



KOREA UNICOM VALVE

Perfect harmony with Technology



■■■ Company Introduction

Since 1983, Korea Unicom Valve co., Ltd. (dba Unicom) has been manufacturing and supplying butterfly valves for a variety of industrial applications.

Unicom valve is specialized in triple offset type butterfly valve (TOD), and we supplied quality products proven on-site in the petrochemical, gas industry, chemical, energy, power plant, shipbuilding and other global markets with its unrivaled technical expertise and highly sophisticated design. TOD valves feature a special sealing mechanism consisting of an inclined conical disc and a laminated seat. TOD's unique characteristics are its low torque operation, reliable sealing and tight shut-off in both directions.

All butterfly valves manufactured by Unicom valve are designed according to API 609 standard. In addition, Unicom valve has wide range of certificates that assist you to use the butterfly valve where you need.

Furthermore, Unicom is striving in the R&D of future butterfly valves. Unicom is striving to develop and manufacture double / triple offset type butterfly valves through ceaseless R&D activities. We look forward to providing you with the highest quality butterfly valves based on our technological know-how and experience, from our modern facilities under stringent quality and HSE systems.



Company History

Year	Contents
1983	Established the Company as sales Representative of Foreign Valve Manufacturer
1997-1998	Registered the trademark 'Unicom' to the Patent Bureau.
	Construction of Incheon Plant, Korea.
	Manufacturing of 'High Performance' Butterfly Valve named 'High Seal'
	Authorized for ISO 9001 Certificate from B.V.
2000-2001	Authorized for 6D & ISO Certificate by API.
	Manufacturing Triple Offset Butterfly Valve Named 'Neo Seal'.
	Appointed as Qualified Vendor by K.O.C and Q.G.P.C
	Appointed as Qualified Vendor by K.N.P.C
2004	Type Approval Certificate from D.N.V
	Type Approval Certificate from B.V
	Certificate of Type Approval from A.B.S
	Appointed as Qualified Vendor by PETROPARS Ltd., NIOC, KALANAFT in IRAN.
2006-2010	Award 'One of the Most Contributed Exporter' by Korean Government
	Fire Safety ISO: VELOSI
	Acquisition of Environment Management System 'ISO 14001' from B.V.
	Construction of Dangjin plant, Korea
	Certificate of CE-PED from B.V.
	Certificate of Fugitive Emission From B.V
2012-2016	Appointed as Qualified Vendor by PETRONAS, PEMEX, PDVSA.
	Successful Exhibition of valve world 2012 in Australia
	Finely succeeding 5 big Projects in 6 months - SOGT, South Yoloten, IPC EVA, Chambers Works, HCC Orange Project
2014-2019	API 607, API 6FA Fire Safety Certificate from Velosi.
	BV MODE II SCHEME from BUREAU VERITAS
	KNPC Clean Fuels Project, Petronas Rapid MOV Package 5 Appointed as Qualified Vendor by Chevron.
2020-	Authorized for ISO 45001 Certificate from B.V.
	Certificate of Type Approval for Cryogenic butterfly valve From B.V

■ ■ ■ Why Unicom?



1 High quality and Cost effective design

- ▶ Unicom provides the highest quality and most cost effective design available on customer's spec.

2 Finding the best solution

- ▶ Unicom has the best solution to provide the valves in right valve and right place.

3 Various project experience

- ▶ Unicom has been participated many of the world's large projects over the past 30 years.

4 Proven performance

- ▶ Unicom's products had proven its quality, reliability and performance under the most demanding applications.

5 Short-term deliveries and customized valve

- ▶ Unicom offers the valve short-term deliveries available and can customize to customer requirements.

Valve Line Up



01 Eccentric Valve - API 609 Category B

1) Triple Offset Valve

- Metal & Graphite Seat
- Solid Metal Seat

2) Double Eccentric Valve

- Soft Seat
- Soft & Metal Seat
- Metal Seat / Metal & Metal Seat

02 Concentric Valve - API 609 Category A

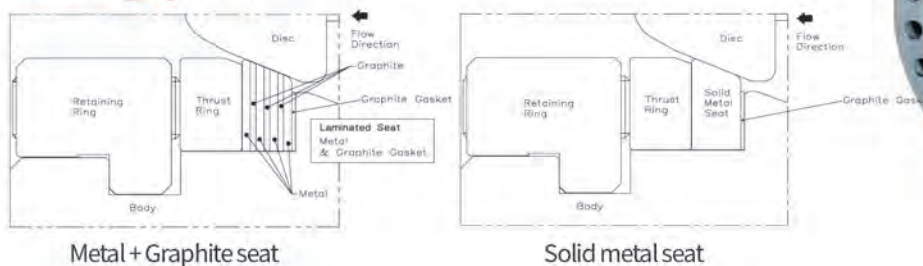
■ ■ ■ Eccentric valve

–API 609 Category B

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat)

When triple offset Design is introduced to the market, Triple Offset Design (TOD) overcame the limitations of Double Offset Design. Double Offset Design is prone to excessive wear from friction and abrasion between sealing components. To eliminate problems, TOD features a special sealing mechanism that consists of an inclined conical disc and a laminated seat. The unique characteristics of TOD are low torque operation, broad sealing width and bi-directional tight shut-off.

▶ Sealing System



Type	Triple Offset Butterfly Valve
Design	ASME B16.34 / API std. 609
Rating	ASME Cl. 150,300,600,900,1500 PN10, 16, 20, 25, 40, 64, 100
Size	DN80(3") to DN2000 (80")
Connection Type	Double Flanged / Lugged & Wafer / Butt Weld End
Temperature Range	-50°C ~450°C
Main Material	Body : WCB, CF8, CF8M etc. Disc : CF8, CF8M (With Stellite or ENP) etc. Shaft : 17-4PH, 316SS etc. Seat : 316ss + Graphite etc.
Operator	Manual Worm Gear Pneumatic Actuator Electric Actuator
Application	General Industrial & Petro Chemical Plant Oil Refinery / Production Gas / Pulp / Paper Industry Steel and Iron Mill / Shipbuilding District Heating / Water and Sewage Combined / Nuclear power plant Hydrocarbon storage and Transportation Sugar Industry / Other Plant engineering
Option	Stellite or ENP on Disc Anti-static device Manual operator with Locking device Bonnet / Stem extension Heating jacket ISO 15848 Fugitive Emission packing NACE MR 0103 / 0175

Sealing System



Double Offset Design uses a sealing mechanism that disc presses on to a metal seat. such design is prone to galling and scratches on sealing components. it eventually causes malfunctions of valves. This is where Unicom's Triple Offset Design has an advantage over Double Offset Design. Triple Offset Design is an elliptical sealing mechanism. it enables a seamless closure at the final position and operates with low torque as all contact surfaces of disc and seat immediately disengage upon opening. therefore, the sealing components are free from galling and scratches. Another important design point is that the seat ring is fixed in body by set screws with a retaining ring. Due to this unique design, the medium flows horizontally to the seat, which minimizes any possibilities of damage from medium.

Seat Mechanism



Laminated metal + graphite seat



Solid metal seat

LAMINATED SEAT RING IS COMPOSED OF ALTERNATING LAYERS OF METAL AND GRAPHITE

Laminated metal + graphite seat enables smooth mating, which makes TOD flawless not only in general application but also in LNG/LPG gas applications. Each individual layer serves a unique and independent sealing purpose. Along with Triple Offset Design, laminated seat ring shows excellent performance and help provide lower operating torque during opening and closing. Different types of materials are selected for laminated metal plate depending on applications.

SOLID METAL SEAT RING IS ALSO AVAILABLE

Solid metal seat can also be selected in Unicom's TOD design. Currently, Unicom uses solid metal seats in heavy duty and high temperature applications.

FEATURES & BENEFITS

1. Bi-directional tight shut-off
2. Triple Offset Design with inclined conical sealing system.
3. Solid Metal or Laminated Metal + Graphite seat available.
4. Robust single piece shaft with shaft bearing extension to disc.
5. Genuine fire safety feature with Triple Offset Design.
6. One piece structure – No fasteners on disc. : Field repairable.
7. Provides non-friction motion.
8. Efficient with worm gear, electric, pneumatic or hydraulic actuators.
9. Availability for various applications using a wide range of materials.
10. Providing durability within a specific temperature range.
11. Inherit fire safety designed.

GENERAL APPLICATION

1. TOD butterfly valve is a field proven high quality butterfly valve developed based on the technology Unicom has acquired through experiences in the industrial applications.
2. Unicom customize valve to exact requirements of customers, which serve specific operating conditions of size, pressure and materials.
3. Triple Offset Design guarantees zero leakage in bi-directional application and provides a longer product life cycle as it is more resistant to problems of Double Offset Design.
4. While most triple offset designs are using a sealing mechanism of inclined surfaces of disc and seat, Unicom's TOD is designed with a curved seat with an inclined surface of disc to provide bubble tight sealing performance.

■ ■ ■ Eccentric valve

–API 609 Category B

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat) For Cryogenic Service

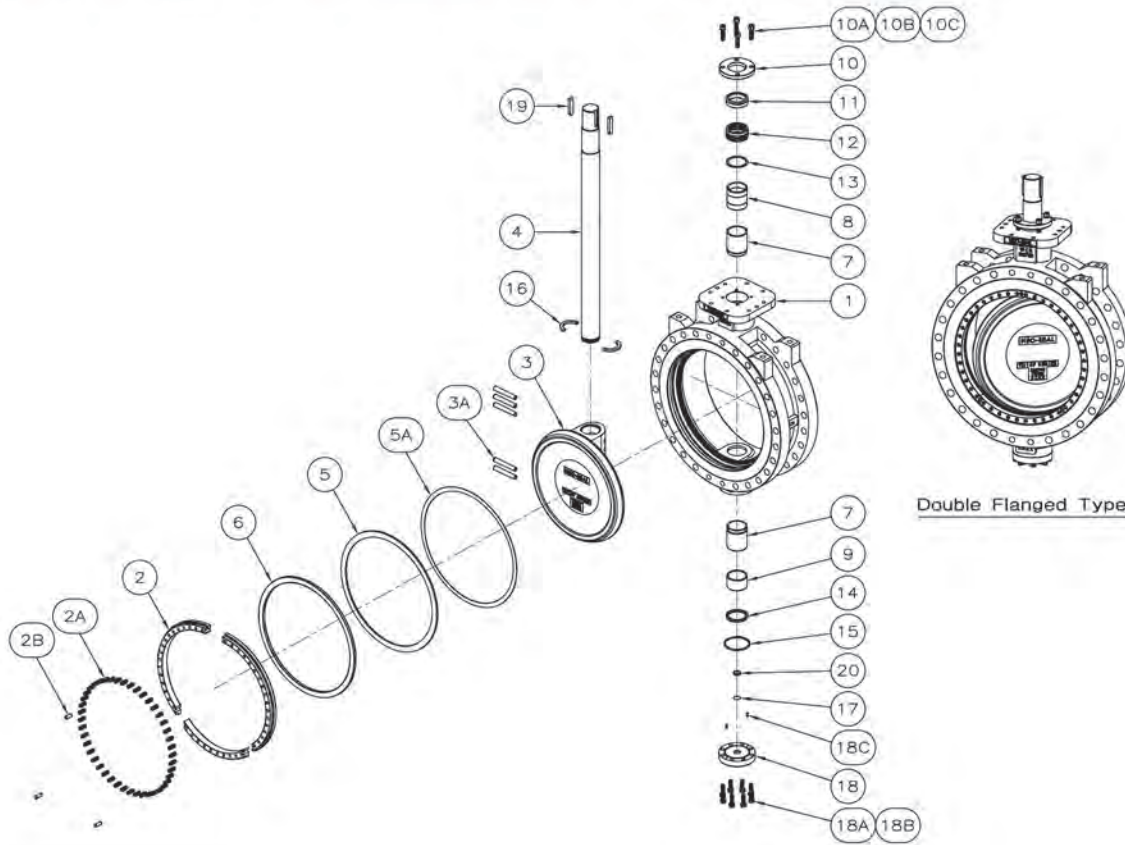
- TOD-CX is suitable for industrial cryogenic applications.
- Robust single piece shaft with shaft bearing extension to disc.
- Absolute Zero-Leakage (0mm³/s)-196°C using Laminated seat.
- Clean booth exclusively for assembly of cryogenic valves.
- Genuine fire safety feature with Triple Offset Design.
- Friction-less design allows a low torque operation.
- Customizing capability of pressure, size and materials.
- Extended bonnet prevents any packing deformations.
- Unicom's stringent quality inspection and testing.
- Manufacturing expertise from casting to assembly.
- Field-proven technology and Superior customer service.



Type	Triple Offset Butterfly Valve for Cryogenic Service
Design	ASME B16.34 / API std. 609 / BS 6364
Rating	ASME Cl. 150,300,600,900 PN10, 16, 20, 25, 40, 64, 100
Size	DN80(3") to DN1200 (48")
Connection Type	Double Flanged / Lugged & Wafer / Butt Weld End
Temperature Range	-196°C ~250°C
Main Material	Body : CF8, CF8M, CF3, CF3M etc. Extended Bonnet : CF8, CF8M, CF3, CF3M etc. Disc : CF8, CF8M, CF3, CF3M (With Stellite or ENP) etc. Shaft : XM-19, 17-4PH, 316SS etc. Seat : 316ss + Graphite, PCTFE, PTFE etc.
Operator	Manual Worm Gear Pneumatic Actuator Electric Actuator
Application	Cryogenic Application Industry All liquid Gases Gasification Plants and Storage LPG/LNG Storage and Transportation Plant Engineering Petrochemical Plant Gas Industry Ship Building Chemical Plant
Option	Stellite or ENP on Disc Anti-static device Manual operator with Locking device Bonnet / Stem extension Heating jacket ISO 15848 Fugitive Emission packing NACE MR 0103 / 0175

■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat)



Double Flanged Type

Parts List	
1	Double Flanged Body
2	Retaining Ring
2A	Set Screw
2B	Parallel Pin
3	Disc
3A	Disc Taper Pin
4	Shaft
5	Seat Ring
5A	Seat Gasket
6	Thrust Ring
7	Shaft Bearing
8	Shaft Upper Bush
9	Shaft Lower Bush
10	Gland Flange
10A	Stud Bolt
10B	Hex. Nut
10C	Spring Washer
11	Packing Gland
12	Gland Packing
13	Packing Retainer
14	Shaft Lower Ring
15	Bottom Packing
16	Shaft Retainer
17	Shaft Spacer
18	Bottom Plug
18A	Hex. Bolt
18B	Spring Washer
18C	Parallel Pin
19	Key
20	Thrust Collar

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Carbon Steel Steel Casting	A216 Gr. WCB / WCC A217 Gr. WC6 / WC9
2	Retaining Ring	Carbon Steel Stainless Steel	A515 Gr. 60 / 70 A240 Tp. 304
2A	Set Screw	Stainless Steel	A193 Gr. B8 / A2-70
2B	Parallel Pin	Stainless Steel	A276 Tp. 304
3	Disc	Carbon Steel & Hard Facing Stainless Steel & Hard Facing	A216 Gr. WCB & STELLITE A351 Gr. CF8 / CF8M & STELLITE
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316
4	Shaft	17-4PH Inconel 718	A564 Tp. 630 B637 UNS N07718
5	Seat Ring (Laminated Seat)	Stainless Steel & Graphite	A240 Tp. 316L & GRAPHITE
		Inconel 625 & Graphite	B443 UNS N06625 & GRAPHITE
5A	Seat Gasket	Stainless Steel	A240 Tp. 316L
		Inconel 625	B443 UNS N06625
6	Thrust Ring	Carbon Steel Stainless Steel	A515 Gr. 60 / 70 A240 Tp. 304
7	Shaft Bearing	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating
8	Shaft Upper Bush	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating
9	Shaft Lower Bush	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating

Part No.	Designation	Specification	Material
			ASTM
10	Gland Flange	Stainless Steel	A276 Tp. 304
10A	Stud Bolt	Stainless Steel	A193 Gr. B8 / A2-70
10B	Hex. Nut	Stainless Steel	A194 Gr. 8 / A2-70
10C	Spring Washer	Stainless Steel	A167 Tp. 304
11	Packing Gland	Stainless Steel	A276 Tp. 316
12	Gland Packing	Grafoil	GRAFOIL
13	Packing Retainer	Stainless Steel	A276 Tp. 316
14	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
15	Bottom Packing	Grafoil	GRAFOIL
16	Shaft Retainer	Stainless Steel	A276 Tp. 316
17	Shaft Spacer	Stainless Steel	A276 Tp. 316
18	Bottom Plug	Carbon Steel	A515 Gr. 60 / 70
		Stainless Steel	A276 Tp. 304
18A	Hex. Bolt	Stainless Steel	A193 Gr. B8 / A2-70
18B	Spring Washer	Stainless Steel	A167 Tp. 304
18C	Parallel Pin	Stainless Steel	A276 Tp. 304
19	Key	Carbon Steel	A576 Gr. 1045
20	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

▲ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
18C	Parallel Pin	10" ~ 48"	6" ~ 38"	6" ~ 36"
20	Thrust Collar	10" ~ 48"	6" ~ 38"	6" ~ 36"

■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat)

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Stainless Steel	A351 Gr. CF8 / CF8M
2	Retaining Ring	Stainless Steel	A240 Tp. 304 / 316
2A	Set Screw	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)
2B	Parallel Pin	Stainless Steel	A276 Tp. 304 / 316
3	Disc	Stainless Steel & Hard Facing	A351 Gr. CF8 / CF8M & STELLITE
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316
4	Shaft	17-4PH	A564 Tp. 630
		Stainless Steel	A276 Tp. XM-19
		Inconel 718	B637 UNS N07718
5	Seat Ring (Laminated Seat)	Stainless Steel & Graphite	A240 Tp. 316L & GRAPHITE
		Inconel 625 & Graphite	B443 UNS N06625 & GRAPHITE
5A	Seat Ring (Solid Metal Seat)	Stainless Steel	A240 Tp. 316L
		Inconel 625	B443 UNS N06625
5A	Seat Gasket	Graphite	GRAPHITE
6	Thrust Ring	Stainless Steel	A240 Tp. 304 / 316
7	Shaft Bearing	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating
8	Shaft Upper Bush	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating
9	Shaft Lower Bush	Stainless Steel	A276 Tp. 316 & Hard Chromium Plating
10	Gland Flange	Stainless Steel	A276 Tp. 304 / 316

Part No.	Designation	Specification	Material
			ASTM
11	Packing Gland	Stainless Steel	A276 Tp. 316
12	Gland Packing	Grafoil	GRAFOIL
13	Packing Retainer	Stainless Steel	A276 Tp. 316
14	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
15	Bottom Packing	Grafoil	GRAFOIL
16	Shaft Retainer	Stainless Steel	A276 Tp. 316
17	Shaft Spacer	Stainless Steel	A276 Tp. 316
18	Bottom Plug	Stainless Steel	A276 Tp. 304 / 316
18A	Hex. Bolt	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)
18B	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
18C	Parallel Pin	Stainless Steel	A167 Tp. 304 / 316
19	Key	Carbon Steel	A576 Gr. 1045
20	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

▲ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
18C	Parallel Pin	10" ~ 48"	6" ~ 38"	6" ~ 36"
20	Thrust Collar	10" ~ 48"	6" ~ 38"	6" ~ 36"

■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat)

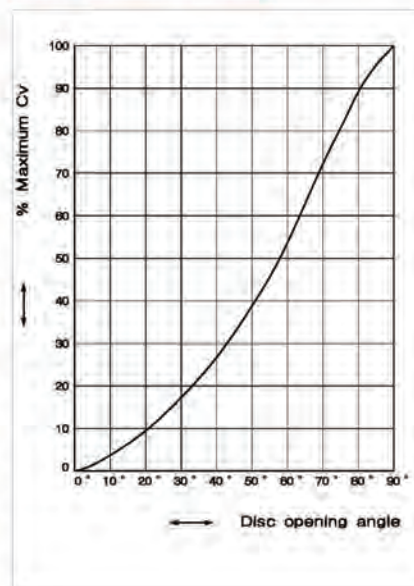
Cv-Value

The Cv flow coefficient, often used or control valves is defined as the flow of water at 60°F(16°C) in gallons per minute, at a pressure drop of 1psi across the valve.

