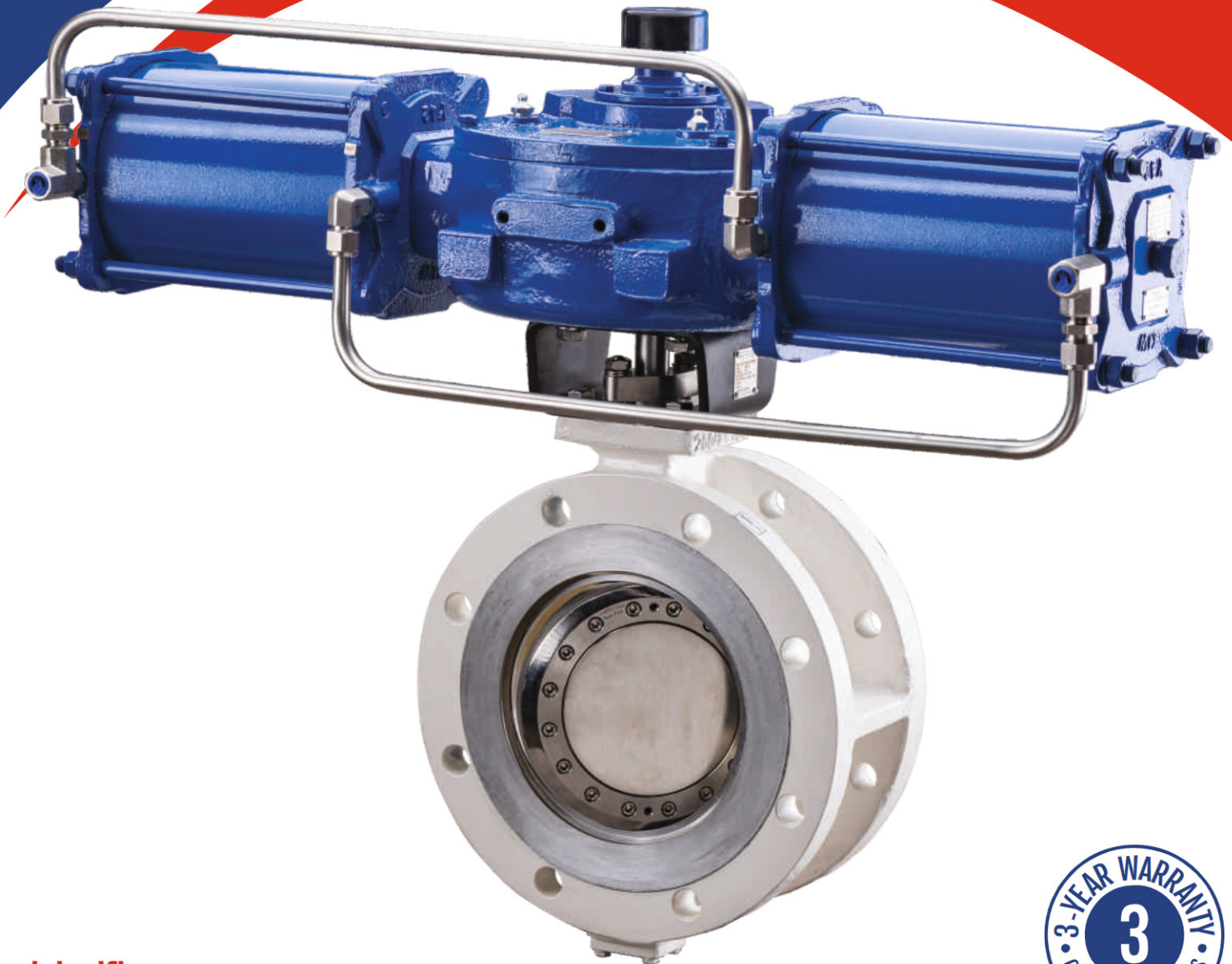


# TriO<sup>®</sup> TRIPLE OFFSET VALVES

Wafer, Lug, Double Flanged  
and Butt Weld Ends



[delvalflow.com](http://delvalflow.com)

1-833-DELVAL1



# STANDARD FEATURES

## Quality & Performance

DelVal Flow Controls provides a wide range of quality products with the reliability you can count on. All TriO® Triple Offset Valves are manufactured in ISO 9001 certified facilities with a robust quality management system and according to ASME B16.34 and API 609 standards.

## Design Construction and Features

### 1. ISO Top Flange

The top flange is drilled as per ISO 5211 to accommodate direct mounting of a wide range of actuators.

### 2. Stem

Robust single piece stem, secured in stem bearings at drive and non-drive end of the body, supports the disc against the pressure exerted by the fluid and minimizes disc and stem deflection. Stem is positively retained with groove design and retainer ring to prevent accidental blow out.

### 3. Stem Seal

Stem seal assembly is live loaded with two Belleville Springs. This ensures continuous compression of packing and sealing. Rocker shaped gland bridge compensates for uneven adjustment of gland bolts. Adjustable stem packing with multiple graphite rings seal on high surface finish of the stem and ensures tight sealing, suitable for fugitive emission control.

### 4. Bearing

Heavy duty bearings are designed to withstand high radial and axial stem loads due to pressure and wear.

### 5. Disc

Disc is designed with a profile to minimize resistance to flow and pressure drop across the valve and maximize flow capacity.

### 6. Seal Ring

Elliptical laminated seal ring is located on the disc. It is precision machined for bi-directional, bubble tight sealing. Alternating layers of metal and graphite flex generate a circumferential compressive force on the precision machined hard face seat on the body. Metal laminations in duplex stainless steel provide a rigid back up for the soft graphite laminations. This combination makes the seat suitable for bubble tight sealing at high and low temperatures alike. Seal ring is replaceable.

### 7. Retainer Ring

Seal ring is clamped rigidly on the disc face by the seal ring retainer. The retainer is made of identical metal as the disc and combines the disc, seal ring and retainer into a robust, composite unit for bubble tight, bi-directional sealing.

