

Fisher® A31D Double-Flange High-Performance Butterfly Valve

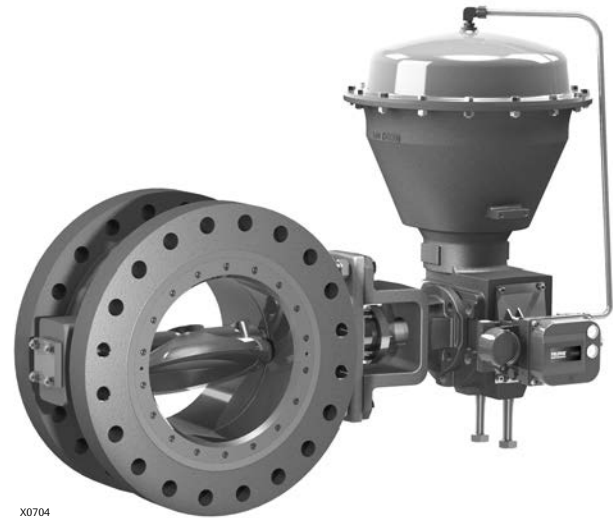
The Fisher A31D double-flange high-performance butterfly valve provides outstanding performance under extreme pressure and temperature conditions.

The A31D valve is available with face-to-face dimensions conforming to ISO 5752 Butterfly Valve Short (CL150) or Long (CL300) Series (for other face-to-face dimension requirements, consult your [Emerson Process Management sales office](#)). A splined shaft combines with a variety of Fisher spring-and-diaphragm or pneumatic piston actuators. A keyed drive shaft combines with a variety of hand levers, handwheels, or pneumatic double-acting or spring-return piston actuators. These combinations make the A31D valve a reliable, high-performance butterfly valve for both throttling and on-off applications in the process industries.

The A31D valve can be supplied with one of several dynamic seals (figure 1) that can be used in a variety of demanding applications. With the appropriate seal selection and materials of construction, the pressure-assisted seal provides excellent shutoff against the full ASME class pressure range.

Features

- **Excellent Shutoff Integrity**-- The pressure-assisted seal design provides tight shutoff and permits the use of smaller actuators in applications requiring full ASME B16.34 shutoff capabilities.
- **True Bi-directional Shutoff Performance**-- A31D valve design helps to ensure that the torque necessary to open and close the valve is the same regardless of the direction in which the differential pressure is applied.
- **Safety**-- Shaft-blowout protection is designed into the A31D valve (figure 2). For NPS 3 through 12 valves, the packing follower and an anti-blowout follower hold an anti-blowout gland securely around the valve shaft. Under the anti-blowout gland, a formed wire ring around the shaft completes the protection design. For NPS 14 through 24 valves, the anti-blowout gland fits securely over the valve shaft which has been turned down to form a circumferential shoulder that contacts the anti-blowout gland.