ASME Class 150

FLOW CHARACTERISTIC

VALVE SIZE		unit	Cv relating to the disc opening angle of the disc								
NPS	DN		10°	20°	30°	40°	50°	60°	70°	80°	90°
3in	DN80	CV	4.7	16.6	33.1	52.1	78.3	110	190	210	240
		KV	4	14.2	28.4	44.6	67.1	95	165	180	210
4in	DN100	CV	8.4	29.3	58.6	92	140	200	330	370	420
		KV	7.2	25.1	50.2	78.7	120	175	285	320	360
5in	DN125	CV	13.8	48.4	96.5	160	230	330	550	610	700
		KV	11.8	41.5	82.7	140	200	285	475	525	600
6in	DN150	CV	20.9	73.7	150	230	350	500	820	930	1050
		KV	17.9	65	130	200	300	430	705	800	900
8in	DN200	CV	38.2	140	270	420	640	900	1500	1690	1920
		KV	32.7	120	235	360	550	775	1285	1450	1645
10in	DN250	CV	59	210	410	650	970	1370	2280	2570	2920
		KV	50.6	180	355	560	835	1175	1955	2205	2505
12in	DN300	CV	88.4	310	620	980	1460	2080	3450	3890	4420
		KV	75.7	270	535	840	1255	1785	2960	3335	3790
14in	DN350	CV	110	390	770	1200	1800	2570	4260	4800	5460
		KV	94.3	335	660	1030	1545	2205	3650	4115	4680
16in	DN400	CV	150	530	1060	1660	2490	3540	5870	6620	7520
		KV	130	455	910	1425	2135	3035	5030	5675	6445
18in	DN450	CV	200	700	1390	2180	3260	4640	7700	8690	9870
		KV	175	600	1195	1870	2795	3980	6600	7450	8460
20in	DN500	CV	270	930	1850	2900	4350	6190	10300	11600	13200
		KV	235	800	1585	2485	3730	5305	8830	9940	11300
22in	DN550	CV	341	1183	2366	3718	5577	7943	13182	14872	16900
		KV	292	1014	2027	3186	4779	6806	11296	12744	14482
24in	DN600	CV	420	1450	2890	4530	6800	9680	16100	18100	20600
		KV	360	1245	2480	3885	5830	8295	13800	15500	17700
26in	DN650	CV	490	1720	3430	5390	8090	11500	19100	21600	24500
		KV	420	1475	2940	4620	6935	9875	16400	18500	21000
28in	DN700	CV	570	1990	3980	6260	9380	13400	22200	25000	28400
		KV	490	1705	3410	5365	8040	11500	19000	21400	24300
30in	DN750	CV	660	2300	4600	7230	10800	15400	25600	28900	32800
		KV	570	1975	3945	6195	9290	13200	22000	24800	28100
32in	DN800	CV	810	2820	5630	8840	13300	18900	31400	35400	40200
		KV	695	2420	4825	7575	11400	16200	26900	30300	34400
34in	DN850	CV	950	3300	6590	10400	15500	22100	36700	41400	47000
		KV	815	2830	5650	8900	13300	19000	31500	35500	40300
36in	DN900	CV	1080	3780	7550	11900	17800	25300	42100	47400	53900
		KV	925	3240	6470	10200	15300	21700	36100	40700	46200
38in	DN950	CV	1210	4200	8400	13200	19800	28200	46800	52800	60000
		KV	1040	3600	7200	11300	17000	24200	40100	45200	51400
40in	DN1000	CV	1380	4810	9610	15100	22600	32300	53600	60400	68600
		KV	1185	4125	8235	12900	19400	27600	46000	51800	58800
42in	DN1050	CV	1480	5150	10300	16200	24300	34600	57400	64700	73500
		KV	1270	4415	8830	13900	20800	29600	49200	55500	63000
44in	DN1100	CV	1710	5970	11900	18800	28100	40100	66600	75000	85300
		KV	1465	5120	10200	16100	24100	34400	57100	64300	73100
46in	DN1150	CV	1940	6800	13600	21400	32100	45600	75700	85400	97000
		KV	1665	5830	11700	18300	27500	39100	64900	73200	83100
48in	DN1200	CV	2040	7140	14300	22400	33700	48000	79500	89700	102000
		KV	1750	6120	12300	19200	28900	41100	68100	76900	87400



■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat)

Cv-Value

The Cv flow coefficient, often used or control valves is defined as the flow of water at 60°F(16°C) in gallons per minute, at a pressure drop of 1psi across the valve.

ASME Class 300

VALVE SIZE			Cv relating to the disc opening angle of the disc									
NPS	DN	unit	10°	20°	30°	40°	50°	60°	70°	80°	90°	
3in	DN80	CV KV	4.4 3.4	15.6 13.3	31.5 26.9	47.6 40.7	74.5 63.8	110 95	180 155	200 170	230 200	
4in	DN100	CV KV	8 6.8	27.9 23.9	55.8 47.8	90 77.1	130 110	190 160	310 270	350 300	400 340	
5in	DN125	CV KV	13.1 11.2	46 39.4	92 80	150 128	220 190	310 260	520 450	580 500	670 570	
6in	DN150	CV KV	19.9 17	70 59.9	140 120	220 190	330 280	480 410	780 670	890 760	1000 870	
8in	DN200	CV KV	36.3 31	130 110	260 220	400 340	610 520	860 740	1430 1220	1600 1370	1830 1670	
10in	DN250	CV KV	56 47.9	200 170	390 330	620 530	920 790	1300 1100	2170 1860	2450 2100	2780 2380	
12in	DN300	CV KV	84 71.9	290 250	590 500	930 800	1400 1200	1980 1700	3290 2820	3700 3170	4200 3600	
14in	DN350	CV KV	100 85.6	370 320	730 630	1140 980	1700 1460	2500 2140	4060 3480	4570 3900	5200 4450	
16in	DN400	CV KV	140 120	480 410	960 820	1500 1280	2300 1970	3220 2760	5340 4580	6020 5160	6840 5860	
18in	DN450	CV KV	180 150	640 550	1260 1080	2000 1710	3000 2570	4220 3620	7000 6000	7900 6770	9000 7710	
20in	DN500	CV KV	240 205	840 720	1680 1440	2600 2230	3950 3380	5630 4820	9300 8000	10500 9000	12000 11280	
24in	DN600	CV KV	380 325	1300 1110	2630 2250	4200 3600	6200 5300	8800 7540	14600 12500	16500 14000	18700 16000	
26in	DN650	CV KV	450 385	1560 1340	2860 2450	4900 4200	7350 6300	10400 8900	17300 14800	19600 16800	22300 19100	
28in	DN700	CV KV	520 445	1800 1540	3620 3100	5690 4900	8530 7300	12100 10400	20200 17300	22700 19400	25800 22100	
30in	DN750	CV KV	600 510	2090 1790	3800 3260	6600 5700	9800 8400	14000 12000	23300 20000	26200 22400	29800 25500	
32in	DN800	CV KV	740 630	2600 2230	5220 4470	8040 7000	12000 10300	17200 14700	28500 24400	32200 27600	36500 31300	
34in	DN850	CV KV	860 740	3000 2570	6000 5140	9400 8050	14000 12000	20000 17100	33400 28600	37600 32200	42700 36600	
36in	DN900	CV KV	980 840	3440 2950	6900 5900	10800 9250	16100 13800	23000 19700	38300 32800	43000 36800	49000 42000	
38in	DN950	CV KV	1100 940	3820 3270	7640 6550	12000 10300	18000 15400	25600 22000	42500 36400	48000 41100	54500 46700	
40in	DN1000	CV KV	1150 990	4000 3430	8000 6850	12600 10800	18800 16100	26900 23000	44700 38300	50300 43100	57200 49000	
42in	DN1050	CV KV	1230 1050	4200 3600	8580 7350	13500 11600	20200 17300	28800 24700	47800 41000	53900 46100	61200 52400	
44in	DN1100	CV KV	1430 1220	5000 4280	9920 8500	15700 13500	23400 20000	33400 28600	55500 47500	68200 58400	71000 60800	
46in	DN1150	CV KV	1620 1390	5660 4850	7500 6430	17800 15300	26700 22900	38000 32600	63000 54000	71100 60900	80800 69200	
48in	DN1200	CV KV	1700 1460	5950 5100	12000 10300	18700 16000	28000 24000	40000 34300	66200 57000	74700 64000	85000 72800	

ASME Class 600

VALVE SIZE			Cv relating to the disc opening angle of the disc									
NPS	DN	unit	10°	20°	30°	40°	50°	60°	70°	80°	90°	
3in	DN80	CV KV	3.5 3	10.2 8.7	18.3 15.6	29.3 25	43.9 37.5	61.5 52.6	102 87.2	115 98.3	130 111	
4in	DN100	CV KV	5 4.3	15.9 13.6	28.6 24.4	45.9 39.2	68.9 58.9	96.4 82.4	160 137	205 175	230 197	
5in	DN125	CV KV	9.3 7.9	29 24.8	51.3 43.8	80 68.4	120 102.7	170 145.5	285 244	370 316	480 410	
6in	DN150	CV KV	17.4 14.8	61.4 60	120 100	190 160	290 250	420 360	680 580	770 660	870 750	
8in	DN200	CV KV	27.2 23.3	100 9	200 170	300 260	460 390	640 550	1070 920	1200 1030	1370 1170	
10in	DN250	CV KV	42 36	150 90	290 250	460 390	690 590	980 840	1630 1340	1840 2205	2090 1800	
12in	DN300	CV KV	58.9 50.4	200 170	410 350	650 560	970 830	1390 1190	2300 1970	2600 2230	2950 2530	
14in	DN350	CV KV	73 62.5	260 220	510 440	800 680	1200 1030	1710 1460	2840 2430	3200 2740	3640 3200	
16in	DN400	CV KV	100 90	350 300	700 600	1100 940	1660 1420	2360 2020	3910 3350	4410 3780	5010 4300	
18in	DN450	CV KV	120 100	440 380	870 750	1360 1160	2040 1750	2900 2490	4810 4120	5430 4650	6170 5290	
20in	DN500	CV KV	170 150	580 500	1160 990	1810 1550	2720 2330	3870 3320	6440 5520	7250 6200	8250 7070	
24in	DN600	CV KV	260 220	900 780	1800 1500	2830 2420	4250 3640	6050 5180	10000 8570	11300 9680	12900 11000	
26in	DN650	CV KV	300 260	1070 920	2140 1830	3370 2890	5060 4330	7200 6170	11900 10200	13500 11600	15300 13000	
28in	DN700	CV KV	340 290	1170 1000	2340 2020	3700 3170	5520 4730	7880 6750	13000 11100	14700 12600	16700 14300	
30in	DN750	CV KV	390 330	1350 1160	2700 2300	4250 3640	6350 5440	9060 7760	15000 12800	17000 14600	19300 16500	
32in	DN800	CV KV	470 400	1660 1420	3310 2840	5200 4450	7820 6700	11100 9500	18400 15800	20800 17800	23600 20200	
34in	DN850	CV KV	540 460	1880 1610	3760 3220	5940 5090	8860 7600	12600 10800	21000 18000	23600 20200	26900 23000	
36in	DN900	CV KV	620 530	2160 1850	4300 3700	6800 6070	10200 8740	14500 12400	24000 20600	27000 23100	30800 26400	

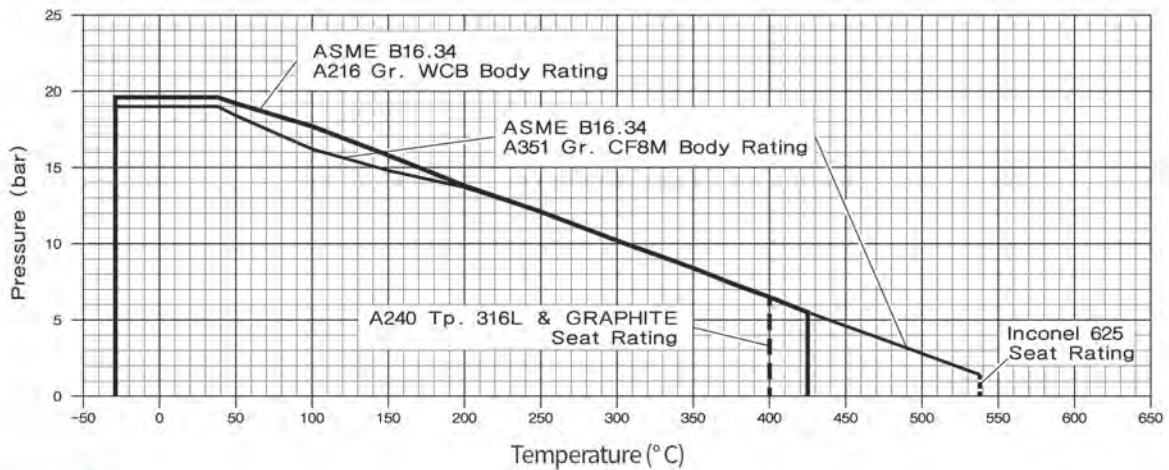
■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat) Pressure – Temperature Rating

ASME Class 150

Temperature	°F	-20	100	122	212	302	392	482	572	617	662	707	752	797	842	887	932	1000
	°C	-29	38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538
Working Pressures (bar)	A216 Gr. WCB ¹⁾	19.6	19.6	19.2	17.7	15.8	13.8	12.1	10.2	9.3	8.4	7.4	6.5	5.5	4.6	3.7	2.8	1.4
	A351 Gr. CF8M ²⁾	19	19	18.4	16.2	14.8	13.7	12.1	10.2	9.3	8.4	7.4	6.5	5.5	4.6	3.7	2.8	1.4

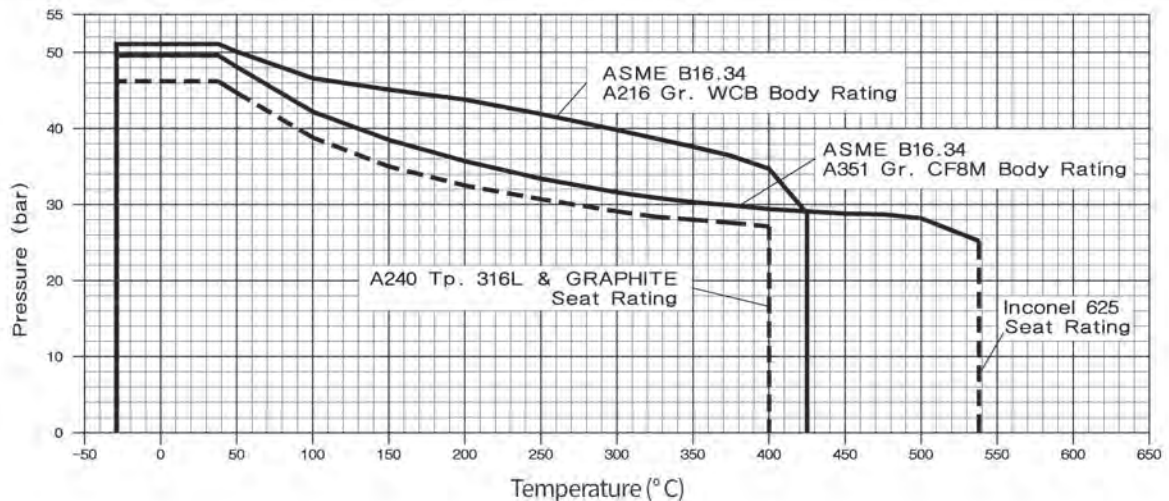
- 1) Upon prolonged exposure to temperatures above 425 °C, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged usage above 425 °C.
- 2) At temperatures above 538 °C, use only when the carbon content is 0.04% or higher.
- 3) Not to be used over 645 °C. Alloy N06625 in the annealed condition is subject to severe loss of impact strength at room temperatures after exposure in the range of 538 °C to 760 °C.