### 8. Seat

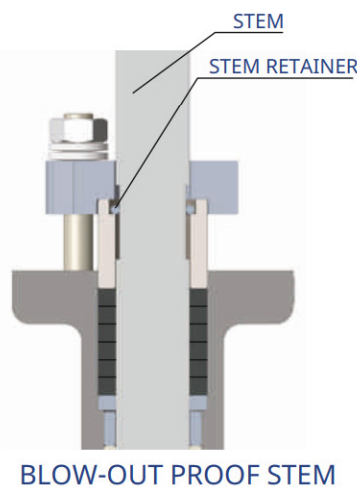
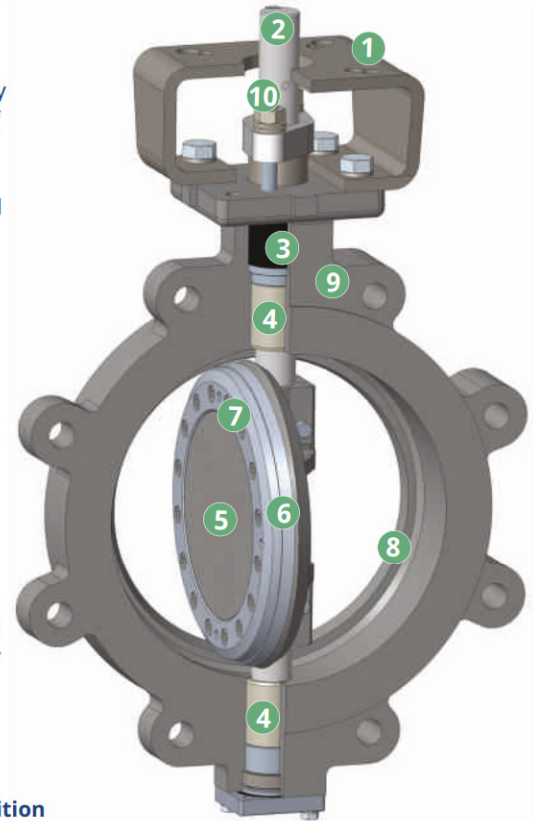
Seat is integral on body and is hard faced with Stellite® gr.21 or suitable alloy. Seat is precision machined to ensure perfect match with the seal ring. This (a) provides bubble tight seal, (b) excellent durability during seating and unseating, and (c) resistance to erosion during high velocity fluid flow.

### 9. Body

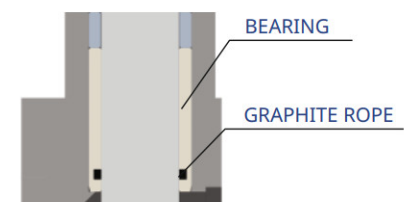
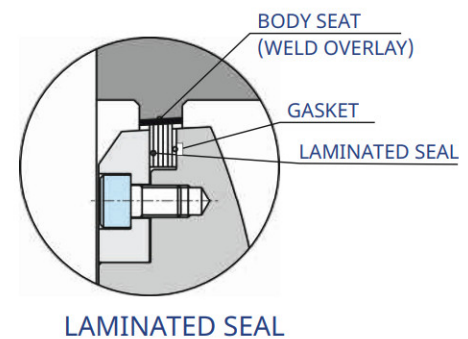
Body is of single-piece cast construction, with options of wafer, lug, double flanged short or long pattern, or butt weld ends. Face to face dimensions and pressure ratings are conforming to international standards.

### 10. External Position Indicator for Disc Position

Disc position is indicated by a dimple on the shaft. When the dimple is in-line with flow axis, the disc is open.



Valves are equipped with a retaining ring at the top of the stem to prevent movement of top portion of the shaft past the compression ring in case the shaft should break within the valve.



### BEARING PROTECTOR

Reinforced flexible graphite bearing protectors provide the highest level of protection to the bearings while extending service life.



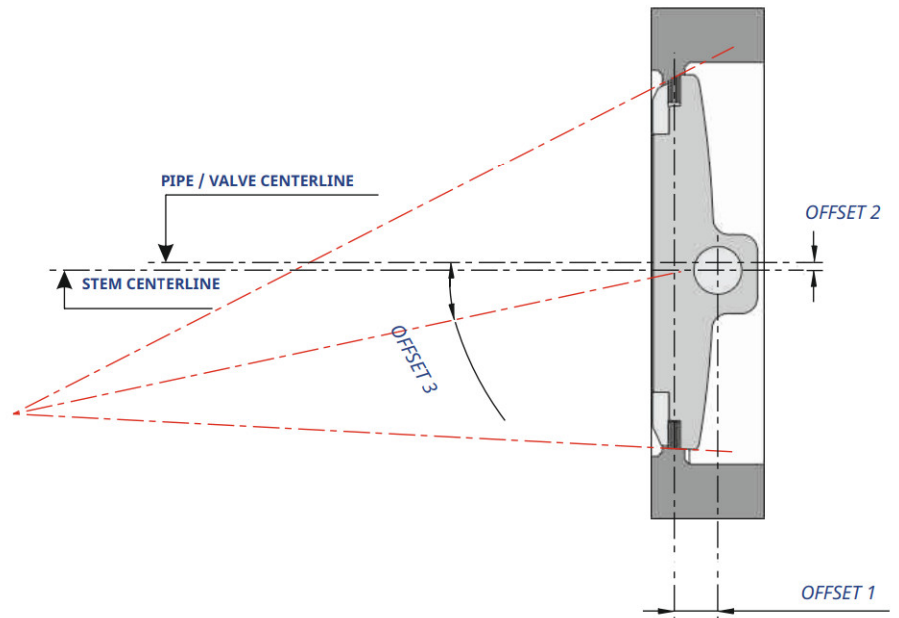
# PRINCIPLE OF OPERATION

DelVal® TriO® Triple Offset Valves provide bi-directional bubble tight shut-off. This geometry ensures that the disc seal contacts the body seal only at the final shut-off position without rubbing or galling, providing a torque generated resilient seal with sufficient “wedging” to ensure a uniform seal contact.

