphurous Acid 80% 100° F	U	U	U	U	U	U	E	U
Nitric acid more 40% 70° F	U	U	U	U	U	U	F	U	Tannic Acid 10% 150° F	U	E	G	-	-	U	E	F
nitrobenzene	U	E	-	-	U	U	G	U	Tar	F	E	E	E	U	U	G	U
Oleum	U	F	-	-	U	E	E	U	Tartaric Acid 150° F	U	E	G	-	-	E	-	G
Olive Oil	-	E	-	-	G	E	E	U	Thinner	U	E	E	E	U	U	U	U
Oxalic Acid	U	G	U	-	G	U	G	U	Toluol and Toluene	U	E	E	-	U	U	G	U
Oxygen 200° F	E	E	E	E	E	G	E	F	Tributyl Phosphate	U	E	-	-	U	U	F	F
Oxygen 300° F	E	E	E	E	U	U	G	U	Trichloroethylene	-	E	E	-	U	U	E	U
Palmitic acid	U	E	G	-	-	E	-	-	Tricresyl Phosphate	U	U	U	-	G	U	E	U
Perchloroethlene	F	E	-	-	U	F	E	U	Triethanolamine	U	-	-	G	E	G	U	U
Petroleum	U	G	F	G	U	E	E	U	Turpermtine	U	E	G	-	U	U	E	U
Phenol	U	E	-	E	U	U	E	U	Vinegar 70° F	U	E	-	-	G	E	E	-
Phosphoric Acid 5%	U	G	U	G	F	F	E	F	Water-Demineralized	U	E	E	E	E	G	E	G
Phosphoric Acid 85% 70° F	U	G	U	-	F	F	-	F	Water-distilled	U	E	U	-	E	G	-	-
Picric Acid 80%	U	E	-	F	U	-	-	-	Water Fresh	F	E	E	E	E	G	-	E
Potassium Cyanide	F	E	U	-	-	E	E	-	Water Minera	F	E	E	E	E	G	-	-
Potassium Hydroxide 5%	F	E	U	E	-	E	E	-	Water-Sewage	U	E	E	E	E	G	-	-
Potassium Nitrate	F	E	F	G	E	E	E	E	Whiskey and Wines	U	E	G	E	E	E	-	-
Potassium Phosphate	U	G	-	-	-	E	E	-	Xylene, Xylol	F	E	E	-	U	U	E	U
Potassium Sulfide	U	E	-	-	-	E	-	-	Zinc Chloride 5% 160° F	U	F	U	G	E	E	E	E
Potassium Sulfite	U	E	-	-	G	F	-	-	Zinc Sulphate 25% 180° F	U	E	E	G	-	E	-	-



MATERIAL SELECTION GUIDE

E-Excellent
G-Good
F-Fair
U-Unsatisfactory

Metal Elastomer

Metal Elastomer

Chemical agents	Metal Elastomer						
	Iron	316SS	Al Bronze	Monel	EPDM	NBR	Viton Natural Rubber
Acetaidihyde	U	E	U	F	G	U	- F
Acetic acid 50% 50°C	U	E	U	F	G	U	U F
Acetic acid-Anhydride	U	E	U	F	U	U	U F
Acetone	G	E	E	E	G	U	U E
Acetylene	G	E	E	-	U	F	U -
Acrylonitrile	G	E	E	E	U	U	U U
Air(Duy)	E	E	E	E	E	E	- -
Alcohol-Amyl	F	E	E	E	-	F	G -
Alcohol-Butyl	F	E	E	E	-	F	- -
Alcohol-Ethyl	U	E	E	E	E	G	G G
Alcohol-Methyl	U	E	E	E	E	G	U G
Alum-Ammonium	U	G	-	-	-	G	G F
Alum-Chrome	U	G	-	-	-	G	G F
Alum-Potassium	U	G	-	-	-	-	-
Alumina	G	G	G	G	E	E	G G
Aluminum Chloride	U	U	U	E	E	E	E E
Aluminum Fluoride	U	G	-	G	-	G	G -
Aluminum Hydroxide	U	G	-	-	-	G	G -
Aluminum Sulphate	U	G	U	-	-	E	- -
Amines	U	E	-	-	-	F	- -
Ammonia, Anhydrous	F	E	U	-	E	G	U -
Ammonia gas 150° F	U	E	U	-	G	-	- -
Ammonia solutions	F	E	U	G	E	G	U G
Ammonia Chloride 50% 180° F	U	G	U	G	-	-	- -
Ammonia Hydroxide	U	E	U	F	E	U	G U
Ammonia Nitrate 5% 60° F	F	E	U	G	-	E	- -
Ammonia Phosphate	U	G	U	G	E	E	- G
Ammonia Sulphate	U	G	U	G	E	E	E -
Amyl Acetate	F	E	E	G	-	U	F U
Amylchloride	F	E	E	-	U	U	U U
Anillne 90% 70° F	F	E	F	-	G	U	G U
Asphalt	E	E	E	E	-	U	E U
Barium Carbonate 60° F	U	-	G	G	E	E	- -
Barium chloride	U	-	-	G	E	E	E E
Barium Hydroxide	F	E	U	-	-	E	- U
Barium Sulphate	U	E	G	G	E	E	E E
Barium Sulphate	F	E	U	-	-	E	- -
Beer (beverage)	U	E	U	-	E	-	- -
Beer sugar solution	U	E	U	-	-	E	- -
Benzaldehyde	F	E	E	-	G	U	U U
Benzene(benzol) 70° F	F	E	E	G	U	U	G U
Benzoic Acid 5%	U	E	-	G	-	F	- -
Borax	U	E	U	E	-	G	- G
Boric acid 5% 200° F	U	E	F	G	E	E	- -
Brine	U	-	-	G	E	E	- -
Bromine-Gas	U	U	U	F	U	U	G U
Bromine-Water	U	U	U	F	U	U	G U
Butadiene	F	E	E	-	-	G	- G
Butane-Butyleae	G	E	E	E	U	G	G U
Butyl Acetate	G	E	E	-	E	U	U U