ASME Class 300

Temperature	°F	-20	100	122	212	302	392	482	572	617	662	707	752	797	842	887	932	1000
	°C	-29	38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538
Working Pressures (bar)	A216 Gr. WCB ¹⁾	51.1	51.1	50.1	46.6	45.1	43.8	41.9	39.8	38.7	37.6	36.4	34.7	28.8	23	17.4	11.8	5.9
	A351 Gr. CF8M ²⁾	49.6	49.6	48.1	42.2	38.5	35.7	33.4	31.6	30.9	30.3	29.9	29.4	29.1	28.8	28.7	28.2	25.2

- 1) Upon prolonged exposure to temperatures above 425 °C, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged usage above 425 °C.
- 2) At temperatures above 538 °C, use only when the carbon content is 0.04% or higher.
- 3) Not to be used over 645 °C. Alloy N06625 in the annealed condition is subject to severe loss of impact strength at room temperatures after exposure in the range of 538 °C to 760 °C.



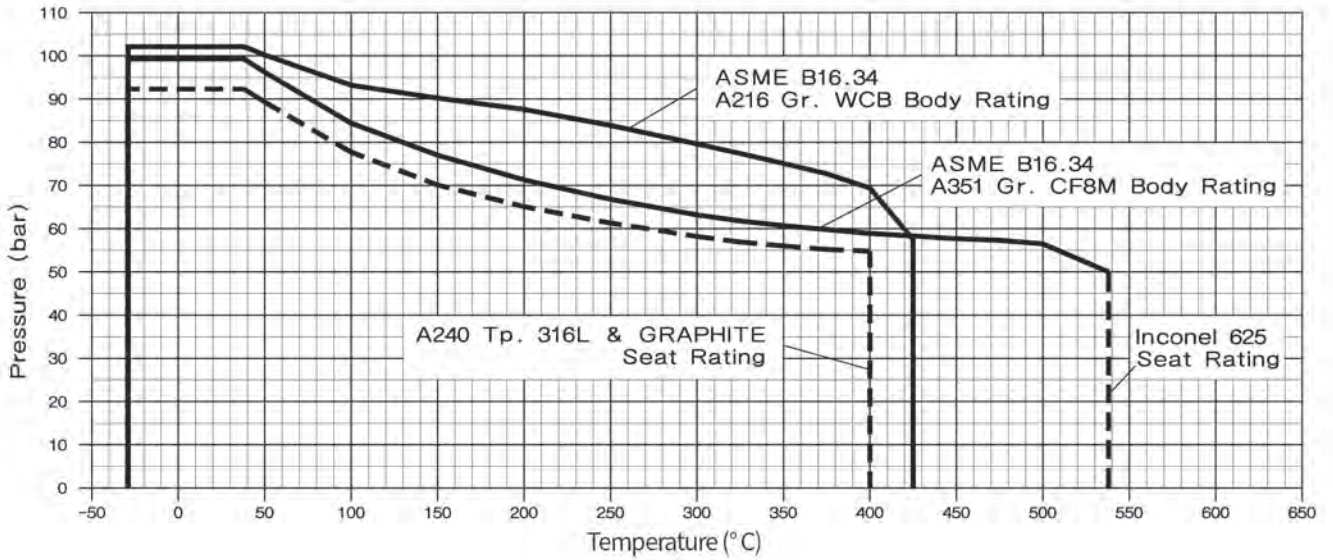
■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat) Pressure – Temperature Rating

ASME Class 600

Temperature	°F	-20	100	122	212	302	392	482	572	617	662	707	752	797	842	887	932	1000
	°C	-29	38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538
Working Pressures (bar)	A216 Gr. WCB ¹⁾	102.1	102.1	100.2	93.2	90.2	87.6	83.9	79.6	77.4	75.1	72.7	69.4	57.5	46	34.9	23.5	11.8
	A351 Gr. CF8M ²⁾	99.3	99.3	96.2	84.4	77	71.3	66.8	63.2	61.8	60.7	59.8	58.9	58.3	57.7	57.3	56.5	50

- 1) Upon prolonged exposure to temperatures above 425 °C, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged usage above 425 °C.
- 2) At temperatures above 538 °C, use only when the carbon content is 0.04% or higher.
- 3) Not to be used over 645 °C. Alloy N06625 in the annealed condition is subject to severe loss of impact strength at room temperatures after exposure in the range of 538 °C to 760 °C.



■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat) Torque Table

ASME Class 150

VALVE SIZE		5 bar	10 bar	15 bar	20 bar
NPS	DN	N·m	N·m	N·m	N·m
3 in	DN80	105	105	138	161
4 in	DN100	155	161	227	292
6 in	DN150	257	270	379	504
8 in	DN200	653	682	885	1146
10 in	DN250	897	1474	1626	2032
12 in	DN300	1178	2178	2892	3427
14 in	DN350	1212	2424	3232	4202
16 in	DN400	1980	2730	3740	4891
18 in	DN450	2840	3976	5264	6986
20 in	DN500	3329	4586	6859	9100
22 in	DN550	3830	6561	9852	13709
24 in	DN600	4332	8536	12845	18318
28 in	DN700	7414	13851	20783	24416
30 in	DN750	9452	17671	26512	31223
32 in	DN800	10945	20436	30645	36085
34 in	DN850	13055	24373	36561	42957
36 in	DN900	16074	29974	44470	52796
38 in	DN950	17716	32971	49397	58018
40 in	DN1000	21224	39466	59131	69290
42 in	DN1050	25475	47330	70908	82949
48 in	DN1200	37209	69014	103378	120555

Shaft Material			
A564 Tp.630	A276 Tp.XM-19	B637 UNS N07718	A276 UNS S31803
N·m	N·m	N·m	N·m
467	245	666	289
1010	529	1440	624
1757	921	2506	1086
3100	1625	4421	1915
5467	2865	7797	3378
5467	2865	7797	3378
10852	5688	15477	6706
10852	5688	15477	6706
22392	11736	31936	13837
22392	11736	31936	13837
37509	19660	53496	23178
37509	19660	53496	23178
55845	29271	79647	34509
93047	48770	132705	57497
93047	48770	132705	57497
127869	67021	182368	79015
127869	67021	182368	79015
127869	67021	182368	79015
165709	86854	236335	102397
216294	113368	308481	133655
338789	177572	483183	209348

ASME Class 300

VALVE SIZE		10 bar	20 bar	30 bar	40 bar	50 bar
NPS	DN	N·m	N·m	N·m	N·m	N·m
3 in	DN80	92	183	275	366	458
4 in	DN100	157	312	467	622	767
6 in	DN150	330	657	984	1312	1641
8 in	DN200	657	1307	1958	2609	3264
10 in	DN250	1616	2262	3151	3717	4848
12 in	DN300	2156	2816	3168	3740	5945
14 in	DN350	2616	4399	5945	6540	7253
16 in	DN400	3093	6142	9192	11361	13747
18 in	DN450	4092	8122	12152	16182	20240
20 in	DN500	7238	13609	17661	20949	25651
24 in	DN600	12221	19095	23169	25715	31061
28 in	DN700	13835	22865	33611	40767	52675
30 in	DN750	16773	29755	43783	53019	68533
38 in	DN950	29756	52834	77839	94054	121631

Shaft Material			
A564 Tp.630(H1150)	A276 Tp.XM-19	B637 UNS N07718	A276 UNS S31803
N·m	N·m	N·m	N·m
1010	529	1440	624
1757	921	2506	1086
5467	2865	7797	3378
5467	2865	7797	3378
10852	5688	15477	6706
10852	5688	15477	6706
22392	11736	31936	13837
22392	11736	31936	13837
37509	19660	53496	23178
55845	29271	79647	34509
93047	48770	132705	57497
127869	67021	182368	79015
165709	86854	236335	102397
338789	177572	483183	209348

■ ■ ■ Data Sheet

▶ Triple Offset Valve (Metal & Graphite Seat / Solid Metal Seat) Torque Table

ASME Class 600

VALVE SIZE		30bar	50 bar	70 bar	90 bar	110 bar	Shaft Material			
NPS	DN	N·m	N·m	N·m	N·m	N·m	A564Tp.630(H1150) N·m	A276 Tp.XM-19 N·m	B637 UNS N07718 N·m	A276 UNS S31803 N·m
6 in	DN150	690	966	1200	1504	1573	5467	2865	7797	3378
8 in	DN200	1142	1642	1964	3035	3213	10852	5688	15477	6706
10 in	DN250	1750	2275	2625	4200	5075	22392	11736	31936	13837
12 in	DN300	3185	4331	5096	6115	7262	37509	19660	53496	23178
14 in	DN350	3745	4587	6314	7160	8204	37509	19660	53496	23178
16 in	DN400	4304	4842	7532	8205	9146	55845	29271	79647	34509
18 in	DN450	6874	9166	11457	13748	15276	93047	48770	132705	57497
20 in	DN500	11969	18919	20077	22780	25869	127869	67021	182368	79015
24 in	DN600	23891	34379	41581	53040	64540	216294	113368	308481	133655
28 in	DN700	31441	45105	54118	58940	83814	338789	177572	483183	209348
30 in	DN750	33251	48365	55922	64990	89173	338789	177572	483183	209348
32 in	DN800	41908	60193	72135	91920	111772	453732	237818	647115	280375
36 in	DN900	53960	77486	92852	118308	143853	453732	237818	647115	280375

Contact for TOD CX valve torque value.

■ ■ ■ Eccentric valve

-API 609 Category B

▶ Double Offset Valve

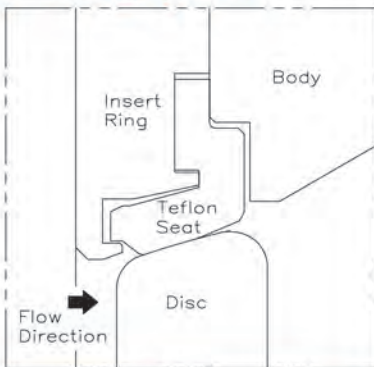
Soft Seat Valve (GTD Valve)

Soft Seat designed for critical requirements has proven its reliability and efficiency in a wide range of application for more than 25 years. Mechanism with an eccentric structure minimizes an on-off torque at high pressure, providing tight shut-off.

Carbon steel and stainless steel are standard materials for body and trim with a Teflon seat. Other special materials or particular treatment on trim and body are available as per the application and service.



▶ Sealing System



Type	Double Offset Butterfly Valve – Soft Seat
Design	ASME B16.34 / API std. 609
Rating	ASME Cl. 150 / Cl. 300 / Cl. 600 PN 10, 16, 25, 40, 60, 64 JIS 10K, 16K, 20K
Size	DN50(2") to DN1800 (72")
Connection Type	Double Flanged / Lugged & Wafer
Temperature Range	-40°C to 250°C
Main Material	Body : WCB, CF8, CF8M etc. Disc : CF8, CF8M etc. Shaft : 17-4PH, 316SS etc. Seat : PTFE, RPTFE, CTFE, UHMW-PE etc.
Operator	Manual Hand lever / Manual Worm Gear Pneumatic Actuator Electric Actuator
Application	General & Petro Chemical Oil Refinery / Production Steel and Iron Mill Shipbuilding Combined / nuclear power plant Water / Sewage Other Plant engineering
Option	Anti-static device Manual operator with Locking device Bonnet / Stem extension Internal Teflon / Velzona coating Low temperature design ISO 15848 Fugitive Emission packing NACE MR0103 / 0175

■ ■ ■ Eccentric valve

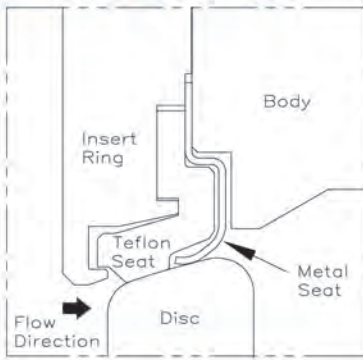
–API 609 Category B

▶ Double Offset Valve

Soft + Metal Seat (FSD Valve)

Having a combined function of Soft seat and Metal seat, Soft +Metal seat gives a tight shut-off at nominal pressure and temperature rating. Soft +Metal seat sealing system consists of reinforced Teflon and Metal seat. Although Soft +Metal seat has double seat structure, it requires relatively low operating torque. Soft +Metal seat valve works with the metal seat when a Teflon seat has been burned out. Soft +Metal seat provides the more reliability for steam and hot air line among its applications.

▶ Sealing System



Type	Double Offset Butterfly Valve – Soft and Metal Seat
Design	ASME B16.34 / API std. 609
Rating	ASME Cl. 150 / Cl. 300 / Cl. 600 PN 10, 16, 25, 40, 60, 64 JIS 10K, 16K, 20K
Size	DN50(2") to DN1800 (72")
Connection Type	Double Flanged / Lugged & Wafer
Temperature Range	-40°C to 250°C
Main Material	Body : WCB, CF8, CF8M etc. Disc : CF8, CF8M etc. Shaft : 17-4PH, 316SS etc. Seat : A240-316 + PTFE, A240-316 + RPTFE etc.
Operator	Manual Hand lever / Manual Worm Gear Pneumatic Actuator Electric Actuator
Application	General & Petro Chemical Oil Refinery / Production Steel and Iron Mill Shipbuilding Combined / nuclear power plant Other Plant engineering Inherit fire safety feature
Option	Anti-static device Manual operator with Locking device Bonnet / Stem extension Heating jacket ISO 15848 Fugitive Emission packing NACE MR0103 / 0175

■ ■ ■ Eccentric valve -API 609 Category B

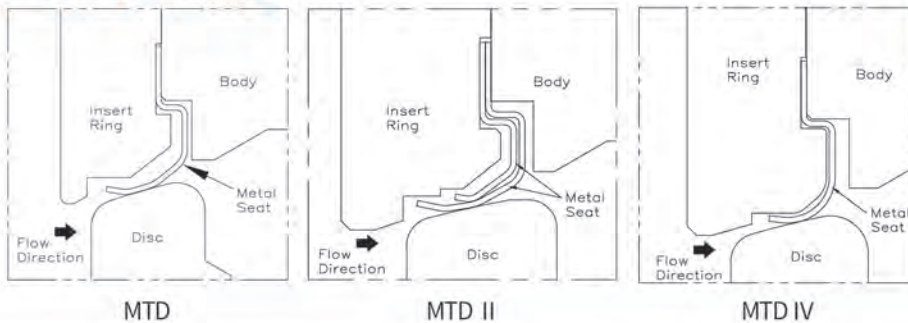
▶ Double Offset Valve

Metal Seat / Metal to Metal Valve(MTD Valve)

Precious metal seated butterfly valve, Metal seat is applicable to high temperature as well as nominal pressure and temperature. Eccentric sealing system assures a low operating torque and positive sealing. Wide selection of valve materials ensures efficient performance in various industries. All UNICOM butterfly valves are tested hydraulically and pneumatically in shop in order to secure perfect sealing and certified by third party at request of clients.



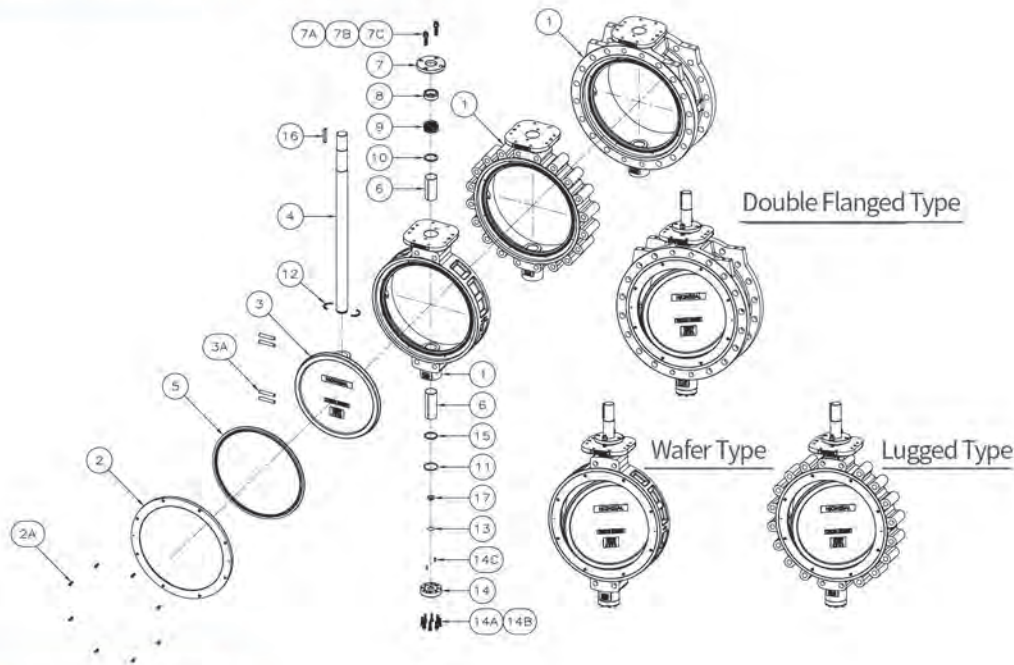
▶ Sealing System



Type	Double Offset Butterfly Valve – Metal Seat / Metal to Metal Seat
Design	ASME B16.34 / API std. 609
Rating	ASME Cl. 150 / Cl. 300 / Cl. 600 PN 10, 16, 25, 40, 60, 64 JIS 10K, 16K, 20K
Size	DN50(2") to DN1600 (64")
Connection Type	Double Flanged / Lugged & Wafer
Temperature Range	-50°C to 650°C
Main Material	Body : WCB, CF8, CF8M etc. Disc : CF8, CF8M etc. Shaft : 17-4PH, 316SS, Inconel 625 etc. Seat : A240-316, Inconel 625 etc.
Operator	Manual Hand lever / Manual Worm Gear Pneumatic Actuator, Electric Actuator
Application	General & Petro Chemical Oil Refinery / Production Steel and Iron Mill Shipbuilding Combined / nuclear power plant Other Plant engineering Inherit fire safety feature
Option	Stellite or ENP on Disc Anti-static device Manual operator with Locking device Bonnet / Stem extension Heating jacket ISO 15848 Fugitive Emission packing NACE MR 0103 / 0175