**Offset 1 :** The shaft is located with an offset behind the sealing plane allowing complete sealing contact around the entire seat periphery.

**Offset 2 :** The shaft axis is offset with respect to the pipe and disc centerline providing interference free opening and closing of the valve.

**Offset 3 :** The seat cone axis is offset from the disc centerline to eliminate friction during opening and closing and to achieve uniform compressive sealing around the entire seat.



## Valve Configuration and Options

### Cryogenic

Extended stem and bonnets can be offered for low temperature and cryogenic applications. The design for extended stem and bonnet conforms to BS 6364.

### High Temperature

Valves are available with stem extensions and fins for high temperature applications.

### Steam Jackets

Steam jacketed valves are available for applications where the media tends to crystallize when cooled down.



## Standards and Specifications

DelVal TriO® Triple Offset Valves are designed and manufactured to meet the requirements of the following industry standards:

**Design:** API 609, ASME B16.34

**Face to Face:** API 609, ASME B16.10, ISO 5752, BS EN 558

**Testing:** API 598, ISO 5208

**Pressure Temperature:** ASME B16.34

**Flange Accommodation:** ASME B16.5, ASME B16.47, BS EN 1092-1

**Butt Weld Ends:** ASME B16.25

**NACE:** ANSI / ASME MR 0175 / ISO 15156-1

**Fire Safe Certified:** API 607

**Fugitive Emission:** ISO 15848

**Compliance:** PED 2014 / 68/EU

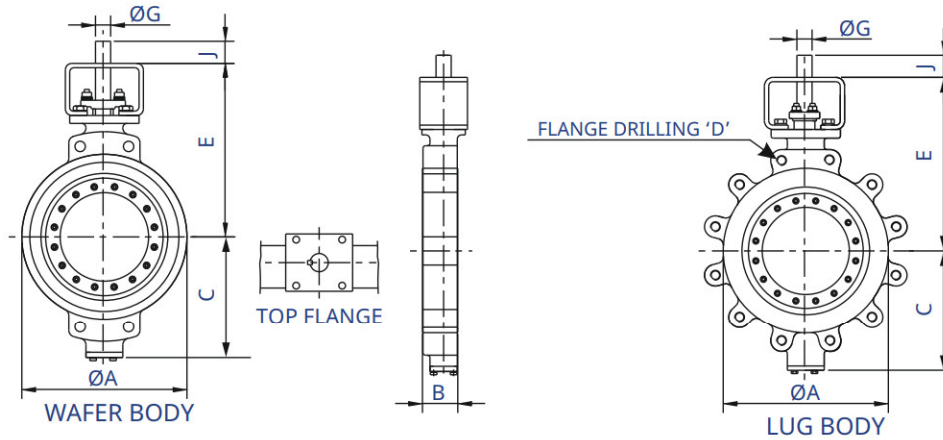
**Body Style:** Wafer, Lug, Double Flanged (short / long pattern), and Butt Weld End

**Rating:** Class 150 to class 600

**Temp Range:** -20°F to 800°F (Standard)  
-320°F to 1290°F (Optional)

**Size Range:** 3" to 80"

# DIMENSIONS AND WEIGHTS



## DIMENSIONS (Inch) ASME CLASS 150 WAFER/LUG (SERIES 4A/4B)

Valve Size		ØA	*B	E	C	Top Flange Details				ØG	J	Key Size	Lug Tapping*		App. Weight (lbs)	
INCH	DN					BC	No. of holes	Hole Dia.	BC				No. of holes	Tapping/UNC/UN2B	Wafer	Lug
3	80	5.00	1.88	7.48	4.60	2.76/4.01	4	0.35/0.43	0.62	1.25	0.19 × 0.19	6.00	4	5/8-11	19	24
4	100	6.18	2.12	8.85	5.66	2.76/4.01	4	0.35/0.43	0.78	1.25	0.23 × 0.23	7.50	8	5/8-11	33	37
6	150	8.50	2.24	9.05	6.10	2.76/4.01	4	0.35/0.43	0.86	1.25	0.23 × 0.23	9.50	8	3/4-10	37	44
8	200	10.62	2.51	11.22	7.30	4.01/4.92	4	0.47/0.55	0.98	1.25	0.31 × 0.27	11.75	8	3/4-10	57	70
10	250	12.75	2.79	12.91	8.85	4.92	4	0.55	1.18	2.00	0.31 × 0.27	14.25	12	7/8-9	99	114
12	300	15.00	3.18	14.96	10.94	4.92/6.49	4	0.55/0.86	1.37	2.00	0.39 × 0.31	17.00	12	7/8-9	154	176
14	350	16.25	3.62	15.94	11.26	5.51	4	0.71	1.57	2.00	0.47 × 0.31	18.75	12	1-8	198	242
16	400	18.50	4.01	20.66	13.47	5.51/6.49	4	0.71/0.86	1.96	2.51	0.55 × 0.35	21.25	16	1-8	361	418
18	450	21.02	4.48	20.66	13.74	6.49	4	0.86	2.16	2.51	0.63 × 0.39	22.75	16	1 1/8-8	418	506
20	500	22.99	5.00	22.83	15.51	10.0	8	0.70	2.36	4.01	0.70 × 0.43	25.00	20	1 1/8-8	528	595
24	600	27.24	6.06	25.39	17.71	10.0	8	0.70	2.75	4.01	0.78 × 0.47	29.50	20	1 1/4-8	991	1079
28	700	31.49	6.49	28.34	20.47	11.73	8	0.86	3.00	4.01	0.75 × 0.75	34.00	28	1 1/4-8	1260	1454
30	750	33.74	7.48	32.67	22.00	11.73	8	0.86	3.00	4.01	0.75 × 0.75	36.00	28	1 1/4-8	2055	2535
32	800	35.98	7.48	34.25	23.50	11.73	8	0.86	4.00	5.27	1.00 × 0.75	38.50	28	1 1/2-8	2315	2866
36	900	40.23	7.99	36.02	25.20	14.0	8	1.30	4.00	5.27	1.00 × 0.75	42.74	32	1 1/2-8	2645	3306
40	1000	44.25	9.88	38.58	27.50	16.0	8	1.53	4.72	5.90	1.26 × 0.71	47.25	36	1 1/2-8	3483	4299
42	1050	47.00	10.00	43.70	32.40	16.0	8	1.53	4.72	5.90	1.26 × 0.71	49.50	36	1 1/2-8	4078	5070
44	1100	49.01	10.00	44.70	32.80	16.0	8	1.53	4.72	5.90	1.26 × 0.71	51.74	40	1 1/2-8	4409	5622
48	1200	53.50	10.88	49.21	33.10	19.01	12	1.53	5.51	7.08	1.41 × 0.78	56.00	44	1 1/2-8	4960	6173