Chemical agents	Metal Elastomer						
	Iron	316SS	Al Bronze	Monel	EPDM	NBR	Viton Natural Rubber
Butyric Acid 5%	U	E	-	-	U	U	U U
Calcium carbonate 60° F	F	-	-	E	E	E	E E
Calcium chlorate 20%	-	E	-	G	-	-	- -
Calcium chloride	F	G	F	G	E	E	E G
Calcium chloride solution	F	E	F	-	E	E	E G
Calcium Hydroxide 50% 175° F	F	E	U	E	E	E	E E
Calcium Hypochlorite	-	G	-	-	-	F	- -
Calcium Sulphate	F	E	E	G	E	E	E E
Carbon Dioxide	F	E	E	-	G	G	E G
Carbon Tetrachloride	U	G	F	G	U	U	E U
Carbonic Acid	U	G	-	G	-	E	- -
Chlorine gas-dry 70° F	U	G	F	F	U	U	E U
Chlorobenzene 90%	F	E	E	E	U	U	G U
Chromin Acid 5% 70° F	U	E	U	-	U	U	E U
Citric acid 5% 150° F	U	E	F	G	E	G	E U
Coffee(food)	U	E	U	-	E	U	E E
Copper Sulphate	F	E	U	U	E	E	E G
Cyclohexane	F	E	E	-	U	E	E U
Deztrose(food)	U	E	-	-	-	E	- -
Diacetone	U	-	E	-	E	U	U U
Dichloroethane	U	F	-	-	U	U	G U
Diesel Fuels	F	E	G	E	U	E	E -
Diethyl Amine	F	E	E	-	F	U	U F
Dowtherms	G	E	E	-	U	U	E U
Drilling Mud	G	E	-	E	U	E	- U
Ethers	U	E	E	G	U	U	- U
Ethyl Acetate	F	E	-	E	G	U	U U
Ethyl Dhloride 5%	F	E	E	G	E	E	E F
Ethyl Glycol	G	E	E	E	E	E	E G
Ethylene Oxide	G	E	-	-	U	U	U U
Fats	E	E	E	-	U	E	- -
Ferric Chloride	U	-	U	E	-	F	- -
Ferric Nitrate	U	E	-	E	G	F	- -
Ferric Sulphate 5%	U	G	U	E	-	E	E -
FerricSulphate	F	E	U	-	G	E	G G
Fluorine	U	U	U	G	-	G	- -
Fluosillicic Acid	U	G	E	-	-	E	- -
Formaldehyde 70° F	U	E	E	G	E	G	E -
Formic acid 5% 150° F	U	E	E	G	-	U	U U
Freon	F	E	E	E	U	G	G U
Fruit Juices(food)	U	E	U	-	G	G	- -
Fuel Oil	F	E	E	G	U	F	E U
Gallic Acid 5% 200° F	U	E	-	-	-	G	- G
Gasoline	F	E	G	G	U	E	E U
Glucose	U	E	G	G	-	E	E -
Glycerine/Glycerol	F	E	G	G	-	E	E -
Heptane	F	E	E	-	U	E	E U
Hexane	F	E	E	-	U	G	E U
Hydrobromic Acid 200° F	U	U	U	U	U	U	U U
Hydrochloric Acid 15% 60° F	U	U	U	U	E	U	E -

OPERATING CHARACTERISTICS FOR SIZING

TORQUES

The factors affect the torque required to operate the valves.