X0704

Fisher A31D Valve with 2052 Actuator



- **Excellent Emissions Capabilities**-- The optional ENVIRO-SEAL™ packing system is designed with improved sealing, guiding, and loading force transmission. The ENVIRO-SEAL packing system can control emissions to below the EPA (Environmental Protection Agency) limit of 100 ppm (parts per million) for valves.
 - **Shaft Versatility**-- This valve will meet your actuator needs with a choice of splined or keyed shaft connections.
 - **Sour Service Capability**-- Trim and bolting materials are available for applications involving sour liquids and gases. These constructions comply with NACE MR0175-2002, MR0103, and MR0175/ISO 15156.
 - **Reliable Flange Gasketing Surface**-- Seal retainer screws are located so there is no interference with the sealing function of either flat sheet or spiral wound line flange gaskets.
 - **Easy Installation**-- The valve body self-centers on the line flange bolts as a fast, accurate means of centering the valve in the pipeline.
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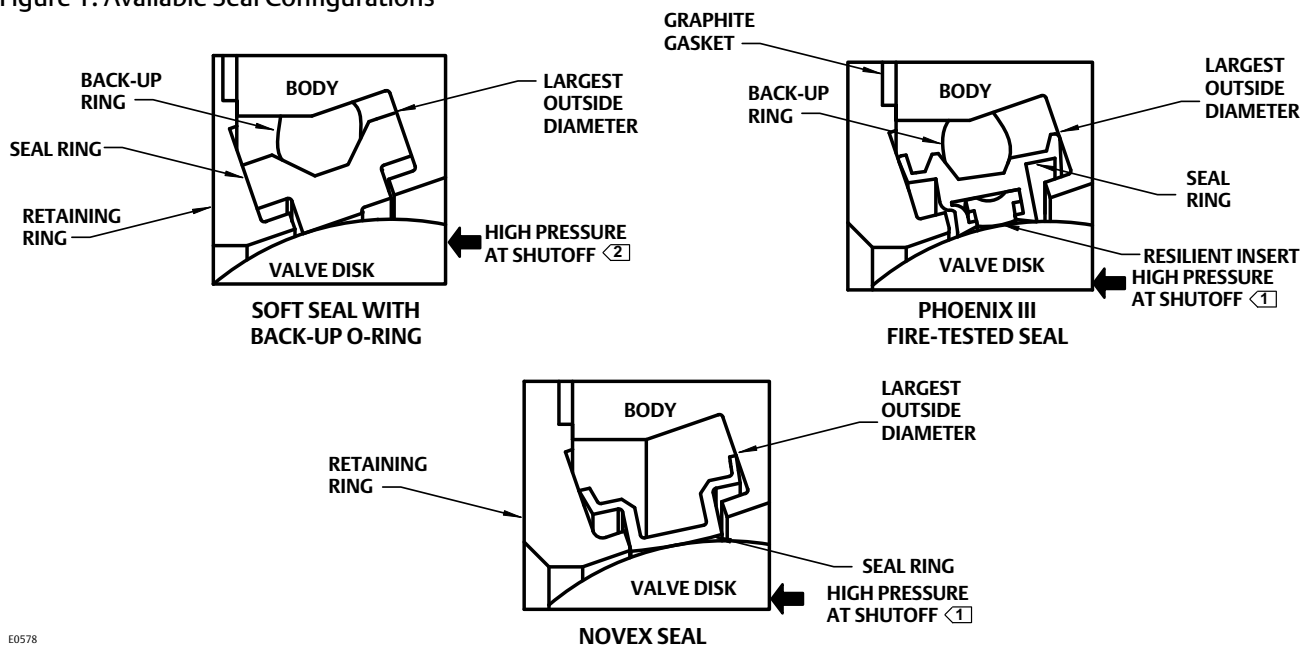
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A31D Valve Specifications and Materials of Construction

Table 1. Fisher A31D Valve Specifications

	SPECIFICATION
Valve Body Size	NPS 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, and 24
Pressure Rating	Consistent with CL150 and 300 per ASME B16.34 ⁽¹⁾
Valve Body Materials	WCC Steel
	CF8M Stainless Steel
Disk Materials	CF8M Stainless Steel
End Connections	Mates with RF flanges per ASME B16.5
Valve Body Style	Double Flange
Shaft Connection	Spline (standard)
	Keyed (optional)
Face-to-Face Dimensions	CL150: ISO 5752 Butterfly Valve Short Series
	CL300: ISO 5752 Butterfly Valve Long Series
Shutoff	Soft Seal: Bidirectional ANSI/FCI 70-2 Class VI
	NOVEX Seal: Unidirectional MSS SP-61 ⁽²⁾
	Phoenix III Seal: ANSI/FCI 70-2 Class VI
Flow Direction	Reverse (flow direction is into the shaft side of the disk)
Flow Characteristic	Approximately Linear
Disk Rotation	Clockwise (CW) to close
<p>1. See table 4 and figure 4 for additional information. The pressure/temperature limits in this bulletin and any applicable codes or standard limitation should not be exceeded. 2. 0.1 scfh per unit of NPS at 80 psi.</p>	

Figure 1. Available Seal Configurations



E0578

Notes:

- [1] This unidirectional seal must be installed so that the retaining ring is downstream from the high pressure side of the valve at shutoff, as shown.
- [2] For this bidirectional seal, The “preferred” valve orientation places the retaining ring downstream from the high pressure side of the valve at shutoff.

Installation

Recommended or “preferred” installation for the A31D valve is with the flow into the shaft side of the disk (retaining ring downstream from the high pressure side of the valve).