## ASME CLASS 300 WAFER/LUG (SERIES 4D/4E)

3	80	5.00	1.88	7.48	4.60	2.76/4.01	4	0.39/0.47	0.62	1.25	0.19 × 0.19	6.62	8	3/4-10	22	26
4	100	6.18	2.12	8.85	5.66	2.76/4.01	4	0.39/0.47	0.78	1.25	0.23 × 0.23	7.87	8	3/4-10	44	55
6	150	8.50	2.32	10.82	7.48	4.92	4	0.55	0.98	1.25	0.31 × 0.27	10.62	12	3/4-10	75	99
8	200	10.62	2.87	12.20	8.07	4.92	4	0.55	1.37	2.00	0.39 × 0.31	13.00	12	7/8-9	110	123
10	250	12.75	3.26	15.03	10.23	6.49	4	0.86	1.37	2.00	0.39 × 0.32	15.25	16	1-8	176	229
12	300	15.00	3.62	16.73	11.22	6.49	4	0.86	1.57	2.00	0.47 × 0.31	17.74	16	1 1/8-8	287	353
14	350	16.25	4.60	18.90	12.40	10.00	8	0.70	2.16	2.51	0.63 × 0.39	20.25	20	1 1/8-8	364	518
16	400	18.50	5.23	19.88	14.17	10.00	8	0.70	2.16	2.51	0.63 × 0.39	22.50	20	1 1/4-8	496	793
18	450	21.02	5.86	23.03	15.35	11.73	8	0.86	2.75	4.01	0.78 × 0.47	24.74	24	1 1/4-8	754	1089
20	500	22.99	6.25	25.59	16.61	11.73	8	0.86	3.50	5.27	1.00 × 0.55	27.00	24	1 1/4-8	860	1225
24	600	27.24	7.12	29.52	20.31	14.01	8	1.29	4.00	5.27	1.00 × 0.75	32.00	24	1 1/2-8	1466	1763

## ASME CLASS 600 WAFER/LUG (SERIES 4G/4H)

3	80	5.74	2.12	9.25	5.35	4.92	4	0.55	1.18	2.00	0.31 × 0.27	6.62	8	3/4-10	30	39
4	100	6.88	2.51	11.81	7.28	4.92	4	0.55	1.18	2.00	0.31 × 0.27	8.50	8	7/8-9	57	66
6	150	9.49	3.07	12.40	7.63	6.50	4	0.87	1.38	2.01	0.39 × 0.31	11.50	12	1-8	136	154
8	200	11.88	4.01	15.94	10.35	6.49	4	0.86	1.57	2.00	0.47 × 0.31	13.74	12	1 1/8-8	198	220
10	250	13.77	4.60	19.09	12.91	10.00	8	0.71	1.96	2.00	0.55 × 0.35	17.00	16	1 1/4-8	290	407
12	300	16.25	5.51	21.06	14.37	10.00	8	0.71	2.16	2.51	0.63 × 0.39	19.25	20	1 1/4-8	484	559
14	350	17.99	6.10	24.01	15.35	11.73	8	0.86	2.75	4.01	0.78 × 0.47	20.74	20	1 3/8-8	621	714
16	400	20.00	7.01	26.18	17.24	11.73	8	0.86	3.50	4.72	0.88 × 0.63	23.75	20	1 1/2-8	992	1133
18	450	22.63	7.87	27.95	18.11	14.01	8	1.29	3.50	4.72	0.88 × 0.63	25.74	20	1 5/8-8	1212	1388
20	500	25.00	8.50	31.30	20.71	14.01	8	1.29	4.00	5.27	1.00 × 0.75	28.50	24	1 5/8-8	1521	1763
24	600	29.48	9.13	34.84	24.52	14.01	8	1.29	4.72	5.90	1.26 × 0.71	33.00	24	1 7/8-8	2393	2732

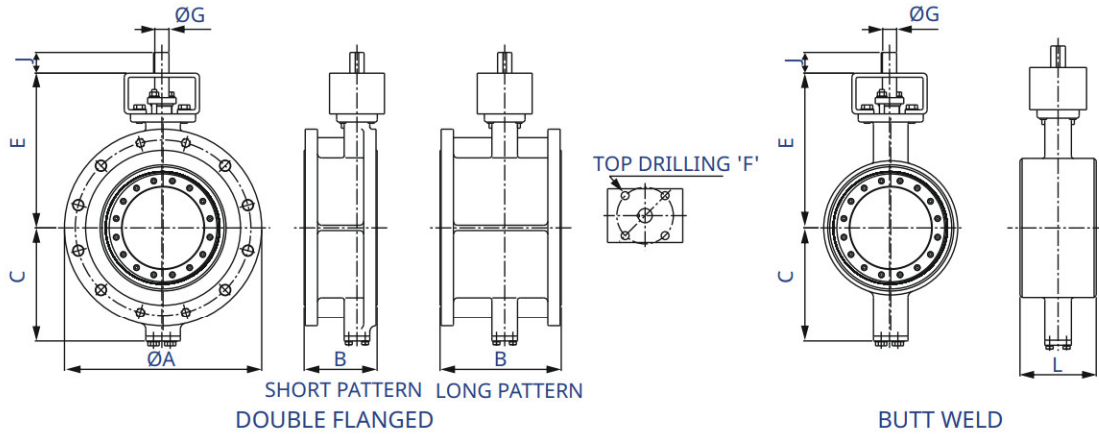
\* Face to Face for sizes up to 24" Class 150 and 300 conforms to API 609 and Flange dimensions are shown as per ASME B16.47 Series A.