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat)



Parts List

1	Wafer Body Lugged Body Double Flanged Body
2	Insert Ring
2A	Wrench Bolt
3	Disc
3A	Disc Taper Pin
4	Shaft
5	Soft Shaft
6	Shaft Bearing
7	Gland Flange
7A	Stud Bolt
7B	Hex. Nut
7C	Spring Washer
8	Packing Gland
9	Gland Packing
10	Packing Retainer
11	Bottom Packing
12	Shaft Retainer
13	Shaft Retainer
14	Bottom Plug
14A	Hex. Bolt
14B	Spring Washer
14C	Parallel Pin
15	Shaft Lower Ring
16	Key
17	Thrust Collar

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Carbon Steel	A216 Gr. WCB / WCC
		Steel Casting High-Temperature Service	A217 Gr. WC6 / WC9
2	Insert Ring	Steel	SS400 (Jis)
		Carbon Steel	A515 Gr. 60 / 70
2A	Wrench Bolt	Stainless Steel	A240 Tp. 304
		Alloy Steel	A193 Gr. B7 / B7M
3	Disc	Carbon Steel	A216 Gr. WCB
		Stainless Steel	A351 Gr. CFS / CFBM
3A	Disc Taper Pin	13Cr	A217 Gr. CA15
		Stainless Steel	A276 Tp. 316
4	Shaft	17-4PH	A564 Tp. 630
		Stainless Steel	A276 Tp. XM-19 A276 Tp. 304 / 316
5	Soft Seat	Teflon	PTFE
		Reinforced Teflon	R.TFE
6	Shaft Bearing	Stainless Steel	A240 Tp. 316
		Stainless Steel & Reinforced Teflon	A240 Tp. 316 & R. TFE
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating
7	Gland Flange	Stainless Steel	A240 Tp. 304
7A	Stud Bolt	Alloy Steel	A193 Gr. B7 / B7M
		Stainless Steel	A193 Gr. B8 A2-70 (ISO3506)
7B	Hex. Nut	Alloy Steel	A194 Gr. 2H / 2HM
		Stainless Steel	A194 Gr. 8 A2-70 (ISO3506)

Part No.	Designation	Specification	Material
			ASTM
7C	Spring Washer	Carbon Steel	A510
		Stainless Steel	A167 Tp. 304
8	Packing Gland	Stainless Steel	A276 Tp. 316
9	Gland Packing	Grafoil / Teflon	GRAFOIL / PTFE
10	Packing Retainer	Stainless Steel	A276 Tp. 316
11	Bottom Packing	Grafoil / Teflon	GRAFOIL / PTFE
12	Shaft Retainer	Stainless Steel	A276 Tp. 316
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Carbon Steel	S45C (Jis)
		Stainless Steel	A515 Gr. 60 / 70 A276 Tp. 304
		Alloy Steel	A193 Gr. B7 / B7M
14A	Hex. Bolt	Stainless Steel	A193 Gr. B8 A2-70 (ISO3506)
14B	Spring Washer	Carbon Steel	A510
		Stainless Steel	A167 Tp. 304
14C	14C Parallel Pin	Stainless Steel	A276 Tp. 304
15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

▶ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat)

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Stainless Steel	A351 Gr. CFS/CF8M A351 Gr. CF3/CF3M
2	Insert Ring	Stainless Steel	A240 Tp. 304 / 316 A240 Tp. 304L / 316L
2A	Wrench Bolt	Stainless Steel	A193 Gr. BB / BBM A2-70 / A4-70 (ISO3506)
3	Disc	Stainless Steel	A351 Gr. CFS/CF8M A351 Gr. CF3/CF3M
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316
4	Shaft	17-4PH	A564 Tp. 630
		Stainless Steel	A276 Tp. XM-19 A276 Tp. 304 / 316
		Duplex Stainless Steel	A276 UNS S31803 / S32760
5	Soft Seat	Teflon	PTFE
		Reinforced Teflon	R.TFE
6	Shaft Bearing	Stainless Steel	A240 Tp. 316
		Stainless Steel & Reinforced Teflon	A240 Tp. 316 & R. TFE
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating
		Stainless Steel	A240 Tp. 304 / 316
7	Gland Flange	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)
7A	Stud Bolt	Stainless Steel	A194 Gr. 8 / 8M
7B	Hex. Nut	Stainless Steel	A2-70 / A4-70 (ISO3506)

Part No.	Designation	Specification	Material
			ASTM
7C	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
8	Packing Gland	Stainless Steel	A276 Tp. 316
9	Gland Packing	Teflon	PTFE
10	Packing Retainer	Stainless Steel	A276 Tp. 316
11	Bottom Packing	Teflon	PTFE
12	Shaft Retainer	Stainless Steel	A276 Tp. 316
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Stainless Steel	A276 Tp. 304 / 316 A276 Tp. 304L / 316L
14A	Hex. Bolt	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)
14B	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 304 / 316
15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

* Option - Packing: Grafoil

▶ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Duplex Stainless Steel	A995 Gr. 4A / 5A / 6A
2	Insert Ring	Duplex Stainless Steel	A240 UN S S31803 / S32750 / S32760
2A	Wrench Bolt	Stainless Steel	A193 Gr. B8M A4-70 (ISO3506)
3	Disc	Duplex Stainless Steel	A995 Gr. 4A / 5A / 6A
3A	Disc Taper Pin	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
4	Shaft	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
		Teflon	PTFE
		Reinforced Teflon	R.TFE
6	Shaft Bearing	Stainless Steel & Reinforced Teflon	A240 Tp. 316 & R. TFE
		Duplex Stainless Steel	A240 UNS S31803
		Duplex Stainless Steel & Hard Chromium Plating	A276 UN S S31803 / S32750 / S32760 & Hard Chromium Plating
		Monel 400	B127 UNS N04400 B164 UNS N04400
		Stainless Steel	A240 Tp. 304 / 316
7	Gland Flange	Stainless Steel	A276 UN S S31803 / S32750 / S32760
		Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
7A	Stud Bolt	Stainless Steel	A193 Gr. B8M A4-70 (ISO3506)
7B	Hex. Nut	Stainless Steel	A194 Gr. 8M A4-70 (ISO3506)

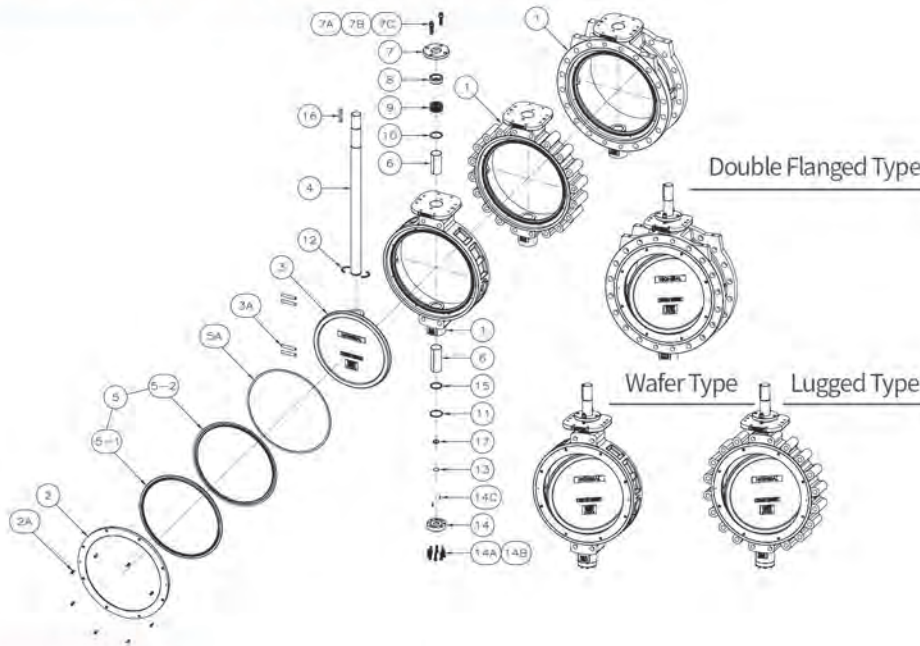
Part No.	Designation	Specification	Material
			ASTM
7C	Spring Washer	Stainless Steel	A167 Tp. 316
8	Packing Gland	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
9	Gland Packing	Grafoil / Teflon	GRAFOIL / PTFE
10	Packing Retainer	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
11	Bottom Packing	Grafoil / Teflon	GRAFOIL / PTFE
12	Shaft Retainer	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
14A	Hex. Bolt	Stainless Steel	A193 Gr. B8M A4-70 (ISO3506)
14B	Spring Washer	Stainless Steel	A167 Tp. 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 316
15	Shaft Lower Ring	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

▶ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft + Metal Seat)



Parts List	
1	Wafer Body Lugged Body Double Flanged Body
2	Insert Ring
2A	Wrench Bolt
3	Disc
3A	Disc Taper Pin
4	Shaft
5	FSD Seat
5-1	Soft Seat
5-2	Metal Seat
5A	Gasket
6	Shaft Bearing
7	Gland Flange
7A	Stud Bolt
7B	Hex. Nut
7C	Spring Washer
8	Packing Gland
9	Gland Packing
10	Packing Retainer
11	Bottom Packing
12	Shaft Retainer
13	Shaft Spacer
14	Bottom Plug
14A	Hex. Bolt
14B	Spring Washer
14C	Parallel Pin
15	Shaft Lower Ring
16	Key
17	Thrust Collar

STANDARD MATERIAL

Part No.	Designation	Specification	Material	Part No.	Designation	Specification	Material																												
			ASTM				ASTM																												
1	Valve Body	Carbon Steel	A216 Gr. WCB / WCC	7C	Spring Washer	Carbon Steel	A510																												
		Steel Casting	A217 Gr. WC6 / WC9			Stainless Steel	A167 Tp. 304																												
2	Insert Ring	Steel	SS400 (Jis)	8	Packing Gland	Stainless Steel	A276 Tp. 316																												
		Carbon Steel	A515 Gr. 60 / 70	9	Gland Packing	Grafoil / Teflon	GRAFOIL																												
2A	Wrench Bolt	Stainless Steel	A240 Tp. 304	10	Packing Retainer	Stainless Steel	A276 Tp. 316																												
		Alloy Steel	A193 Gr. B7 / B7M	11	Bottom Packing	Grafoil / Teflon	GRAFOIL																												
3	Disc	Alloy Steel	A193 Gr. B8	12	Shaft Retainer	Stainless Steel	A276 Tp. 316																												
		Stainless Steel	A2-70 (ISO3506)	13	Shaft Spacer	Stainless Steel	A240 Tp. 316																												
		Carbon Steel	A216 Gr. WCB	14	Bottom Plug	Carbon Steel	S45C (Jis)																												
Stainless Steel	A351 Gr. CFS / CF8M	Stainless Steel	A515 Gr. 60 / 70																																
3A	Disc Taper Pin	13 Cr	A217 Gr. CA15	14A	Hex. Bolt	Alloy Steel	A193 Gr. B7 / B7M																												
		Stainless Steel	A276 Tp. 316			Stainless Steel	A193 Gr. B8																												
4	Shaft	17-4PH	A564 Tp. 630	14B	Spring Washer	Carbon Steel	A510																												
		Stainless Steel	A276 Tp. XM-19			Stainless Steel	A167 Tp. 304																												
		Stainless Steel	A276 Tp. 304 / 316			14C	Parallel Pin	Stainless Steel	A276 Tp. 304																										
5	Fire-Safe Seat	Stainless Steel & Teflon	PTFE	15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316																												
		Stainless Steel & Reinforced Teflon	R.TFE	16	Key	Carbon Steel	A576 Gr. 1045																												
		Inconel 625 & Teflon	B443 UNS N06625 & PTFE	17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE																												
		Inconel 625 & Reinforced Teflon	B443 UNS N06625 & R.TFE																																
5A	Gasket	Graphite	GRAPHITE	▶ Recommend Spare Parts																															
6	Shaft Bearing	Stainless Steel	A240 Tp. 316	<table border="1"> <thead> <tr> <th rowspan="2">Part No.</th> <th rowspan="2">Designation</th> <th colspan="3">Pressure Rating & Valve Size</th> </tr> <tr> <th>ASME Class 150</th> <th>ASME Class 300</th> <th>ASME Class 600</th> </tr> </thead> <tbody> <tr> <td>14C</td> <td>Parallel Pin</td> <td>20" ~ 48"</td> <td>16" ~ 48"</td> <td>12" ~ 48"</td> </tr> <tr> <td>15</td> <td>Shaft Lower Ring</td> <td>16" ~ 48"</td> <td>14" ~ 48"</td> <td>8" ~ 48"</td> </tr> <tr> <td>16</td> <td>Key</td> <td>16" ~ 48"</td> <td>14" ~ 48"</td> <td>8" ~ 48"</td> </tr> <tr> <td>17</td> <td>Thrust Collar</td> <td>20" ~ 48"</td> <td>16" ~ 48"</td> <td>12" ~ 48"</td> </tr> </tbody> </table>				Part No.	Designation	Pressure Rating & Valve Size			ASME Class 150	ASME Class 300	ASME Class 600	14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"	15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"	16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"	17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"
		Part No.	Designation							Pressure Rating & Valve Size																									
ASME Class 150	ASME Class 300			ASME Class 600																															
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"																															
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16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"																															
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"																															
Stainless Steel & Hard Chromium Plating	& Hard Chromium Plating																																		
7	Gland Flange	Stainless Steel	A240 Tp. 304																																
		Alloy Steel	A193 Gr. B7 / B7M																																
7A	Stud Bolt	Alloy Steel	A193 Gr. B8																																
		Stainless Steel	A2-70 (ISO3506)																																
7B	Hex. Nut	Alloy Steel	A194 Gr. 2H / 2HM																																
		Stainless Steel	A194 Gr. 8																																
			A2-70 (ISO3506)																																

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft + Metal Seat)

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Stainless Steel	A351 Gr. CFS/CF8M A351 Gr. CF3/CF3M
2	Insert Ring	Stainless Steel	A240 Tp. 304 / 316 A240 Tp. 304L / 316L
2A	Wrench Bolt	Stainless Steel	A193 Gr. BB / BBM A2-70 / A4-70 (ISO3506)
3	Disc	Stainless Steel	A351 Gr. CFS/CF8M A351 Gr. CF3/CF3M
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316 17-4PH A564 Tp. 630
4	Shaft	Stainless Steel	A276 Tp. XM-19 A276 Tp. 304 / 316
		Duplex Stainless Steel	A276 UNS S31803 / S32760
5	Fire-Safe Seat	Stainless Steel & Teflon	A240 Tp. 304L / 316L & PTFE
		Stainless Steel & Reinforced Teflon	A240 Tp. 304L / 316L & R.TFE
		Inconel 625 & Teflon	B443 UNS N06625 & PTFE
5A	Gasket	Graphite	B443 UNS N06625 & R.TFE GRAPHITE
6	Shaft Bearing	Stainless Steel	A240 Tp. 316
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating
7	Gland Flange	Stainless Steel	A240 Tp. 304 / 316
7A	Stud Bolt	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)

Part No.	Designation	Specification	Material
			ASTM
7B	Hex. Nut	Stainless Steel	A194 Gr. 8 / 8M A2-70 / A4-70 (ISO3506)
7C	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
8	Packing Gland	Stainless Steel	A276 Tp. 316
9	Gland Packing	Grafoil	GRAFOIL
10	Packing Retainer	Stainless Steel	A276 Tp. 316
11	Bottom Packing	Grafoil	GRAFOIL
12	Shaft Retainer	Stainless Steel	A276 Tp. 316
13	Shaft Spacer	Stainless Steel	A240 Tp. 316 A276 Tp. 304 / 316 A276 Tp. 304L / 316L
14	Bottom Plug	Stainless Steel	A193 Gr. B8 / B8M A2-70 / A4-70 (ISO3506)
14A	Hex. Bolt	Stainless Steel	A167 Tp. 304 / 316
14B	Spring Washer	Stainless Steel	A276 Tp. 304 / 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 304 / 316
15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

▶ Recommend Spare Parts

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Duplex Stainless Steel	A995 Gr. 4A / 5A / 6A
2	Insert Ring	Duplex Stainless Steel	A240 UNS S31803 / S32750 / S32760 A193 Gr. B8M
2A	Wrench Bolt	Stainless Steel	A4-70 (ISO3506)
3	Disc	Duplex Stainless Steel	A995 Gr. 4A / 5A / 6A
3A	Disc Taper Pin	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
4	Shaft	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
5	Fire-Safe Seat	Duplex Stainless Steel & Teflon	A276 UN S S31803 / S32750 / S32760 & PTFE
		Duplex Stainless Steel & Reinforced Teflon	A276 UN S S31803 / S32750 / S32760 & R.TFE
5A	Gasket	Graphite	GRAPHITE
6	Shaft Bearing	Duplex Stainless Steel	A240 UN S S31803 A276 UNS S31803 / S32750 / S32760
		Monel 400	B127 UNS N04400 B164 UNS N04400
		Stainless Steel	A240 Tp. 304 / 316
7	Gland Flange	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
		Stainless Steel	A193 Gr. B8M A4-70 (ISO3506)
7A	Stud Bolt	Stainless Steel	A194 Gr. 8M A4-70 (ISO3506)
7B	Hex. Nut	Stainless Steel	A4-70 (ISO3506)