The standard soft seal offers ANSI/FCI 70-2 Class VI, bidirectional shutoff. The Phoenix III seal should be installed in the preferred direction to obtain optimal shutoff performance, and it must be installed in the preferred direction for fire-tested applications. The NOVEX seal is uni-directional and should be installed in the preferred direction.

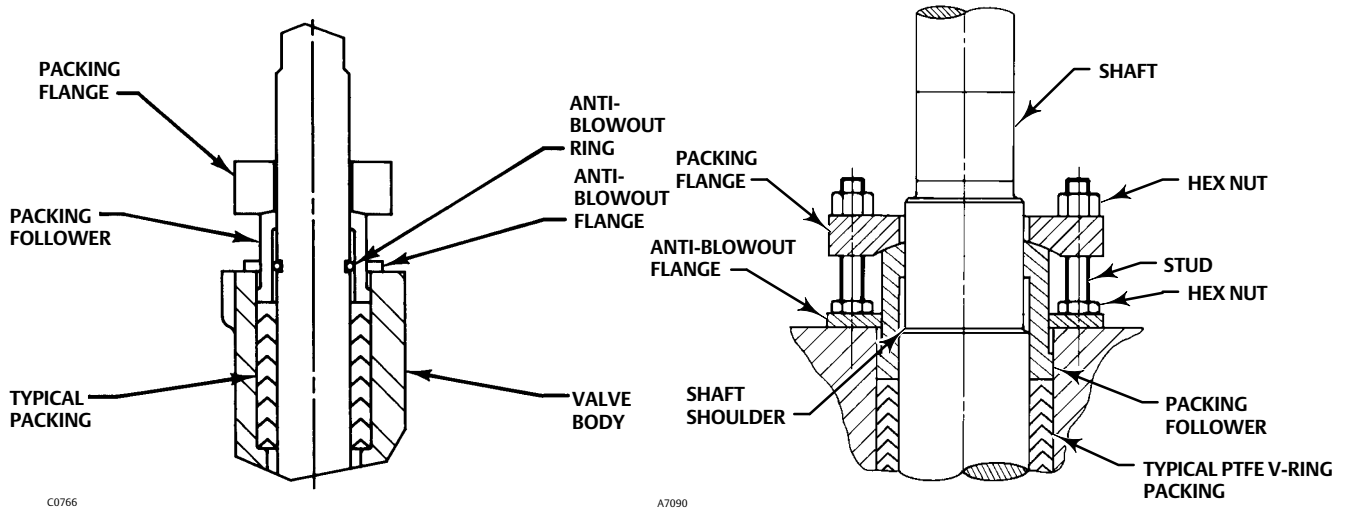
For assistance in selecting the appropriate combination of actuator action and open valve position, contact your [Emerson Process Management sales office](#).



Standard Seal Configurations

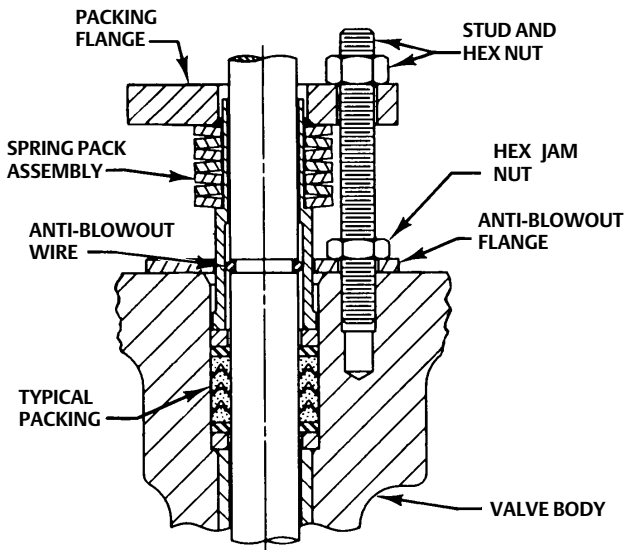
- Standard Soft Seal (PTFE)-- A resilient dynamic seal with an elastomeric back-up ring for low to moderate temperature applications.
- NOVEX Seal-- The NOVEX stainless steel seal is available for severe service, Cryogenic, and high-temperature applications.
- Phoenix III Seal-- This three-component, metal-and-polymeric seal is available for severe service with low to moderate temperature applications.