Please consult Delval for other dimensions

Delval reserves rights to change the contents without notice.



# DIMENSIONS AND WEIGHTS



## DIMENSIONS (Inch) ASME CLASS 150 SHORT PATTERN/LONG PATTERN/BUTT WELD (SERIES 4C/4P/4W)

Valve Size		B*					Top Flange Details						Lug Tapping*			App. Weight (lbs)			
INCH	DN	ØA	SP	LP	L*	E	C	BC	No. of holes	Hole Dia.	ØG	J	Key Size	BC	No. of holes	Tapping /UNC/UN2B	DF (SP)	DF (LP)	BW
3	80	7.48	4.50	8.00	7.09	7.48	4.60	2.76/4.01	4	0.35/0.43	0.62	1.25	0.19 × 0.19	6.00	4	5/8-11	39	42	24
4	100	9.05	5.00	9.00	7.48	8.85	5.60	2.76/4.01	4	0.35/0.43	0.78	1.25	0.23 × 0.23	7.50	8	5/8-11	61	65	33
6	150	11.02	5.50	10.50	8.27	9.05	6.10	2.76/4.01	4	0.35/0.43	0.86	1.25	0.23 × 0.23	9.50	8	3/4-10	83	92	59
8	200	13.58	6.00	11.49	9.06	11.22	7.30	4.01/4.92	4	0.47/0.55	0.98	1.25	0.31 × 0.27	11.75	8	3/4-10	121	133	122
10	250	15.94	6.49	13.00	9.84	12.91	8.80	4.92	4	0.55	1.18	2.00	0.31 × 0.27	14.25	12	7/8-9	198	221	180
12	300	19.09	7.00	14.00	10.63	14.96	10.90	4.92/6.49	4	0.55/0.86	1.37	2.00	0.39 × 0.31	17.00	12	7/8-9	335	367	225
14	350	21.06	7.50	15.00	11.42	15.94	11.20	5.51	4	0.71	1.57	2.00	0.47 × 0.31	18.75	12	1-8	429	469	325
16	400	23.42	8.50	16.00	12.20	20.66	13.10	5.51/6.49	4	0.71/0.86	1.96	2.51	0.55 × 0.35	21.25	16	1-8	595	650	532
18	450	25.00	8.75	17.00	12.99	20.66	13.50	6.49	4	0.86	2.16	2.51	0.63 × 0.39	22.75	16	1 1/8-8	650	723	604
20	500	27.55	9.00	18.00	13.78	22.83	15.50	10.00	8	0.70	2.36	4.01	0.70 × 0.43	25.00	20	1 1/8-8	936	1029	695
24	600	32.08	10.50	20.00	15.35	25.39	17.70	10.00	8	0.70	2.75	4.01	0.78 × 0.47	29.50	20	1 1/4-8	1322	1457	1050
28	700	36.41	11.50	24.00	-	28.34	20.40	11.73	8	0.86	3.00	4.01	0.75 × 0.75	34.00	28	1 1/4-8	1921	2150	-
30	750	38.77	12.52	24.00	-	32.67	22.00	11.73	8	0.86	3.00	4.01	0.75 × 0.75	36.00	28	1 1/4-8	3042	3498	-
32	800	41.73	12.52	26.00	-	34.25	23.50	11.73	8	0.86	4.00	5.27	1.00 × 0.75	38.50	28	1 1/2-8	3439	3955	-
36	900	46.06	12.99	28.00	-	36.02	25.20	14.00	8	1.30	4.00	5.27	1.00 × 0.75	42.70	32	1 1/2-8	4133	4762	-
40	1000	50.78	16.14	-	-	38.58	27.40	16.00	8	1.53	4.72	5.90	1.26 × 0.71	47.20	36	1 1/2-8	5357	-	-
42	1050	52.95	16.14	-	-	43.70	32.40	16.00	8	1.53	4.72	5.90	1.26 × 0.71	49.50	36	1 1/2-8	6338	-	-
44	1100	55.31	18.50	-	-	44.70	32.80	16.00	8	1.53	4.72	5.90	1.26 × 0.71	51.70	40	1 1/2-8	7010	-	-
48	1200	59.44	18.50	-	-	49.21	33.10	19.01	12	1.53	5.51	7.08	1.41 × 0.78	56.00	44	1 1/2-8	7716	-	-