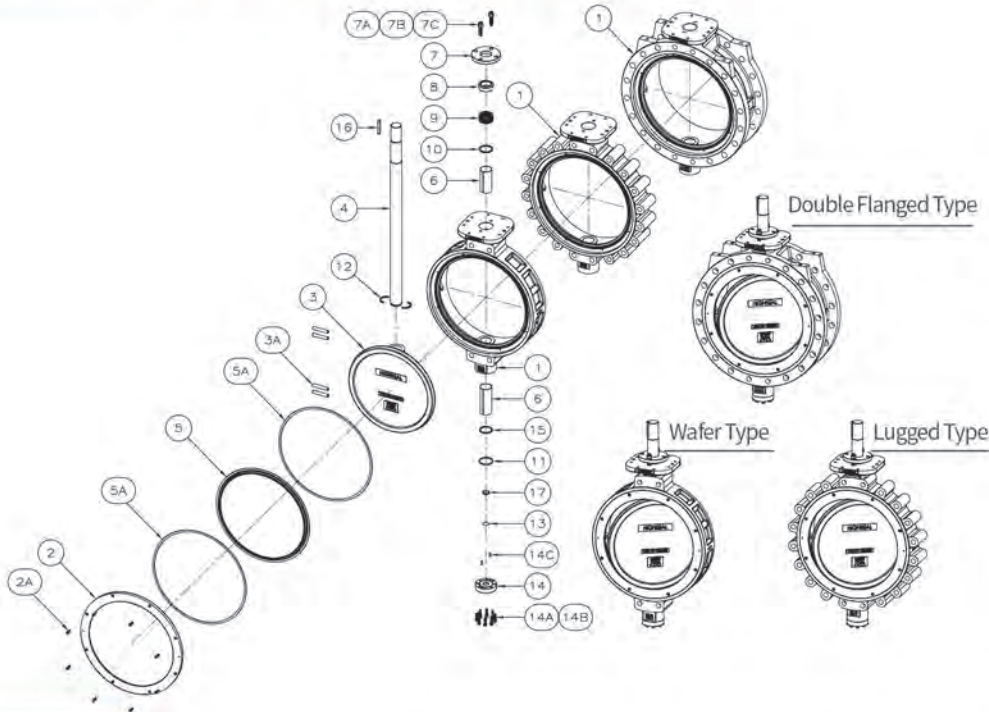
Part No.	Designation	Specification	Material
			ASTM
7C	Spring Washer	Stainless Steel	A167 Tp. 316
8	Packing Gland	Duplex Stainless Steel	A276 UN S S31803 / S32750 / S32760
9	Gland Packing	Grafoil	GRAFOIL
10	Packing Retainer	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
11	Bottom Packing	Grafoil	GRAFOIL
12	Shaft Retainer	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760 A193 Gr. B8M A4-70 (ISO3506)
14A	Hex. Bolt	Stainless Steel	A167 Tp. 316
14B	Spring Washer	Stainless Steel	A276 Tp. 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 316
15	Shaft Lower Ring	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

▶ Recommend Spare Parts

■ ■ ■ Data Sheet

▶ Double Offset Valve (Metal Seat / Metal to Metal Seat)



Parts List	
1	Wafer Body Lugged Body Double Flanged Body
2	Insert Ring
2A	Wrench Bolt
3	Disc
3A	Disc Taper Pin
4	Shaft
5	Metal Seat
5A	Gasket
6	Shaft Bearing
7	Gland Flange
7A	Stud Bolt
7B	Hex. Nut
7C	Spring Washer
8	Packing Gland
9	Gland Packing
10	Packing Retainer
11	Bottom Packing
12	Shaft Retainer
13	Shaft Spacer
14	Bottom Plug
14A	Hex. Bolt
14B	Spring Washer
14C	Parallel Pin
15	Shaft Lower Ring
16	Key
17	Thrust Collar

STANDARD MATERIAL

Part No.	Designation	Specification	Material	Part No.	Designation	Specification	Material
			ASTM				ASTM
1	Valve Body	Carbon Steel	A216 Gr. WCB / WCC	7C	Spring Washer	Carbon Steel	A510
		Steel Casting High-Temperature Service	A217 Gr. WC6 / WC9			Stainless Steel	A167 Tp. 304
2	Insert Ring	Steel	SS400 (Jis)	8	Packing Gland	Stainless Steel	A276 Tp. 316
		Carbon Steel	A515 Gr. 60 / 70	9	Gland Packing	Grafoil	GRAFOIL
		Stainless Steel	A240 Tp. 304	10	Packing Retainer	Stainless Steel	A276 Tp. 316
2A	Wrench Bolt	Alloy Steel	A193 Gr. B7 / B7M	11	Bottom Packing	Grafoil	GRAFOIL
		Stainless Steel	A193 Gr. B8 A2-70 (ISO3506)	12	Shaft Retainer	Stainless Steel	A276 Tp. 316
3	Disc	Carbon Steel & Hard Facing	A216 Gr. WCB & STELLITE	13	Shaft Spacer	Stainless Steel	A240 Tp. 316
		Stainless Steel & Hard Facing	A351 Gr. CFS / CF8M & STELLITE	14	Bottom Plug	Carbon Steel	S45C (Jis) A515 Gr. 60 / 70
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316			Stainless Steel	A276 Tp. 304
4	Shaft	17-4PH	A564 Tp. 630	14A	Hex. Bolt	Alloy Steel	A193 Gr. B7 / B7M
		Stainless Steel	A276 Tp. XM-19 A276 Tp. 304 / 316			Stainless Steel	A193 Gr. B8 A2-70 (ISO3506)
5	Metal Seat	Stainless Steel	A240 Tp. 304L / 316L	14B	Spring Washer	Carbon Steel	A510
		Inconel 625	B443 UNS N06625			Stainless Steel	A167 Tp. 304
5A	Gasket	Graphite	GRAPHITE	14C	Parallel Pin	Stainless Steel	A276 Tp. 304
6	Shaft Bearing	Stainless Steel	A240 Tp. 316	15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating	16	Key	Carbon Steel	A576 Gr. 1045
7	Gland Flange	Stainless Steel	A240 Tp. 304	17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316 & STELLITE
7A	Stud Bolt	Alloy Steel	A193 Gr. B7 / B7M				
7B	Hex. Nut	Alloy Steel	A194 Gr. 2H / 2HM	▶ Recommend Spare Parts			
		Stainless Steel	A194 Gr. 8 A2-70 (ISO3506)				

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

■ ■ ■ Data Sheet

▶ Double Offset Valve (Metal Seat / Metal to Metal Seat)

STANDARD MATERIAL

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Stainless Steel	A351 Gr. CFS/CF8M
			A351 Gr. CF3/CF3M
2	Insert Ring	Stainless Steel	A240 Tp. 304 / 316
			A240 Tp. 304L / 316L
2A	Wrench Bolt	Stainless Steel	A193 Gr. B8 / B8M
			A2-70 / A4-70 (ISO3506)
3	Disc	Stainless Steel	A351 Gr. CFS/CFBM
			A351 Gr. CF3/CF3M
3A	Disc Taper Pin	Stainless Steel	A276 Tp. 316
			A564 Tp. 630
4	Shaft	Stainless Steel	A276 Tp. XM-19
			A276 Tp. 304 / 316
		Duplex Stainless Steel	A276 UNS S31803 / S32760
5	Metal Seat	Stainless Steel	A240 Tp. 304L / 316L & PTFE
		Inconel 625	B443 UNS N06625 & R.TFE
5A	Gasket	Graphite	GRAPHITE
6	Shaft Bearing	Stainless Steel	A240 Tp. 316
		Stainless Steel & Hard Chromium Plating	A276 Tp. 316 & Hard Chromium Plating
7	Gland Flange	Stainless Steel	A240 Tp. 304 / 316
7A	Stud Bolt	Stainless Steel	A193 Gr. B8 / B8M
			A2-70 / A4-70 (ISO3506)
7B	Hex. Nut	Stainless Steel	A194 Gr. 8 / 8M
			A2-70 / A4-70 (ISO3506)

Part No.	Designation	Specification	Material
			ASTM
1	Valve Body	Duplex Stainless Steel	A995 Gr. 4A / 5A / 6A
2	Insert Ring	Duplex Stainless Steel	A240 UNS S31803 / S32750 / S32760
2A	Wrench Bolt	Stainless Steel	A193 Gr. B8M
			A4-70 (ISO3506)
3	Disc	Duplex Stainless Steel & Hard Facing	A995 Gr. 4A / 5A / 6A & STELLITE
3A	Disc Taper Pin	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
4	Shaft	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
5	Metal Seat	Duplex Stainless Steel	A240 UNS S31803 / S32750 / S32760
5A	Gasket	Graphite	GRAPHITE
6	Shaft Bearing	Duplex Stainless Steel	A240 UNS S31803
			A276 UNS S31803 / S32750 / S32760
		Monel 400	B127 UNS N04400 B164 UNS N04400
7	Gland Flange	Stainless Steel	A240 Tp. 304 / 316
		Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
7A	Stud Bolt	Stainless Steel	A193 Gr. B8M
			A4-70 (ISO3506)
7B	Hex. Nut	Stainless Steel	A194 Gr. 8M
			A4-70 (ISO3506)
7C	Spring Washer	Stainless Steel	A167 Tp. 316
8	Packing Gland	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760

Part No.	Designation	Specification	Material
			ASTM
7C	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
8	Packing Gland	Stainless Steel	A276 Tp. 316
9	Gland Packing	Grafoil	GRAFOIL
10	Packing Retainer	Stainless Steel	A276 Tp. 316
11	Bottom Packing	Grafoil	GRAFOIL
12	Shaft Retainer	Stainless Steel	A276 Tp. 316
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Stainless Steel	A276 Tp. 304 / 316
			A276 Tp. 304L / 316L
14A	Hex. Bolt	Stainless Steel	A193 Gr. B8 / B8M
			A2-70 / A4-70 (ISO3506)
14B	Spring Washer	Stainless Steel	A167 Tp. 304 / 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 304 / 316
15	Shaft Lower Ring	Stainless Steel	A276 Tp. 316
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316
			& STELLITE

▶ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

Part No.	Designation	Specification	Material
			ASTM
9	Gland Packing	Grafoil	GRAFOIL
10	Packing Retainer	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
11	Bottom Packing	Grafoil	GRAFOIL
12	Shaft Retainer	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
13	Shaft Spacer	Stainless Steel	A240 Tp. 316
14	Bottom Plug	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
14A	Hex. Bolt	Stainless Steel	A193 Gr. B8M
			A4-70 (ISO3506)
14B	Spring Washer	Stainless Steel	A167 Tp. 316
14C	Parallel Pin	Stainless Steel	A276 Tp. 316
15	Shaft Lower Ring	Duplex Stainless Steel	A276 UNS S31803 / S32750 / S32760
16	Key	Carbon Steel	A576 Gr. 1045
17	Thrust Collar	Stainless Steel & Hard Facing	A276 Tp. 316
			& STELLITE

▶ Recommend Spare Parts

Part No.	Designation	Pressure Rating & Valve Size		
		ASME Class 150	ASME Class 300	ASME Class 600
14C	Parallel Pin	20" ~ 48"	16" ~ 48"	12" ~ 48"
15	Shaft Lower Ring	16" ~ 48"	14" ~ 48"	8" ~ 48"
16	Key	16" ~ 48"	14" ~ 48"	8" ~ 48"
17	Thrust Collar	20" ~ 48"	16" ~ 48"	12" ~ 48"

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat)

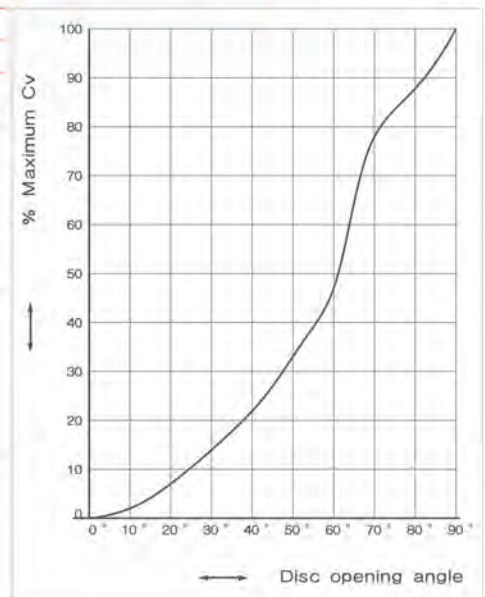
Cv-Value

The Cv flow coefficient, often used or control valves is defined as the flow of water at 60°F(16°C) in gallons per minute, at a pressure drop of 1psi across the valve.

ASME Class 150

FLOW CHARACTERISTIC

VALVE SIZE		unit	Cv relating to the disc opening angle of the disc								
NPS	DN		10°	20°	30°	40°	50°	60°	70°	80°	90°
2in	DN50	Cv	2.1	6.4	12.9	20.2	30.4	43.2	72	81	92
		Kv	1.8	5.5	11.0	17.3	26.0	37.1	62	70	80
2.5in	DN65	Cv	3.0	10.5	21.0	33.0	49.5	71	117	132	150
		Kv	2.6	9.0	18.0	28.3	42.4	61	100	115	130
3in	DN80	Cv	5.2	18.2	36.4	57.2	86	112	203	230	260
		Kv	4.5	15.6	31.2	49.0	75	105	175	200	225
4in	DN100	Cv	9.2	32.2	64.4	101	152	216	360	405	460
		Kv	7.9	27.6	55.2	87	130	185	310	350	395
5in	DN125	Cv	15.2	53.2	106	167	251	357	595	670	760
		Kv	13.0	45.6	91	145	215	306	510	580	655
6in	DN150	Cv	23.0	81	161	253	380	540	897	1015	1150
		Kv	19.7	70	140	220	325	465	770	870	985
8in	DN200	Cv	42	147	295	462	695	987	1640	1850	2100
		Kv	36	126	255	396	600	845	1410	1590	1800
10in	DN250	Cv	64	225	450	705	1056	1505	2496	2816	3200
		Kv	55	195	390	605	905	1290	2140	2415	2745
12in	DN300	Cv	94	330	660	1035	1551	2210	3666	4136	4700
		Kv	81	285	570	890	1330	1895	3145	3545	4030
14in	DN350	Cv	116	406	815	1276	1915	2726	4525	5105	5800
		Kv	100	350	700	1095	1645	2335	3880	4380	4970
16in	DN400	Cv	160	560	1120	1760	2640	3760	6240	7040	8000
		Kv	137	480	960	1510	2265	3225	5350	6035	6855
18in	DN450	Cv	210	735	1470	2310	3465	4935	8190	9240	10500
		Kv	180	630	1260	1980	2970	4230	7020	7920	9000
20in	DN500	Cv	280	980	1960	3080	4620	6580	10920	12320	14000
		Kv	240	840	1680	2640	3960	5670	9360	10560	12000
22in	DN550	Cv	365	1275	2550	4005	6006	8555	14196	16016	18200
		Kv	315	1095	2190	3435	5150	7330	12165	13730	15595
24in	DN600	Cv	420	1470	2940	4620	6930	9870	16380	18480	21000
		Kv	360	1260	2520	3960	5940	8460	14040	15835	17995
26in	DN650	Cv	500	1750	3500	5500	8250	11750	19500	22000	25000
		Kv	430	1500	3000	4715	7070	10070	16710	18855	21425
28in	DN700	Cv	580	2030	4060	6380	9570	13630	22620	25520	29000
		Kv	500	1740	3480	5470	8200	11680	19385	21870	24850
30in	DN750	Cv	670	2345	4690	7370	11055	15745	26130	29480	33500
		Kv	575	2010	4020	6315	9480	13495	22390	25265	28710
32in	DN800	Cv	820	2870	5740	9020	13530	19270	31980	36080	41000
		Kv	705	2460	4920	7730	11595	16515	27405	30920	35135
34in	DN850	Cv	960	3360	6720	10560	15840	22560	37440	42240	48000
		Kv	825	2880	5760	9050	13575	19335	32085	36195	41135
36in	DN900	Cv	1100	3850	7700	12100	18150	25850	42900	48400	55000
		Kv	945	3300	6600	10370	15555	22150	36760	41475	47130
38in	DN950	Cv	1225	4285	8570	13465	20200	28765	47736	53856	61200
		Kv	1050	3675	7350	11540	17310	24650	40905	46150	52445
40in	DN1000	Cv	1400	4900	9800	15400	23100	32900	54600	61600	70000
		Kv	1200	4200	8400	13200	19795	28195	46790	52785	59985
42in	DN1050	Cv	1505	5255	10510	16511	24770	35275	58540	66045	75050
		Kv	1290	4505	9010	14150	21230	30230	50165	56595	64310
44in	DN1100	Cv	1740	6090	12180	19140	28710	40890	67860	76560	87000
		Kv	1495	5220	10440	16405	24605	35040	58150	65605	74550
46in	DN1150	Cv	1980	6930	13860	21780	32670	46530	77220	87120	99000
		Kv	1700	5940	11880	18665	27995	39875	66170	74655	84835
48in	DN1200	Cv	2080	7280	14560	22880	34320	48880	81120	91520	104000
		Kv	1785	6240	12480	19605	29410	41890	69515	78425	89120



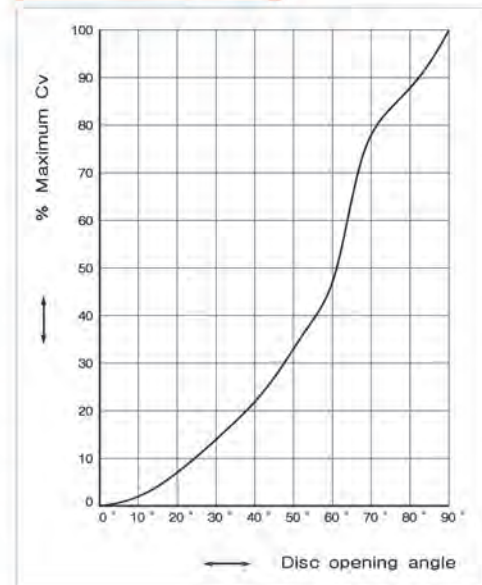
■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat)