Figure 2. Blowout Protection (NPS 3 through 24)



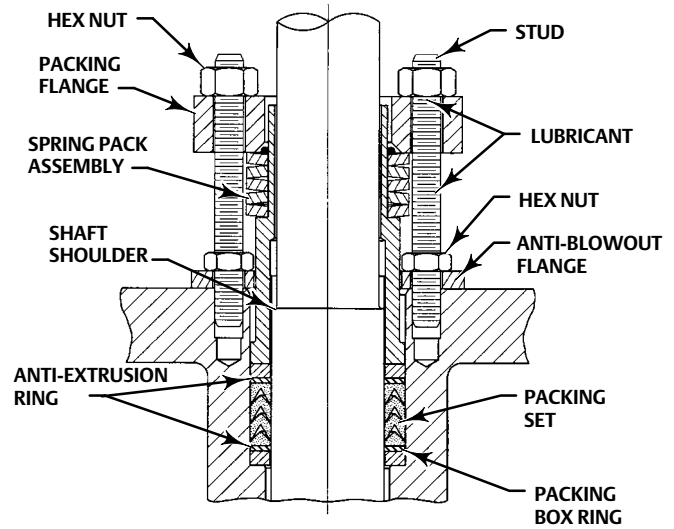
**STANDARD PACKING ARRANGEMENT
CUTAWAY, NPS 3 THROUGH 12**

**STANDARD PACKING ARRANGEMENT
CUTAWAY, NPS 14 THROUGH 24**



B2449

**ENVIRO-SEAL ARRANGEMENT (PTFE SHOWN)
NPS 3 THROUGH 12**



**ENVIRO-SEAL ARRANGEMENT (PTFE SHOWN)
NPS 14 THROUGH 24**

Table 2. Materials of Construction and Temperature Ratings

COMPONENT AND MATERIAL OF CONSTRUCTION		TEMPERATURE RANGE	
		°C	°F
Valve Body Carbon steel (SA216 WCC) CF8M (316 SST)		-29 to 427 -198 to 538	-20 to 800 -325 to 1000
Disk CF8M (316 SST)		-198 to 538	-325 to 1000
Disk Edge Coating Chrome Plating (Standard with NOVEX or Phoenix III Seals) Chrome Coating		-254 to 316 -254 to 593	-425 to 600 -425 to 1100
Shaft S20910 S17400 (H1025) S17400 (H1150M) N07718		-198 to 538 -73 to 427 -196 to 427 -254 to 704	-325 to 1000 -100 to 800 -320 to 800 -425 to 1300
Bearings PEEK (standard) S31600 ⁽¹⁾ R30006 (Alloy 6)		-73 to 260 -198 to 816 -198 to 816	-100 to 500 -325 to 1500 -325 to 1500
Packing PTFE Packing and PTFE ENVIRO-SEAL Packing Graphite packing Graphite packing with oxidizing media Graphite ENVIRO-SEAL Packing		-148 to 232 -198 to 916 -198 to 538 -148 to 315	-325 to 450 -325 to 1500 -325 to 1000 -325 to 600
Seal Ring and Backup Ring	PTFE Seal Ring		
	Nitrile Backup O-Ring	-29 to 93	-20 to 200
	Chloroprene Backup O-Ring	-43 to 149	-45 to 300
	EPR Backup O-Ring	-54 to 182	-65 to 360
	Fluorocarbon Backup O-Ring (std)	-29 to 204	-20 to 400
	UHMWPE ⁽²⁾ Seal Ring (CL150 Only)		
Seal Ring and Backup Ring	Nitrile Backup O-Ring	-29 to 93	-20 to 200
	Chloroprene Backup O-Ring	-43 to 93	-45 to 200
	EPR Backup O-Ring	-54 to 93	-65 to 200
	Fluorocarbon Backup O-Ring (std)	-29 to 93	-20 to 200
Phoenix III and/or Fire Tested Construction	S31600 and PTFE Seal Ring with Nitrile Backup O-Ring	-40 to 149	-40 to 300
	Chloroprene Backup O-Ring	-54 to 149	-65 to 300
	EPR Backup O-Ring	-62 to 204	-80 to 400
	Fluorocarbon Backup O-Ring (std)	-40 to 232	-40 to 450
Seal Ring	NOVEX S31600 Seal ⁽¹⁾ Ring (CL150)	-254 to 816	-425 to 1500
	NOVEX S31600 Seal ⁽¹⁾ Ring (CL300)	-254 to 816	-425 to 1500
	NOVEX S21800 Seal ⁽¹⁾ Ring (CL300)	-254 to 816	-425 to 1500

1. For a complete material description, contact your [Emerson Process Management sales office](#).
2. UHMWPE stands for ultra high molecular weight polyethylene.