- Valve diameter
- Shaft diameter
- Bearing friction coefficient
- Type of seat material

Size		Shut off Pressure in Bar			
mm	Inch	3.5Bar	6Bar	10Bar	16Bar
40	1 ½	10	10	13	14
50	2	12	22	25	25
65	2 ½	17	23	28	29
80	3	25	35	31	37
100	4	41	40	52	59
125	5	58	66	74	89
150	6	87	91	109	126
200	8	156	170	180	260
250	10	243	276	320	390
300	12	342	389	484	560
350	14	488	544	680	1520
400	16	667	762	880	2030
450	18	887	1023	1261	2493
500	20	1146	1322	1630	3076
600	24	2386	2781	3256	4150
700	28	2710	3300	4050	5650
750	30	3000	3940	4590	6040
800	32	3540	4340	4990	6640
900	36	4640	5360	6940	9490
1000	40	6300	7800	9940	13240

Actuator torques can be calculated using the following formulas.

$$T_a = T_b + T_s + T_h = 1.2T_b \pm T_d$$

$$T_s = C_s D^2$$

$$T_b = 4.17 D^2 d f P$$

$$T_d = C_t D^3 P$$

$$T_h = 3.06 D^4$$

$$V = C_f \sqrt{p} = \frac{Q}{0.785 D^2}$$

T_a : The required actuator torque(lb-ft)

T_s : Seating or unseating torque(lb-ft)

T_d : Dynamic torque(lb-ft)

T_h : Hydrostatic torque(lb-ft)

Q : Flow(cubic for per second)

V : Velocity(feet per second)

D : Diameter of valve(feet)

d : Diameter of Shaft(inch)

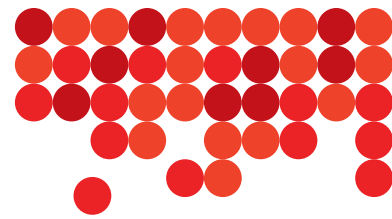
P : Pressure drop across valve(psi)

C_s : Coefficient of Seating or unseating torque

C_t : Coefficient of dynamic torque

C_f : Coefficient of flow

f : Bearing friction coefficient

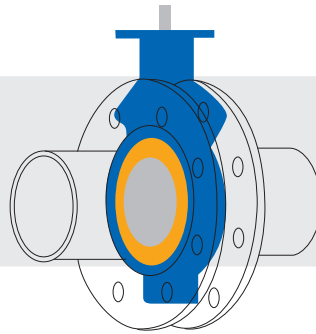


INSTALLATION

배관 파이핑 테스트를 할 경우 차단용 플랜지 대용으로 밸브를 사용하여서는 안되며 필히 완전열림 상태이어야 한다.
 On piping test, Valve can not use in stead of isolation flange as substitute, Valve Should perfectly open

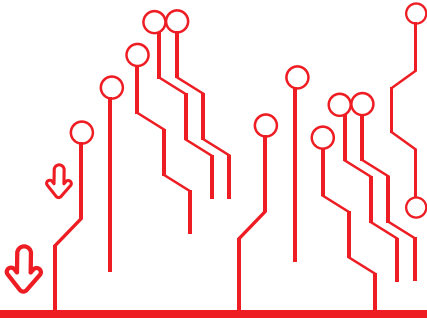
PROPER INSTALLATION

DO NOT USE GASKETS



IMPROPER INSTALLATION

<p>Pipework opened to allow valve free entry, disc in semi-closed position</p> <p>▶디스크를 약간 연 상태에서 밸브가 자연스럽게 끼워질 수 있도록 후렌지간격을 벌린 후 삽입.</p>	<p>Pipework not spread sufficiently could tear rubber, disc position open will foul flange and score disc edge</p> <p>□ 주의: 반드시 후렌지 용접후 밸브를 설치할것 (밸브설치후 용접 엄금)</p> <p>▶후렌지 간격을 충분히 벌리지 않으면 씨트가 찢어질 우려가 있고, 디스크를 완전히 연 상태로 삽입하면 후렌지와 디스크 가장자리가 부딪침으로서 디스크에 흠이 생길 우려가 있음.</p>
<p>Valve in semi-open to protect disc edge and reduce rubber interference during installation and start up, this helps reduce initial torque build up.</p> <p>▶디스크를 약간 연 상태이면</p> <ol style="list-style-type: none"> 1. 디스크의 가장자리를 보호하고 2. 설치시 씨트의 간섭을 감소시키며 3. 최초 토크의 발생을 감소시킴. 	<p>Disc as shown in fully closed position cause seat distortion, than subjected to flange draw will close rubber round disc creating excessive torque in initial operation</p> <p>▶그림처럼 디스크가 완전히 닫힌 상태이면 씨트가 찌그러질 우려가 있고, 이 상태에서 볼트를 조이면 씨트가 디스크 옆으로 부풀어올라서 필요이상의 토크크가 요구됨.</p>
<p>Disc should be turned to full open position after flange alignment and before eventy pulling up flange bolts.</p> <p>□ 주의: 가스켓(Gasket)을 사용하지 말것.</p> <p>▶후렌지 조정이 끝난 후 디스크를 완전히 연 상태에서 후렌지 볼트를 조임.</p> <p>조립후 용접 불가 "Don't Welding Work after Installation"</p>	<p>Incorrect pipe alignment will cause interference between disc edge and flange face creating leakage and also excessive torque to open valve.</p> <p>▶후렌지 조정이 부정확하면 디스크 가장자리와 후렌지 사이 틈이 발생하므로 누수되기 쉽고 밸브를 열때 필요이상의 토크크가 요구됨.</p>



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