ASME Class 300

VALVE SIZE		unit	Cv relating to the disc opening angle of the disc								
NPS	DN		10°	20°	30°	40°	50°	60°	70°	80°	90°
2in	DN50	Cv	1.8	6.4	12.9	20.2	30.4	43.2	72	81	92
		Kv	1.6	5.5	11.0	17.3	26.0	37.1	62	70	80
2.5in	DN65	Cv	3	10.5	21.0	33.0	49.5	71	117	132	150
		Kv	2.6	9.0	18.0	28.3	42.5	61	100	115	130
3in	DN80	Cv	5.2	18.2	36.5	57.2	86	122	203	230	260
		Kv	4.5	15.6	31.5	49.0	75	105	175	200	225
4in	DN100	Cv	9.2	32.2	64.5	101	152	216	360	405	460
		Kv	7.9	27.6	55.5	87	130	185	310	350	395
5in	DN125	Cv	15.2	53.2	106	167	251	357	595	670	760
		Kv	13.0	45.6	91	145	215	306	510	580	655
6in	DN150	Cv	23	81	161	253	380	540	897	1015	1150
		Kv	19.7	70	140	220	325	460	770	870	985
8in	DN200	Cv	38	133	266	418	627	895	1485	1675	1900
		Kv	33	115	230	360	540	770	1270	1440	1630
10in	DN250	Cv	56	196	392	616	925	1316	2185	2465	2800
		Kv	48	170	336	530	795	1130	1875	2115	2400
12in	DN300	Cv	82	287	575	905	1355	1930	3200	3610	4100
		Kv	70	246	495	780	1160	1660	2740	3095	3515
14in	DN350	Cv	110	385	770	1210	1815	2585	4290	4840	5500
		Kv	95	330	660	1040	1555	2215	3680	4150	4715
16in	DN400	Cv	152	532	1065	1675	2510	3575	5930	6690	7600
		Kv	130	456	915	1440	2150	3060	5080	5730	6515
18in	DN450	Cv	198	695	1390	2180	3270	4655	7725	8715	9900
		Kv	170	600	1190	1870	2800	3990	6620	7470	8485
20in	DN500	Cv	260	910	1820	2860	4290	6110	10140	11440	13000
		Kv	225	780	1560	2450	3680	5235	8690	9805	11140
22in	DN550	Cv	325	1138	2275	3575	5363	7655	12701	14326	16250
		Kv	278	975	1949	3063	4595	6599	10883	12276	13925
24in	DN600	Cv	390	1365	2730	4290	6435	9165	15210	17160	19500
		Kv	335	1170	2340	3680	5515	7855	13035	14705	16710
26in	DN650	Cv	480	1680	3360	5280	7920	11280	18720	21120	24000
		Kv	415	1445	2890	4540	6810	9700	16100	18160	20640
28in	DN700	Cv	572	2005	4005	6295	9440	13445	22310	25170	28600
		Kv	490	1720	3435	5395	8080	11520	19120	21570	24510
30in	DN750	Cv	675	2360	4720	7415	11125	15840	26290	29660	33700
		Kv	580	2025	4045	6360	9530	13575	22530	25420	28880
32in	DN800	Cv	815	2845	5658	8935	13400	19085	31670	35730	40600
		Kv	700	2440	4870	7660	11480	16360	27140	30620	34790
34in	DN850	Cv	929	3252	6503	10219	15329	21890	36304	40949	46450
		Kv	796	2786	5572	8757	13135	18749	31109	35089	39803
36in	DN900	Cv	1050	3665	7325	11510	17260	24585	40795	46025	52300
		Kv	900	3140	6280	9860	14790	21070	34960	39440	44815
38in	DN950	Cv	1160	4210	8130	13110	19750	28600	46050	53080	60500
		Kv	995	3600	6970	11235	16625	24510	39460	45490	51900
42in	DN1050	Cv	1470	5135	10265	16130	24190	34455	57175	64505	73300
		Kv	1260	4400	8800	13820	20730	29530	48995	55280	62810
48in	DN1200	Cv	2060	7210	14420	22660	33990	48410	80340	90640	103000
		Kv	1765	6180	12360	19420	29130	41485	68845	77670	88260

FLOW CHARACTERISTIC



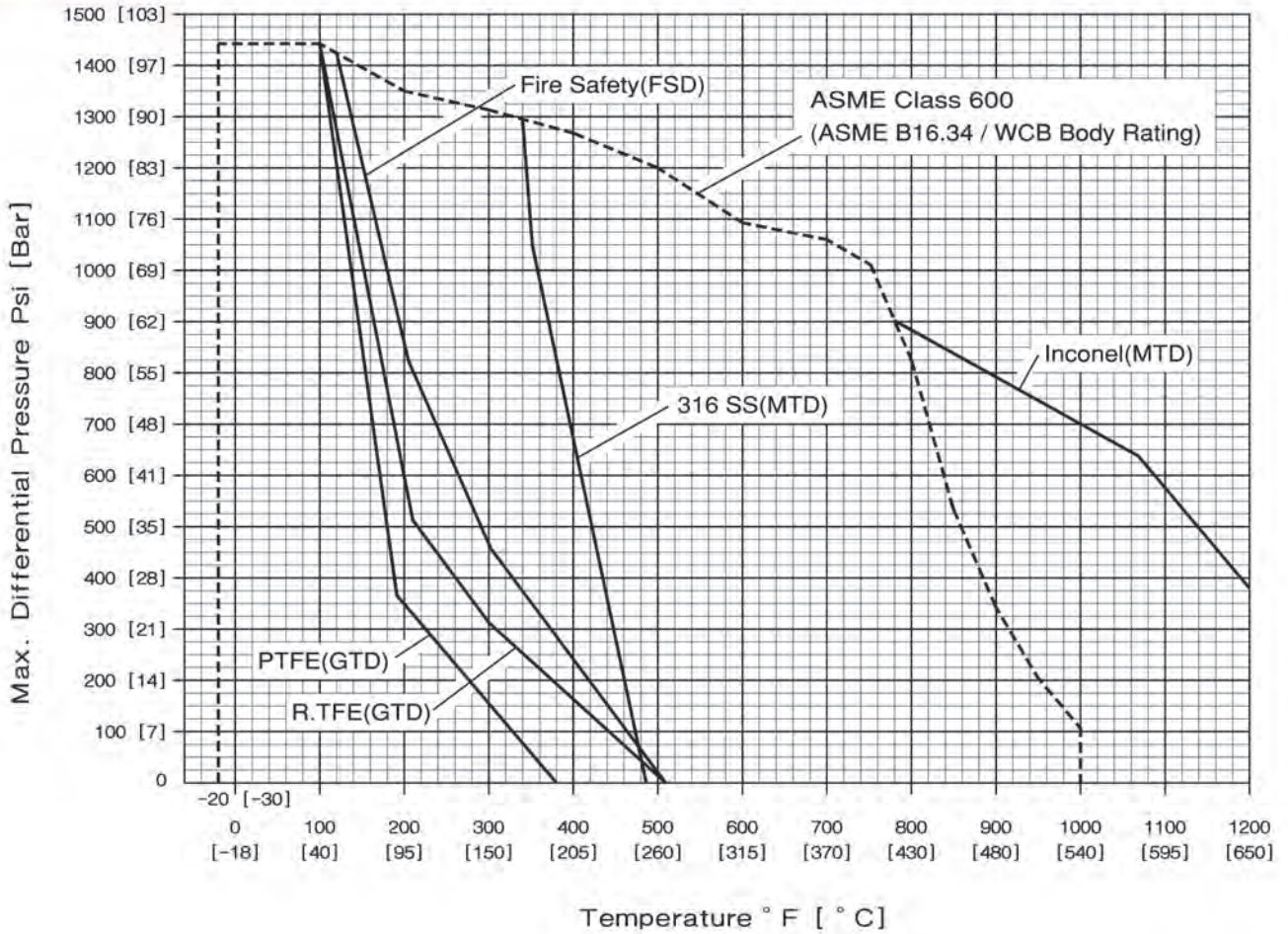
ASME Class 600

VALVE SIZE		unit	Cv relating to the disc opening angle of the disc								
NPS	DN		10°	20°	30°	40°	50°	60°	70°	80°	90°
3in	DN80	Cv	3.1	10.9	21.7	34.1	51.2	72.9	120	137	155
		Kv	2.7	9.3	18.6	29.2	43.8	62.4	105	120	135
4in	DN100	Cv	5.1	17.9	35.7	56.1	84.2	120	200	225	255
		Kv	4.4	15.3	30.6	48.1	72.1	105	170	195	220
5in	DN125	Cv	11.6	40.6	81.2	130	192	275	455	510	580
		Kv	9.9	34.8	69.6	110	165	235	390	440	500
6in	DN150	Cv	20.4	71.4	143	225	340	480	795	900	1020
		Kv	17.5	61.2	125	195	290	410	685	770	875
8in	DN200	Cv	27	95	190	297	450	635	1055	1190	1350
		Kv	23	81	165	25	390	545	905	1020	1160
10in	DN250	Cv	41	144	290	451	680	965	1600	1805	2050
		Kv	35	125	250	390	580	830	1370	1550	1760
12in	DN300	Cv	56	196	395	616	925	1316	2185	2465	2800
		Kv	48	170	340	530	795	1130	1875	2115	2400
14in	DN350	Cv	78	273	550	860	1290	1835	3045	3435	3900
		Kv	67	235	470	740	1110	1570	2610	2940	3345
16in	DN400	Cv	102	357	715	1125	1685	2400	3980	4490	5100
		Kv	87	305	615	965	1445	2055	3410	3850	4370
18in	DN450	Cv	110	385	770	1210	1815	2585	4290	4840	5500
		Kv	95	330	660	1040	1555	2215	3680	4150	4715
20in	DN500	Cv	158	555	1110	1740	2610	3715	6165	6955	7900
		Kv	135	475	950	1490	2235	3185	5280	5960	6770
24in	DN600	Cv	222	780	1555	2445	3665	5220	8660	9770	11100
		Kv	190	670	1335	2095	3140	4470	7420	8370	9515
28in	DN700	Cv	319	1120	2230	3510	5260	7500	12400	14000	15900
		Kv	279	981	1960	3070	4610	6560	10900	12300	14000
30in	DN750	Cv	371	1299	2598	4083	6125	8723	14477	16333	18560
		Kv	318	1113	2227	3499	5248	7475	12405	13996	15904
32in	DN800	Cv	422	1478	2957	4646	6970	9926	16474	18586	21120
		Kv	362	1267	2534	3981	5972	8506	14116	15926	18098

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat)
 Pressure-Temperature Rating

ASME Class 600



■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat) Torque Table

ASME Class 150

VALVE SIZE		GTD			FSD			MTD			Shaft Material					
		0~10 bar	15 bar	20 bar	0~10 bar	15 bar	20 bar	0~10 bar	15 bar	20 bar	A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
NPS	DN	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m
2in	DN50	30	45	54	39	59	70	45	68	81	57	76	201	191	82	124
2.5in	DN65	34	51	61	44	66	80	51	77	92	74	99	261	248	106	161
3in	DN80	38	57	68	49	74	89	57	86	103	74	99	261	248	106	161
4in	DN100	44	66	79	57	86	103	66	99	119	74	99	261	248	106	161
5in	DN125	55	83	99	72	107	129	83	124	149	175	234	618	588	251	382
6in	DN150	72	108	130	94	140	168	108	162	194	175	234	618	588	251	382
8in	DN200	125	188	225	163	244	293	188	281	338	292	392	1034	984	421	639
10in	DN250	185	278	333	241	361	433	278	416	500	454	609	1606	1528	653	992
12in	DN300	270	378	454	351	491	590	405	567	680	839	1126	2968	2825	1208	1834
14in	DN350	400	560	672	520	728	874	600	840	1008	1151	1544	4071	3875	1657	2516
16in	DN400	570	798	958	741	1037	1245	855	1197	1436	1772	2376	6265	5963	2549	3871
18in	DN450	770	1078	1294	1001	1401	1682	1155	1617	1940	1772	2376	6265	5963	2549	3871
20in	DN500	1160	1624	1949	1508	2111	2533	1740	2436	2923	3505	4702	12396	11797	5044	7660
22in	DN550	1440	2016	2419	1872	2621	3145	2160	3024	3629	6078	8154	21497	20459	8747	13283
24in	DN600	1760	2464	2957	2288	3203	3844	2640	3696	4435	6078	8154	21497	20459	8747	13283
26in	DN650	2000	2800	3360	2600	3640	4368	3000	4200	5040	6078	8154	21497	20459	8747	13283
28in	DN700	2280	3192	3830	2964	4150	4980	3420	4788	5746	14442	19373	51075	48609	20782	31561
30in	DN750	2720	3808	4570	3536	4950	5940	4080	5712	6854	14442	19373	51075	48609	20782	31561
32in	DN800	3280	4592	5510	4264	5970	7164	4920	6888	8266	14442	19373	51075	48609	20782	31561
34in	DN850	3840	5376	6451	4992	6989	8387	5760	8064	9677	17470	23436	61785	58802	25140	38179
36in	DN900	4400	6160	7392	5720	8008	9610	6600	9240	11088	17470	23436	61785	58802	25140	38179
38in	DN950	5040	7056	8467	6552	9173	11007	7560	10584	12701	17470	23436	61785	58802	25140	38179
40in	DN1000	5840	8176	9811	7592	10629	12755	8760	12264	14717	17470	23436	61785	58802	25140	38179
42in	DN1050	6400	8960	10752	8320	11648	13978	9600	13440	16128	15791	21183	55845	53149	22723	34509
44in	DN1100	6960	9744	11693	9048	12667	15201	10440	14616	17539	17470	23436	61785	58802	25140	38179
46in	DN1150	7600	10640	12768	9880	13832	16598	11400	15960	19152	50637	67928	179083	170438	72868	110661
48in	DN1200	8800	12320	14784	11440	16016	19219	13200	18480	22176	50637	67928	179083	170438	72868	110661

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat) Torque Table

ASME Class 300 (Soft Seat)

VALVE SIZE		GTD					
		0~10bar	20bar	25bar	35bar	40 bar	50 bar
NPS	DN	N·m	N·m	N·m	N·m	N·m	N·m
2in	DN50	31	54	65	91	100	120
2.5in	DN65	34	61	73	103	113	136
3in	DN80	38	68	82	115	126	152
4in	DN100	45	79	95	133	146	176
5in	DN125	60	99	119	166	183	220
6in	DN150	80	130	156	218	240	287
8in	DN200	135	225	270	378	416	499
10in	DN250	205	336	403	564	621	745
12in	DN300	305	504	605	847	931	1118
14in	DN350	500	828	994	1391	1530	1836
16in	DN400	715	1218	1462	2046	2251	2701
18in	DN450	960	1584	1901	2661	2927	3513
20in	DN500	1430	2244	2693	3770	4147	4976
22in	DN550	1690	2805	3366	4712	5184	6220
24in	DN600	2080	3370	4039	5655	6247	7464
26in	DN650	2455	3929	4724	6597	7270	8709
28in	DN700	2830	4488	5386	7540	8294	9953
30in	DN750	3468	5100	6120	8568	9425	11310
32in	DN800	4188	6324	7589	10624	11687	14024
34in	DN850	4902	7395	8874	12424	13666	16399
36in	DN900	5616	8466	10159	14223	15645	18774
38in	DN950	6790	9843	11812	16536	18190	21828
42in	DN1050	8160	12240	14688	20563	22620	27143
48in	DN1200	11220	16830	20196	28274	31102	37322

Shaft Material					
A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
N·m	N·m	N·m	N·m	N·m	N·m
57	76	201	191	82	124
74	99	261	248	106	161
74	99	261	248	106	161
74	99	261	248	106	161
175	234	618	588	251	382
175	234	618	588	251	382
454	609	1606	1528	653	992
839	1126	2968	2825	1208	1834
1151	1544	4071	3875	1657	2516
1772	2376	6265	5963	2549	3871
3505	4702	12396	11797	5044	7660
6078	8154	21497	20459	8747	13283
6078	8154	21497	20459	8747	13283
14442	19373	51075	48609	20782	31561
14442	19373	51075	48609	20782	31561
14442	19373	51075	48609	20782	31561
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
50637	67928	179083	170438	72868	110661
50637	67928	179083	170438	72868	110661
81140	108846	286959	273106	116763	177321
81140	108846	286959	273106	116763	177321
173024	232106	611915	582375	248986	378122

ASME Class 300 (Soft + Metal Seat)

VALVE SIZE		FSD					
		0~10bar	20bar	25bar	35bar	40 bar	50 bar
NPS	DN	N·m	N·m	N·m	N·m	N·m	N·m
2in	DN50	40	70	84	118	130	156
2.5in	DN65	44	80	95	134	147	176
3in	DN80	49	89	107	149	164	197
4in	DN100	59	103	124	173	190	228
5in	DN125	78	129	154	216	238	285
6in	DN150	104	168	202	283	311	374
8in	DN200	176	293	351	491	541	649
10in	DN250	267	437	524	734	807	969
12in	DN300	397	655	786	1101	1211	1453
14in	DN350	650	1076	1292	1808	1989	2387
16in	DN400	930	1583	1900	2660	2926	3511
18in	DN450	1248	2059	2471	3459	3805	4566
20in	DN500	1859	2917	3501	4901	5391	6469
22in	DN550	2197	3647	4376	6126	6739	8086
24in	DN600	2704	4381	5251	7351	8121	9704
26in	DN650	3192	5108	6141	8577	9452	11321
28in	DN700	3679	5834	7001	9802	10782	12938
30in	DN750	4508	6630	7956	11138	12252	14703
32in	DN800	5444	8221	9865	13812	15193	18231
34in	DN850	6373	9614	11536	16151	17766	21319
36in	DN900	7301	11006	13207	18490	20339	24406
38in	DN950	8827	12796	15355	21497	23647	28376
42in	DN1050	10608	15912	19094	26732	29405	35286
48in	DN1200	14586	21879	26255	36757	40432	48519