## ASME CLASS 300 SHORT PATTERN/LONG PATTERN/BUTT WELD (SERIES 4F/4Q/4Y)

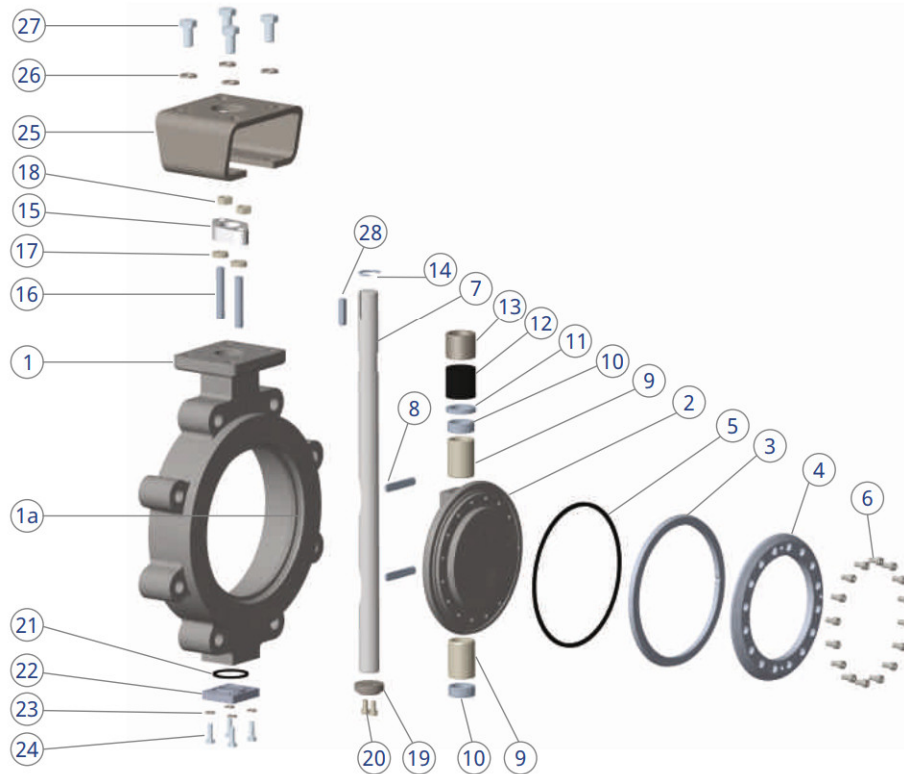
3	80	8.26	4.50	11.12	7.09	7.48	4.60	2.76/4.01	4	0.39/0.47	0.62	1.25	0.19 × 0.19	6.62	8	3/4-10	39	44	24
4	100	10.03	5.00	12.00	7.48	8.85	5.66	2.76/4.01	4	0.39/0.47	0.78	1.25	0.23 × 0.23	7.87	8	3/4-10	70	80	33
6	150	12.59	5.50	15.88	8.27	10.82	7.48	4.92	4	0.55	0.98	1.25	0.31 × 0.27	10.62	12	3/4-10	185	210	80
8	200	14.96	6.00	16.46	9.06	12.20	8.07	4.92	4	0.55	1.37	2.00	0.39 × 0.31	13.00	12	7/8-9	220	258	150
10	250	17.51	6.49	18.00	9.84	15.03	10.23	6.49	4	0.86	1.37	2.00	0.39 × 0.31	15.25	16	1-8	286	340	217
12	300	20.47	7.00	19.75	10.63	16.73	11.22	6.49	4	0.86	1.57	2.00	0.47 × 0.31	17.74	16	1 1/8-8	495	566	300
14	350	23.03	7.50	30.00	11.42	18.90	12.40	10.00	8	0.70	2.16	2.51	0.63 × 0.39	20.25	20	1 1/8-8	683	820	422
16	400	25.59	8.50	33.00	12.20	19.88	14.17	10.00	8	0.70	2.16	2.51	0.63 × 0.39	22.50	20	1 1/4-8	894	1200	763
18	450	27.95	8.75	36.00	12.99	23.03	15.35	11.73	8	0.86	2.75	4.01	0.78 × 0.47	24.74	24	1 1/4-8	1157	1640	993
20	500	30.51	9.00	39.00	13.78	25.59	16.61	11.73	8	0.86	3.50	5.27	1.00 × 0.55	27.00	24	1 1/4-8	1463	2110	1220
24	600	36.02	10.50	45.00	15.35	29.52	20.31	14.01	8	1.29	4.00	5.27	1.00 × 0.75	32.00	24	1 1/2-8	2104	3162	1900

## ASME CLASS 600 SHORT PATTERN/LONG PATTERN/BUTT WELD (SERIES 4J/4R/4K)

3	80	8.26	7.08	14.00	7.09	9.25	5.35	4.92	4	0.55	1.18	2.00	0.31 × 0.27	6.62	8	3/4-10	90	100	65
4	100	10.82	7.48	17.00	7.48	11.81	7.28	4.92	4	0.55	1.18	2.00	0.31 × 0.27	8.50	8	7/8-9	143	155	130
6	150	13.97	8.26	22.00	8.27	12.40	7.63	6.49	4	0.86	1.37	2.00	0.39 × 0.31	11.50	12	1-8	290	324	180
8	200	16.53	9.05	26.00	9.06	15.94	10.35	6.49	4	0.86	1.57	2.00	0.47 × 0.31	13.74	12	1 1/8-8	352	415	270
10	250	20.07	9.84	31.00	9.84	19.09	12.91	10.00	8	0.71	1.96	2.00	0.55 × 0.35	17.00	16	1 1/4-8	586	700	480
12	300	22.04	10.62	33.00	10.63	21.06	14.37	10.00	8	0.71	2.16	2.51	0.63 × 0.39	19.25	20	1 1/4-8	804	930	650
14	350	23.81	11.41	35.00	11.42	24.01	15.35	11.73	8	0.86	2.75	4.01	0.63 × 0.39	20.74	20	1 3/8-8	1079	1222	1210
16	400	26.96	12.20	39.00	12.20	26.18	17.25	11.73	8	0.86	3.50	4.72	0.78 × 0.47	23.74	20	1 1/2-8	1540	1900	1424
18	450	29.33	12.99	43.00	12.99	27.95	18.11	14.01	8	1.29	3.50	4.72	0.88 × 0.63	25.74	20	1 5/8-8	1619	2139	1800
20	500	32.08	13.77	47.00	13.78	31.29	20.70	14.01	8	1.29	4.00	5.27	1.00 × 0.75	28.50	24	1 5/8-8	1917	2650	2600
24	600	37.00	15.35	55.00	15.35	34.84	24.52	14.01	8	1.29	4.72	5.90	1.26 × 0.71	33.00	24	1 7/8-8	3129	4350	3900

\* Face to Face dimension 'B' for short pattern conforms to API 609 Category B, and long pattern conforms to API 609 Category B / ASME B16.10 gate valves. End to End dimension 'L' conforms to ISO 5752 Series 14. Flange dimensions are shown as per ASME B16.47 Series A. Please consult DelVal for other dimensions. DelVal reserves rights to change the contents without notice.