Shaft Material					
A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
N·m	N·m	N·m	N·m	N·m	N·m
57	76	201	191	82	124
74	99	261	248	106	161
74	99	261	248	106	161
74	99	261	248	106	161
175	234	618	588	251	382
175	234	618	588	251	382
454	609	1606	1528	653	992
839	1126	2968	2825	1208	1834
1151	1544	4071	3875	1657	2516
1772	2376	6265	5963	2549	3871
3505	4702	12396	11797	5044	7660
6078	8154	21497	20459	8747	13283
6078	8154	21497	20459	8747	13283
14442	19373	51075	48609	20782	31561
14442	19373	51075	48609	20782	31561
14442	19373	51075	48609	20782	31561
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
50637	67928	179083	170438	72868	110661
50637	67928	179083	170438	72868	110661
81140	108846	286959	273106	116763	177321
81140	108846	286959	273106	116763	177321
173024	232106	611915	582375	248986	378122

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat) Torque Table

ASME Class 300 (Metal Seat)

VALVE SIZE		MTD						Shaft Material							
		0~10bar	20bar	25bar	35bar	40 bar	50 bar	A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803		
NPS	DN	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m
2in	DN50	47	81	97	136	150	180	57	76	201	191	82	124		
2.5in	DN65	51	92	110	154	170	204	74	99	261	248	106	161		
3in	DN80	57	103	123	172	190	228	74	99	261	248	106	161		
4in	DN100	68	119	143	200	220	263	74	99	261	248	106	161		
5in	DN125	90	149	178	249	274	329	175	234	618	588	251	382		
6in	DN150	120	194	233	327	359	431	175	234	618	588	251	382		
8in	DN200	203	338	405	567	624	748	454	609	1606	1528	653	992		
10in	DN250	308	504	605	847	931	1118	839	1126	2968	2825	1208	1834		
12in	DN300	458	756	907	1270	1397	1677	1151	1544	4071	3875	1657	2516		
14in	DN350	750	1242	1490	2087	2295	2754	1772	2376	6265	5963	2549	3871		
16in	DN400	1073	1827	2192	3069	3376	4052	3505	4702	12396	11797	5044	7660		
18in	DN450	1440	2376	2851	3992	4391	5269	6078	8154	21497	20459	8747	13283		
20in	DN500	2145	3366	4039	5655	6220	7464	6078	8154	21497	20459	8747	13283		
22in	DN550	2535	4208	5049	7069	7775	9331	14442	19373	51075	48609	20782	31561		
24in	DN600	3120	5055	6059	8482	9371	11197	14442	19373	51075	48609	20782	31561		
26in	DN650	3683	5894	7086	9896	10906	13063	14442	19373	51075	48609	20782	31561		
28in	DN700	4245	6732	8078	11310	12441	14929	17470	23436	61785	58802	25140	38179		
30in	DN750	5202	7650	9180	12852	14137	16965	17470	23436	61785	58802	25140	38179		
32in	DN800	6282	9486	11383	15936	17530	21036	17470	23436	61785	58802	25140	38179		
34in	DN850	7353	11093	13311	18635	20499	24599	50637	67928	179083	170438	72868	110661		
36in	DN900	8424	12699	15239	21334	23468	28161	50637	67928	179083	170438	72868	110661		
38in	DN950	10185	14765	17717	24804	27285	32742	81140	108846	286959	273106	116763	177321		
42in	DN1050	12240	18360	22032	30845	33929	40715	81140	108846	286959	273106	116763	177321		
48in	DN1200	16830	25245	30294	42412	46653	55983	173024	232106	611915	582375	248986	378122		

■ ■ ■ Data Sheet

▶ Double Offset Valve (Soft Seat / Soft + Metal Seat / Metal Seat / Metal to Metal Seat) Torque Table

ASME Class 600 (Soft Seat)

VALVE SIZE		GTD					
NPS	DN	0~10 bar	35 bar	55 bar	70 bar	85 bar	100 bar
		N·m	N·m	N·m	N·m	N·m	N·m
3in	DN80	45	116	185	240	288	346
4in	DN100	45	79	95	133	146	176
5in	DN125	60	99	119	166	183	220
6in	DN150	80	130	156	218	240	287
8in	DN200	135	225	270	378	416	499
10in	DN250	205	336	403	564	621	745
12in	DN300	305	504	605	847	931	1118
14in	DN350	500	828	994	1391	1530	1836
16in	DN400	715	1218	1462	2046	2251	2701
18in	DN450	960	1584	1901	2661	2927	3513
20in	DN500	1430	2244	2693	3770	4147	4976
24in	DN600	2080	3370	4039	5655	6247	7464
28in	DN700	2830	4488	5386	7540	8294	9953
30in	DN750	3468	5100	6120	8568	9425	11310
32in	DN800	4188	6324	7589	10624	11687	14024

Shaft Material					
A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
N·m	N·m	N·m	N·m	N·m	N·m
175	234	618	588	251	382
292	392	1034	984	421	639
454	609	1606	1528	653	992
839	1126	2968	2825	1208	1834
1037	1391	3666	3489	1492	2265
1772	2376	6265	5963	2549	3871
3505	4702	12396	11797	5044	7660
6078	8154	21497	20459	8747	13283
6078	8154	21497	20459	8747	13283
14442	19373	51075	48609	20782	31561
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
50637	67928	179083	170438	72868	110661
81140	108846	286959	273106	116763	177321
81140	108846	286959	273106	116763	177321

ASME Class 600 (Soft + Metal Seat)

VALVE SIZE		FSD					
NPS	DN	0~10 bar	35 bar	55 bar	70 bar	85 bar	100 bar
		N·m	N·m	N·m	N·m	N·m	N·m
3in	DN80	59	150	249	312	375	450
4in	DN100	78	176	292	365	438	526
5in	DN125	101	233	388	485	582	699
6in	DN150	125	291	484	606	727	872
8in	DN200	182	501	832	1041	1249	1499
10in	DN250	289	738	1227	1536	1843	2212
12in	DN300	507	1268	2106	2636	3164	3796
14in	DN350	811	1989	3305	4137	4965	5957
16in	DN400	1030	2703	4491	5622	6746	8095
18in	DN450	1451	3475	5774	7228	8673	10408
20in	DN500	1885	4633	7698	9637	11564	13877
24in	DN600	2808	7293	12118	15169	18203	21844
28in	DN700	4047	10511	17464	21862	26235	31482
30in	DN750	4959	12894	21424	26820	32183	38620
32in	DN800	5989	15571	25872	32388	38865	46638

Shaft Material					
A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
N·m	N·m	N·m	N·m	N·m	N·m
175	234	618	588	251	382
292	392	1034	984	421	639
454	609	1606	1528	653	992
839	1126	2968	2825	1208	1834
1037	1391	3666	3489	1492	2265
1772	2376	6265	5963	2549	3871
3505	4702	12396	11797	5044	7660
6078	8154	21497	20459	8747	13283
6078	8154	21497	20459	8747	13283
14442	19373	51075	48609	20782	31561
17470	23436	61785	58802	25140	38179
17470	23436	61785	58802	25140	38179
50637	67928	179083	170438	72868	110661
81140	108846	286959	273106	116763	177321
81140	108846	286959	273106	116763	177321

ASME Class 600 (Metal Seat)

VALVE SIZE		GTD					
NPS	DN	0~10 bar	35 bar	55 bar	70 bar	85 bar	100 bar
		N·m	N·m	N·m	N·m	N·m	N·m
3in	DN80	68	173	277	360	432	519
4in	DN100	90	203	324	421	505	607
5in	DN125	117	269	431	560	672	806
6in	DN150	144	336	538	699	839	1006
8in	DN200	210	578	924	1201	1441	1730
10in	DN250	333	852	1363	1772	2127	2552
12in	DN300	585	1463	2340	3042	3650	4380
14in	DN350	936	2295	3672	4774	5728	6874
16in	DN400	1188	3119	4990	6486	7784	9341
18in	DN450	1674	4010	6415	8340	10008	12009
20in	DN500	2175	5346	8554	11120	13344	16012
24in	DN600	3240	8415	13464	17503	21004	25205
28in	DN700	4670	12128	19404	25226	30271	36325
30in	DN750	5722	14878	23804	30946	37135	44562
32in	DN800	6910	17967	28746	37370	44844	53813

Shaft Material					
A276 Tp.316	A276 Tp.410	A564 Tp.630	MONEL K500	B150-C63000	A276-S31803
N·m	N·m	N·m	N·m	N·m	N·m
175	234	618	588	251	382
292	392	1034	984	421	639
454	609	1606	1528	653	992
839	1126	2968	2825	1208	1834
1037	1391	3666	3489	1492	2265
1772	2376	6265	5963	2549	3871
3505	4702	12396	11797	5044	7660
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17470	23436	61785	58802	25140	38179
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81140	108846	286959	273106	116763	177321
81140	108846	286959	273106	116763	177321

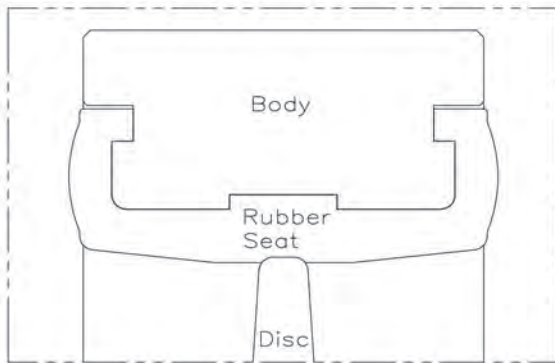
Concentric valve

-API 609 Category A

▶ General Rubber Seat Valve

GRS (General Rubber Seat) type is elastomer seated butterfly valve used for the process demanding positive shut-off and effective flow control.

▶ Sealing System

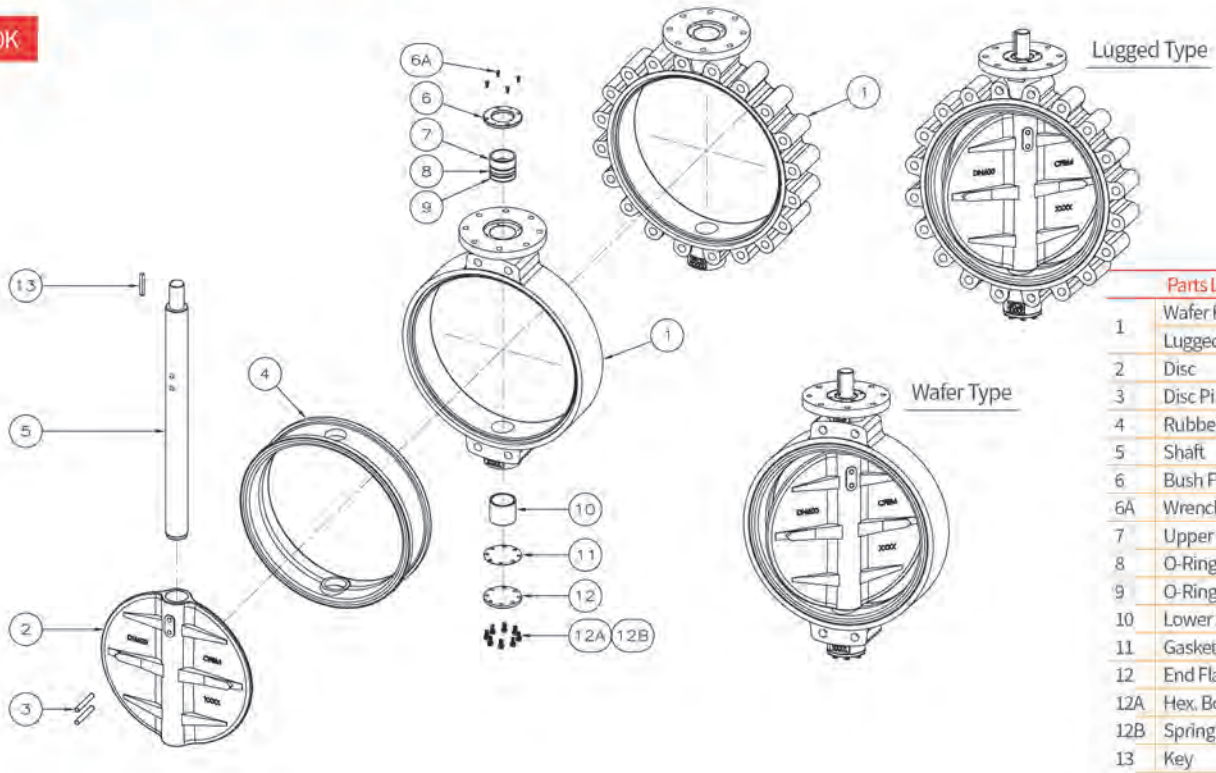


Type	General Rubber Seat Valve
Design	API std. 609
Rating	ASME Cl. 150 PN 10, 16 JIS 10K, 16K
Size	DN50(2") to DN1000 (40")
Connection Type	Lugged & Wafer
Temperature Range	-20°C to 120°C
Main Material	Body : WCB, CF8, CF8M, B148-C95800 etc. Disc : CF8, CF8M, B148-C95800 etc. Shaft : 17-4PH, 316SS, B150-C63000 etc. Seat : EPDM, NBR, VITON etc.
Operator	Manual Hand lever / Manual Worm Gear Pneumatic Actuator Electric Actuator
Application	- General & Petro Chemical - Oil Refinery / Production - Steel and Iron Mill - Shipbuilding - Water Treatment - Sea Water
Option	Teflon V-packing Anti-static device Stem extension Monel / Al-bronze Body and Disc

■ ■ ■ Data Sheet

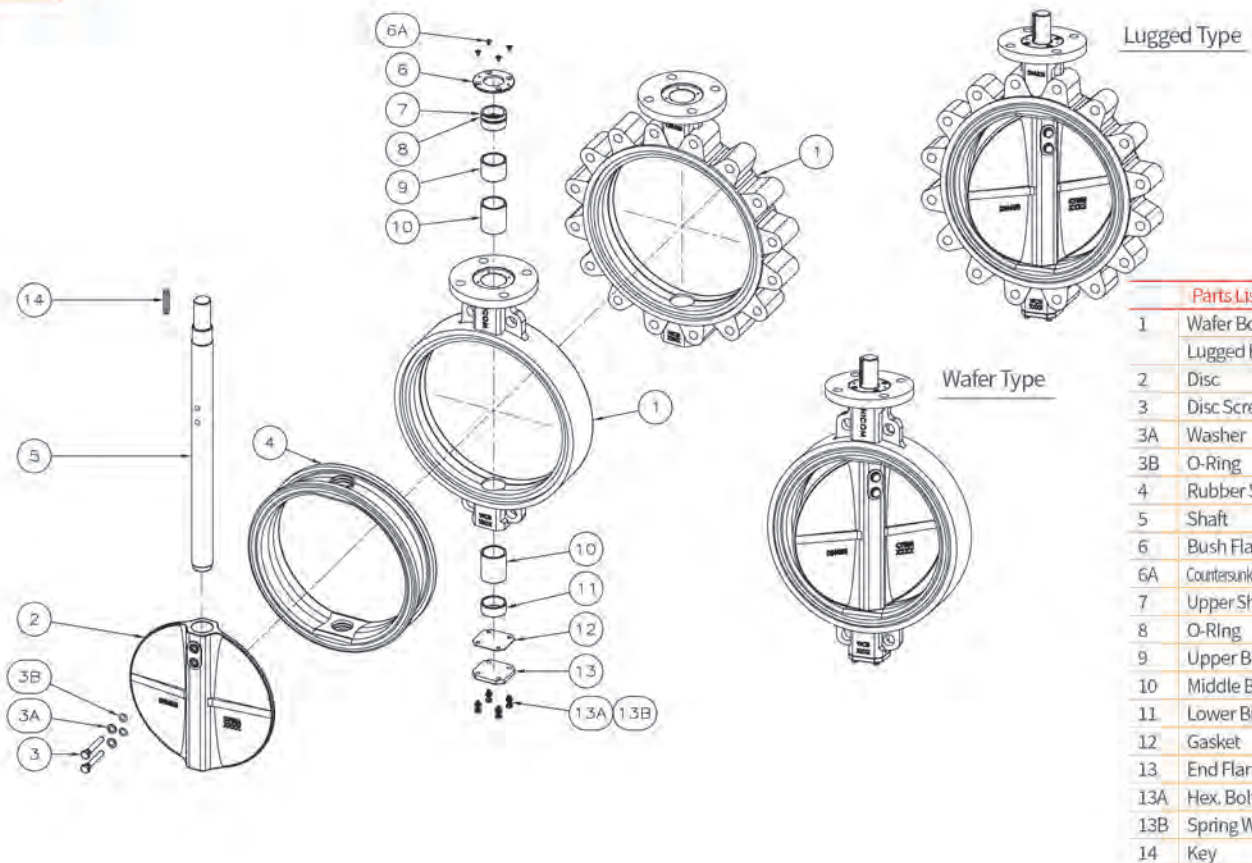
▶ General Rubber Seat Valve

10K



Parts List	
1	Wafer Body Lugged Body
2	Disc
3	Disc Pin
4	Rubber Seat
5	Shaft
6	Bush Flange
6A	Wrench Bolt
7	Upper Bush
8	O-Ring
9	O-Ring Retainer
10	Lower Bush
11	Gasket
12	End Flange
12A	Hex. Bolt
12B	Spring Washer
13	Key

16K



Parts List	
1	Wafer Body Lugged Body
2	Disc
3	Disc Screw Pin
3A	Washer
3B	O-Ring
4	Rubber Seat
5	Shaft
6	Bush Flange
6A	Countersunk Head Screw
7	Upper Shaft Bush
8	O-Ring
9	Upper Bush
10	Middle Bush
11	Lower Bush
12	Gasket
13	End Flange
13A	Hex. Bolt
13B	Spring Washer
14	Key