# STANDARD MATERIALS OF CONSTRUCTION



## Part List

Item	Description	Standard Material*	
		Carbon steel	Stainless steel
1	Body	ASTM A216 WCB / WCC, ASTM A352 LCC	ASTM A351 CF8M / CF3M
1a	Body Seat	Stellite® gr. 21	Stellite® gr. 21
2	Disc	ASTM A216 WCB / WCC, ASTM A352 LCC	ASTM A351 CF8M / CF3M
3**	Seal Ring	ASTM A 240 S31803 (Duplex) + Graphite ASTM A 240 S20910 (XM-19) + Graphite ASTM A 693 Type 630 (17-4PH) hard faced ASTM A 240 S20910 (XM-19) hard faced	ASTM A 240 S31803 (Duplex) + Graphite ASTM A 240 S20910 (XM-19) + Graphite ASTM A 693 Type 630 (17-4PH) hard faced ASTM A 240 S20910 (XM-19) hard faced
4	Retainer Ring	ASTM A516 Gr.70 / ASTM A240 SS304	ATM A240 SS316 / SS316L
5**	Seal Gasket	Graphite	Graphite
6	Retainer Screw	ISO 3506 A4-70	ISO 3506 A4-70
7	Stem	ASTM A322 4130 ASTM A479 SS410 -cond.3 ASTM A564 Type 630 (17-4PH)	ASTM A564 Type 630 (17-4PH) / ASTM A479 Xm19
8**	Wedge Key	ASTM A322 4130 ASTM A479 SS410 -cond.3 ASTM A564 Type 630 (17-4PH)	ASTM A564 Type 630 (17-4PH) / ASTM A479 Xm19
9**	Stem Bearing + Protector	ASTM A 479 SS316 / SS316L hard faced + Graphite	ASTM A 479 SS316 / SS316L hard faced + Graphite
10	Bearing Spacer	ASTM A 479 SS316 / SS316L	ASTM A 479 SS316 / SS316L
11	Packing Spacer	ASTM A 479 SS316 / SS316L	ASTM A 479 SS316 / SS316L
12**	Gland Packing	Graphite	Graphite
13	Gland	ASTM A 479 SS316 / SS316L	ASTM A 479 SS316 / SS316L
14	Stem Retainer	ASTM A313 SS302	ASTM A313 SS302

Item	Description	Standard Material*	
		Carbon steel	Stainless steel
15	Gland Flange	ASTM A516 Gr.70 / ASTM A240 SS304	ASTM A240 SS316
16	Stud	ASTM A193 Gr B8M	ASTM A193 Gr B8M
17**	Belleville Spring	ASTM A 240 SS 304	ASTM A 240 SS 304
18	Hex Nut	ASTM A194 Gr 8M	ASTM A194 Gr 8M
19**	Thrust Bearing	ASTM A 479 SS316 / SS316L hard faced	ASTM A 479 SS316 / SS316L hard faced
20	Bearing Screw	ISO 3506 A4 -70	ISO 3506 A4 -70
21**	Cover Gasket	Graphite, ASTM A 240 SS316 / SS316L + Graphite	Graphite, ASTM A 240 SS316 / SS316L + Graphite
22	Bottom Cover	ASTM A516 Gr.70 / ASTM A240 SS304	ASTM A240 SS316 / SS316L
23	Punch Washer	ASTM A 240 SS304	ASTM A 240 SS304
24	Hex Hd Screw	ISO 3506 A4 -70	ISO 3506 A4 -70
25	Bracket	Carbon steel	Carbon steel
26	Punch Washer	ASTM A 240 SS304	ASTM A 240 SS304
27	Hex Hd Screw	ISO 3506 A4 -70	ISO 3506 A4 -70
28	Key	ASTM A322 4130 ASTM A479 SS410 -cond.3 ASTM A564 Type 630 (17-4PH)	ASTM A564 Type 630 (17-4PH) / ASTM A479 Xm19

\*Other materials may be available on request.

\*\*Recommended spares



# TORQUE DATA

## ASME CLASS 150

Valve Size		Running Torque (Lbf-Inch)	*Flow Direction	Torque at various Differential Pressure (Lbf-Inch)					
INCH	DN			150 psi		230 psi		285 psi	
				ETC	BTO	ETC	BTO	ETC	BTO
3	80	313	Shaft Side	751	939	793	992	835	1045
			Disc Side	1033	827	1091	873	1148	918
4	100	406	Shaft Side	958	1197	1016	1270	1083	1355
			Disc Side	1317	1054	1397	1118	1489	1191
6	150	700	Shaft Side	1646	2058	1780	2225	1869	2337
			Disc Side	2264	1811	2447	1958	2570	2056
8	200	1062	Shaft Side	2336	2920	2690	3363	2832	3540
			Disc Side	3212	2570	3699	2959	3894	3115
10	250	2437	Shaft Side	4930	6174	6066	7582	6499	8125
			Disc Side	6791	5433	8340	6672	8936	7149
12	300	3138	Shaft Side	5857	7322	7280	9100	8368	10462
			Disc Side	8054	6443	10010	8008	11506	9205
14	350	4163	Shaft Side	8511	10638	10472	13090	11101	13878
			Disc Side	11702	9362	14399	11519	15264	12211
16	400	4683	Shaft Side	13269	16587	17172	21465	18733	23419
			Disc Side	18245	14596	23612	18889	25758	20607
18	450	6395	Shaft Side	16551	20689	21442	26802	25580	31978
			Disc Side	22758	18206	29482	23586	35172	28138
20	500	7240	Shaft Side	21701	27127	30681	38352	32178	40227
			Disc Side	29840	23872	42187	33750	44245	35396
24	600	9292	Shaft Side	35194	43993	45250	56563	49560	61955
			Disc Side	48392	38714	62219	49775	68145	54516
26	650	15930	Shaft Side	62708	78385	77526	96907	84960	106200
			Disc Side	86224	68979	106598	85278	116820	93456
28	700	18585	Shaft Side	74753	93441	99120	123900	99120	123911
			Disc Side	102785	82228	136290	109032	136290	109032
30	750	22089	Shaft Side	99502	124378	128955	161194	147264	184096
			Disc Side	136816	109452	177313	141851	202488	161990
32	800	24500	Shaft Side	104546	130682	135202	169003	153282	191619
			Disc Side	143751	115000	185903	148722	210762	168610
36	900	28983	Shaft Side	148231	185288	217378	271722	231870	289862
			Disc Side	203817	163054	298894	239115	318821	255057
40	1000	37922	Shaft Side	199590	249488	268250	335312	303378	379255
			Disc Side	274437	219549	368843	295075	417144	333715
42	1050	38816	Shaft Side	222943	278679	275892	344866	310528	388194
			Disc Side	306547	245238	379352	303482	426977	341581
44	1100	42037	Shaft Side	237870	297338	310052	387565	336300	420375
			Disc Side	327072	261657	426321	341057	462412	369930
48	1200	48200	Shaft Side	336710	420888	437723	547154	481015	601320
			Disc Side	462977	370381	601870	481496	661395	529116

\*The preferred direction of flow is through the shaft side.

## ASME CLASS 300

Valve Size		Running Torque (Lbf-Inch)	*Flow Direction	Torque at various Differential Pressure (Lbf-Inch)									
INCH	DN			150 psi		285 psi		425 psi		570 psi		710 psi	
				ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO
3	80	677	Shaft Side	1241	1551	1354	1693	1467	1834	1579	1974	1805	2256
			Disc Side	1706	1365	1862	1489	2017	1613	2172	1737	2482	1985
4	100	828	Shaft Side	1536	1920	1728	2160	1872	2341	2112	2641	2208	2761
			Disc Side	2112	1690	2377	1901	2575	2060	2905	2324	3037	2429
6	150	1497	Shaft Side	2556	3194	2914	3643	3194	3993	3513	4392	3993	4992
			Disc Side	3513	2811	4008	3206	4392	3513	4831	3865	5490	4392
8	200	3100	Shaft Side	5175	6469	6093	7617	7095	8869	7930	9912	8765	10957
			Disc Side	7116	5693	8378	6703	9756	7805	10904	8723	12051	9641
10	250	3800	Shaft Side	6947	8683	9132	11415	10693	13367	11708	14635	12489	15612
			Disc Side	9552	7641	12557	10045	14703	11763	16099	12879	17172	13738
12	300	5040	Shaft Side	9361	11701	12356	15446	16101	20126	18722	23403	20220	25278
			Disc Side	12871	10297	16990	13592	22139	17711	25743	20594	27803	22242
14	350	6400	Shaft Side	12785	15981	16691	20864	19888	24860	24150	30187	26280	32854
			Disc Side	17579	14063	22951	18361	27346	21877	33206	26565	36136	28909
16	400	7200	Shaft Side	21535	26919	28458	35572	35764	44705	43071	53839	48455	60575
			Disc Side	29611	23689	39129	31303	49176	39341	59223	47378	66626	53301
18	450	8232	Shaft Side	28707	35884	38755	48444	46650	58312	55980	69975	66028	82542
			Disc Side	39473	31578	53288	42631	64144	51315	76972	61578	90788	72630
20	500	10163	Shaft Side	32522	40653	43609	54512	57653	72067	69480	86850	81306	101642
			Disc Side	44718	35774	59963	47970	79274	63419	95535	76428	111796	89437
24	600	15813	Shaft Side	48369	60462	61764	77205	81856	102320	107157	133946	126505	158145
			Disc Side	66508	53206	84926	67940	112552	90042	147341	117873	173944	139155

## ASME CLASS 600

Valve Size		Running Torque (Lbf-Inch)	*Flow Direction	Torque at various Differential Pressure (Lbf-Inch)									
INCH	DN			425 psi		600 psi		850 psi		1140 psi		1450 psi	
				ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO	ETC	BTO
3	80	1258	Shaft Side	1549	1936	1807	2258	2194	2743	2581	3227	3356	4195
			Disc Side	2130	1704	2484	1987	3017	2414	3550	2840	4614	3692
4	100	2135	Shaft Side	2627	3284	3065	3831	3722	4652	4379	5473	5692	7115
			Disc Side	3612	2890	4215	3371	5118	4094	6021	4817	7827	6262
6	150	4461	Shaft Side	5490	6862	6405	8006	7777	9721	9150	11437	11894	14869
			Disc Side	7548	6039	8807	7045	10694	8555	12581	10064	16355	13084
8	200	7982	Shaft Side	10135	12668	11654	14568	14188	17735	16722	20902	21282	26605
			Disc Side	13935	11148	16025	12820	19509	15607	22993	18394	29263	23411
10	250	13647	Shaft Side	15800	19750	18194	22742	22025	27531	26812	33516	36388	45490
			Disc Side	21725	17380	25017	20013	30284	24227	36867	29494	50034	40027
12	300	17907	Shaft Side	23387	29233	27772	34715	33618	42023	39952	49940	47748	59689
			Disc Side	32156	25725	38186	30549	46225	36980	54934	43947	65653	52522
14	350	25586	Shaft Side	30928	38660	39114	48893	48666	60832	57307	71634	68223	85286
			Disc Side	42526	34020	53782	43026	66915	53532	78797	63038	93806	75045
16	400	26149	Shaft Side	45472	56840	62751	78439	80940	101175	88216	110270	104586	130744
			Disc Side	62524	50019	86283	69027	111293	89034	121297	97037	143805	115044
18	450	38225	Shaft Side	62953	78691	84537	105671	107919	134899	130402	163003	152886	191123
			Disc Side	86560	69248	116238	92990	148389	118711	179303	143443	210218	168174
20	500	41543	Shaft Side	76485	95606	105496	131870	131870	164838	158244	197805	184618	230792
			Disc Side	105166	84133	145057	116046	181321	145057	217586	174068	253850	203080
24	600	57831	Shaft Side	128502	160628	179903	224879	220167	275208	261287	326609	308405	385538
			Disc Side	176690	141352	247366	197893	302729	242183	359270	287416	424057	339245

## Operator Information



All valves can be direct mounted with gear operators for manual operation. Gear operators can also be attached with chainwheel operators for opening or closing valves located on pipelines at high elevations.



All valves can be direct mounted with pneumatic actuators or electric actuators and accessories for complete automation options such as fail open/close and positioner controlled. Valves can be mounted with manual overrides.



# 100% TESTING 100% SERIALIZATION



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