■ ■ ■ Data Sheet

▶ General Rubber Seat Valve

STANDARD MATERIAL

Part No.	Designation	Specification	Material	
			ASTM	
1	Valve Body	Cast Iron	A126 Cl B	
		Ductile Cast Iron	A395	A536
		Carbon Steel	A216 Gr. WCB	
		304 Stainless Steel	A351 Gr. CFS	
		316 Stainless Steel	A351 Gr. CF8M	
2	Disc	Carbon Steel	A216 Gr. WCB	
		304/304L Stainless Steel	A351 Gr. CF8/CF3	
		316/316L Stainless Steel	A351 Gr. CF8M/CF3M	
		13 Cr	A217 Gr. CA15	
		Monel 400	A494 Gr. M35-1	
		Aluminum Bronze	B148	
3	Disc Pin	316 Stainless Steel	A276 Tp. 316	
4	Rubber Seat	Nitrile Butadiene Rubber	NBR	
		Ethylene Propylene Diene Monomer	EPDM	
		Fluorine Rubber	VITON	
		CR(Neoprene)	NEOPRENE	
		Silicone	SILICONE	
5	Shaft	304 Stainless Steel	A276 Tp. 304	
		316 Stainless Steel	A276 Tp. 316	
		13 Cr	A276 Tp. 410	
		17-4PH	A564 Tp. 630	
		Monel K500	B865 UN S N05500	
6	Bush Flange	304 Stainless Steel	A240 Tp. 304	
6A	Wrench Bolt	304 Stainless Steel	A2-70	
7	Upper Bush	Bronze	BRONZE	
8	O-Ring	Nitrile Butadiene Rubber	NBR	
		Ethylene Propylene Diene Monomer	EPDM	
9	O-Ring Retainer	304 Stainless Steel	A276 Tp. 304	
10	Lower Bush	Bronze	BRONZE	
11	Gasket	Non-Asbestos	NON-ASBESTOS	
12	End Flange	Carbon Steel	AISI 1045	
		316 Stainless Steel	A276 Tp. 316	
12A	Hex. Bolt	Carbon Steel	A307 Gr. B	
		304 Stainless Steel	A2-70(Std)	
		316 Stainless Steel	A4-70(Std)	
12B	Spring Washer	Carbon Steel	A510	
		304 Stainless Steel	A167 Tp. 304	
		316 Stainless Steel	A167 Tp. 316	
13	Key	Carbon Steel	AISI 1045	

▲ Recommend Spare Parts

Part No.	Designation	Specification	Material	
			ASTM	
1	Valve Body	Aluminum Bronze	B148	
		Aluminum Bronze	B148	
2	Disc	Monel 400	A494 Gr. M35-1	
		316/316L Stainless Steel	A351 Gr. CF8M/CF3M	
		316 Stainless Steel	A276 Tp. 316	
3	Disc Pin	316 Stainless Steel	A276 Tp. 316	
4	Rubber Seat	Nitrile Butadiene Rubber	NBR	
		Ethylene Propylene Diene Monomer	EPDM	
		CR(Neoprene)	NEOPRENE	
		Silicone	SILICONE	
5	Shaft	Aluminum Bronze	B150-C63000	
		Duplex Stainless Steel	A276- S31803	
		Monel K500	B865 UNS N05500	
6	Bush Flange	Aluminum Bronze	B150-C63000	
6A	Wrench Bolt	316 Stainless Steel	A4-70	
7	Upper Bush	Bronze	BRONZE	
8	O-Ring	Nitrile Butadiene Rubber	NBR	
		Ethylene Propylene Diene Monomer	EPDM	
9	O-Ring Retainer	Monel 400	B127 UNS N04400	
10	Lower Bush	Bronze	BRONZE	
11	Gasket	Non-Asbestos	NON-ASBESTOS	
12	End Flange	Aluminum Bronze	B150-C63000	
12A	Hex. Bolt	316 Stainless Steel	A4-70	
12B	Spring Washer	316 Stainless Steel	A167 Tp. 316	
13	Key	Carbon Steel	AISI 1045	

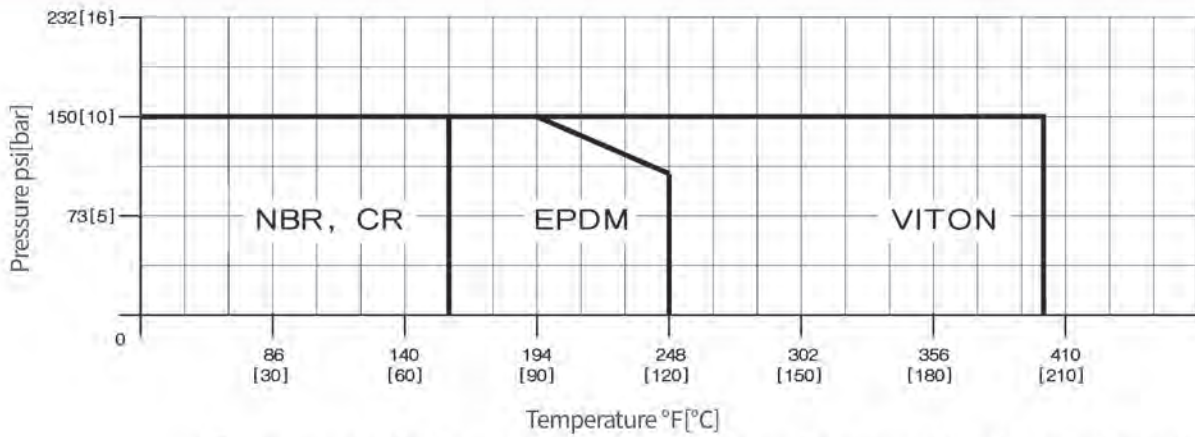
▲ Recommend Spare Parts

■ ■ ■ Data Sheet

▶ General Rubber Seat Valve Pressure – Temperature Rating

10K

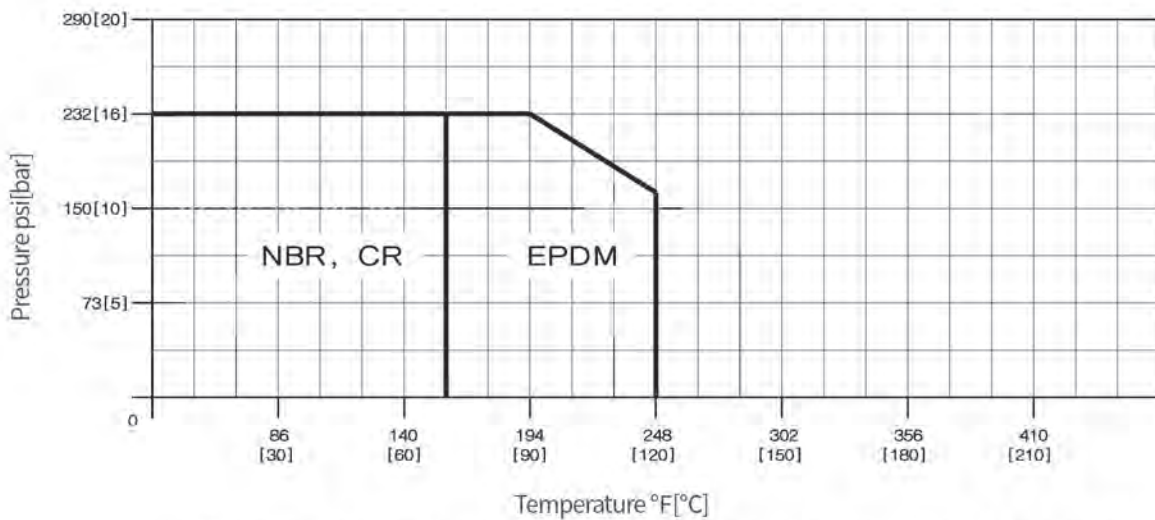
Maximum Allowable Pressure		10 bar	7 bar
Working Temperature	NBR(BUNA-N)	0 ~ 70°C	
	CR(NEOPRENE)	0 ~ 70°C	
	EPDM	0 ~ 90°C	Max. 120 °C
	VITON	0 ~ 205°C	



* Rubber seat material and usage at below 0 °C it must be discussed between consignee, deliverer and person in charge.

16K

Maximum Allowable Pressure		16 bar	11 bar
Working Temperature	NBR(BUNA-N)	0 ~ 70°C	
	CR(NEOPRENE)	0 ~ 70°C	
	EPDM	0 ~ 90°C	Max. 120 °C



* Rubber seat material and usage at below 0 °C it must be discussed between consignee, deliverer and person in charge.

Test Facilities

▶ Shell Test

Test Standard	API 598 / ASME B16.34 / EN 12266 / ISO 5208
Test Medium	Water, Nitrogen Gas
Allowable leakage	No Leakage

- All valves go through pressure and operation tests in Unicom facilities.
- Test is conducted under the specific acceptance criteria of customers.
- Additionally, we apply Unicom test standards which are more stringent than the generally accepted test criteria in the industry.
- Test is conducted gradually from low pressure to high pressure to ensure the perfect seal in all the pressure within the design pressure.
- Since both gas test and hydro test are conducted as Unicom's internal test criteria, a perfect seal is guaranteed under any conditions, gas or liquid.



▶ CRYOGENIC TEST

Test Standard	BS 6364 / SHELL SPE 77/306 / KOGAS-GSM-1015	Coolant	Liquid Nitrogen
Test Temperature	-196°C ± 1°C	Acceptance Standard	Seat Leakage : BS 6364 (100mm ³ /s x DN) Outside Leakage : Shell SPE 77/306
Test Medium	Helium Gas		

- Unicom conducts the most stringent quality inspection in the test lab. Specially designed for cryogenic valves.
- Cryogenic valves are tested by soaking in the liquid nitrogen and cooling down all components to -196°C.
- The valve is tested by increasing the pressure gradually to comply with the requirements of BS6364 to assure the sealing from low pressure to high pressure.














■ ■ ■ Certificates

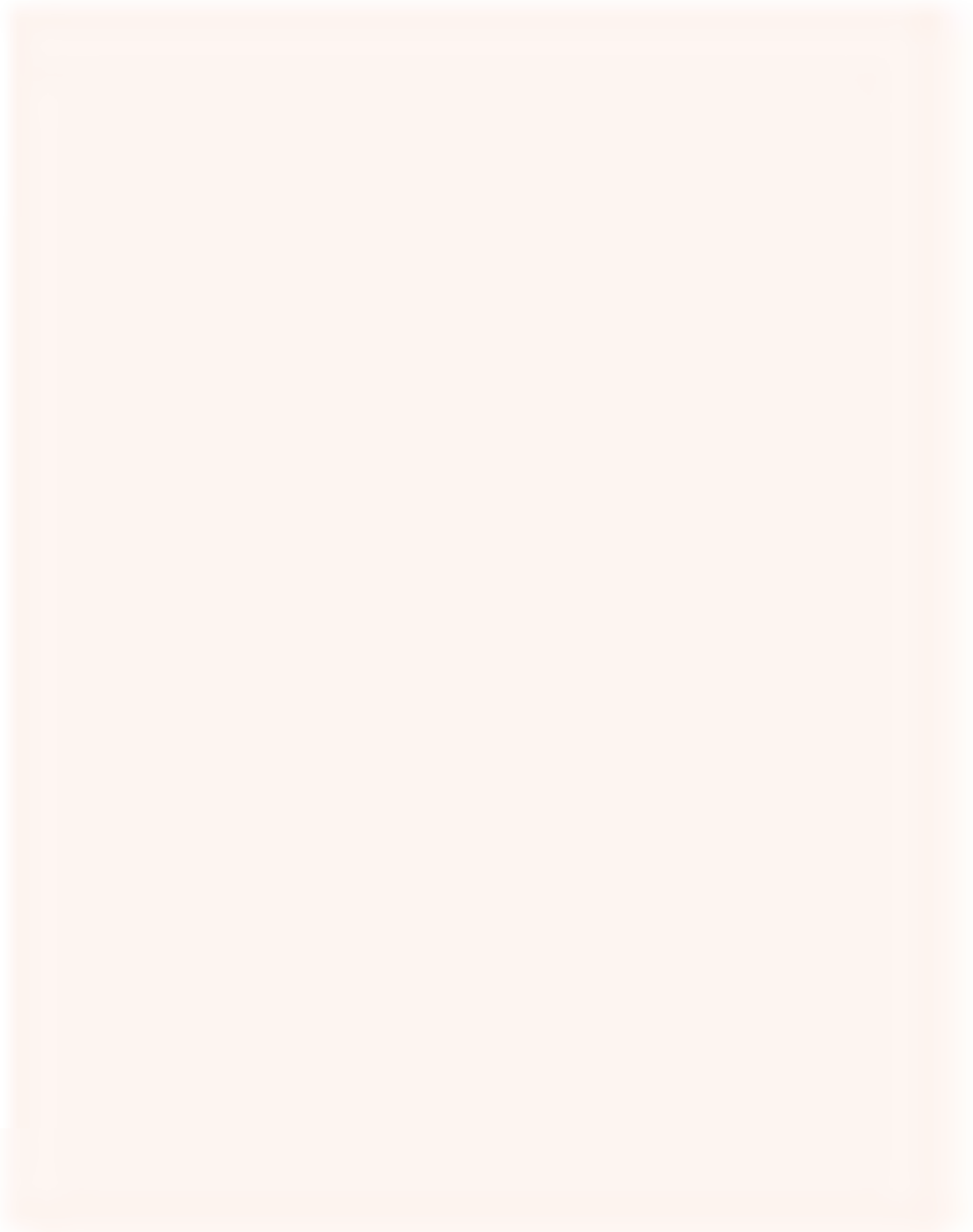
▶ System Certificate

Certificate	Institution	Scope	
 BUREAU VERITAS	ISO 9001:2015	BUREAU VERITAS	Quality Management
	ISO 14001:2015	BUREAU VERITAS	Environmental Management
	ISO 45001:2018	BUREAU VERITAS	Safety & Health Management

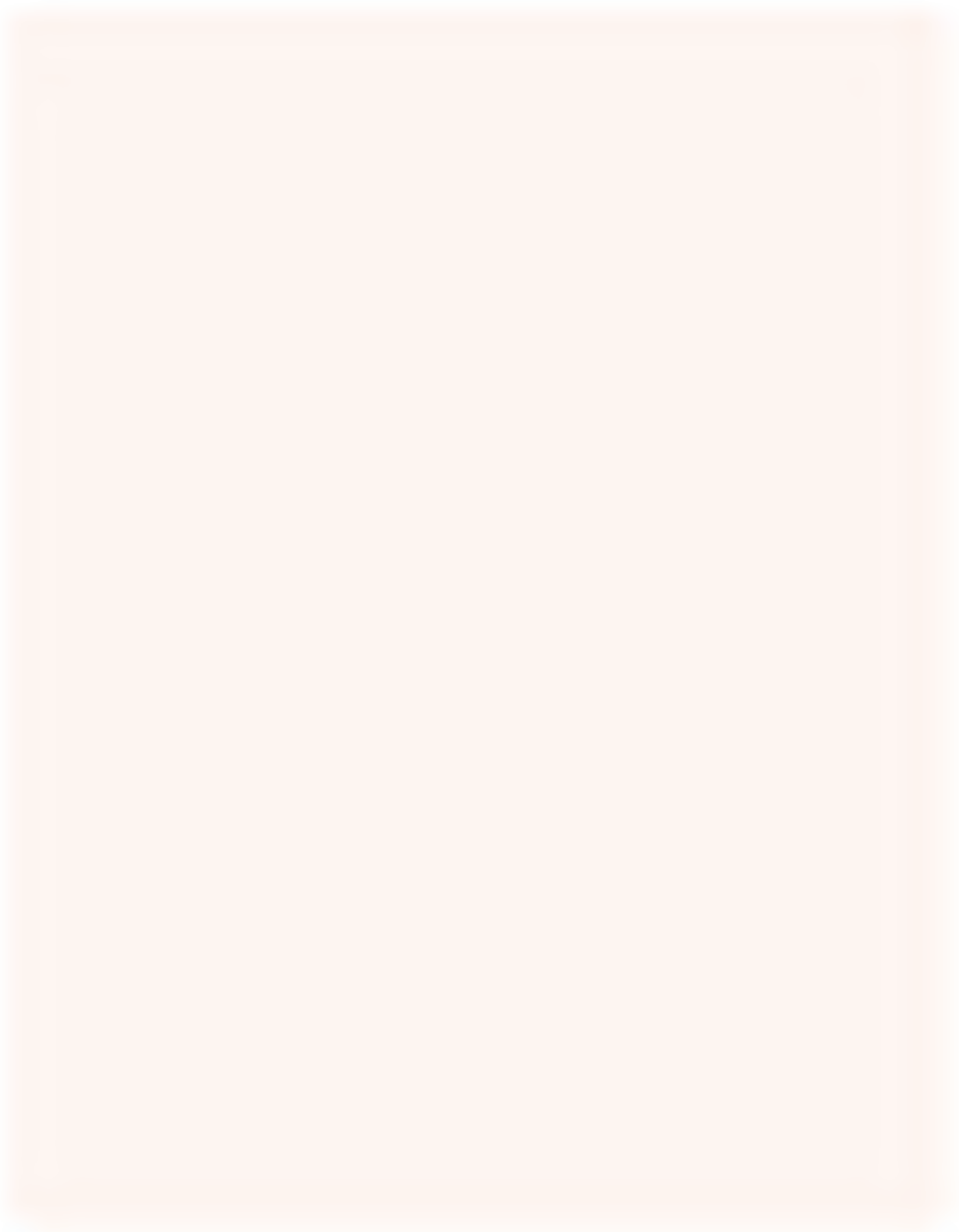
▶ Product Certificate

Certificate	Institution	Scope	
	API 609 MONOGRAM	AMERICAN PETROLEUM INSTITUTE	API 609 License
	CE-PED	BUREAU VERITAS	All valves of Unicom production
	TYPE APPROVAL	BUREAU VERITAS	Butterfly Valves (TOD CX BUTTERWELD / TOD CX DOUBLE FLANGE)
	TYPE APPROVAL	BUREAU VERITAS	Butterfly Valves (HP, GRS)
	MODE II SCHEM	BUREAU VERITAS	Factory acceptance
	FUGITIVE EMISSION	BUREAU VERITAS	High performance Valves
	TYPE APPROVAL	DNV GL	High performance Valves
	SIL 3 CAPABLE	EXIDA	HP, TOD Valves
	FIRE PROTECTION	UL	GRSU
	FIRE TEST (API 607 / 6FA)	APPLUS	HP(FSD), TOD
	LIFE CYCLE TEST	ABS	High performance Valves

MEMO



MEMO





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