Table 3. Valve/Actuator Combinations

TEMPERATURE RANGE	SELECTION GUIDELINES	
	1052, 1061, or 2052 ⁽²⁾	Bettis™ ⁽¹⁾
-46 to 343°C (-50 to 650°F)	Valve (select appropriate trim) and standard actuator	Valve (select appropriate trim) and standard actuator
343 to 426°C (650 to 800°F)	Mounting positions 1 and 3: Valve (select appropriate trim) and standard actuator	Valve (select appropriate trim) and actuator with high-temperature O-rings option
426 to 538°C (800 to 1000°F)	Mounting positions 1 and 3: Valve (select appropriate trim) and standard actuator	Valve (select appropriate trim) and actuator with high-temperature O-rings option

1. Select keyed shaft option.
2. See figure 3 for actuator mounting positions.
3. Consult your [Emerson Process Management sales office](#).

Figure 3. Mounting Styles and Positions

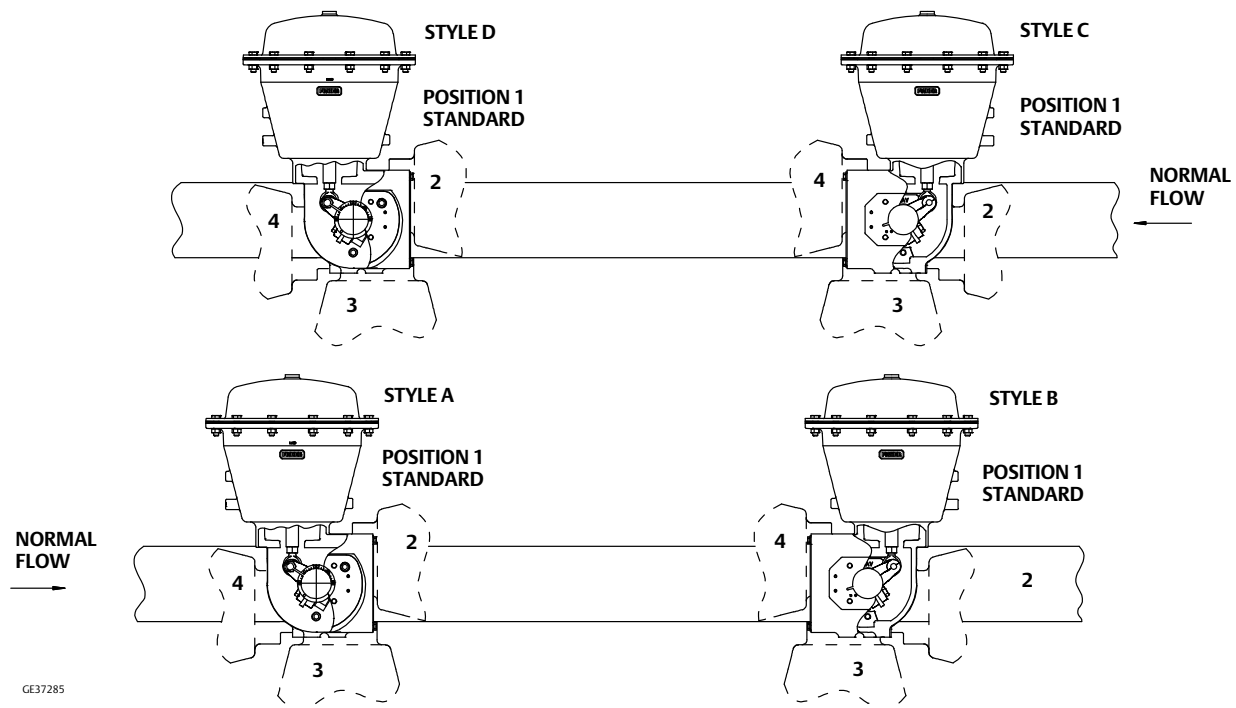
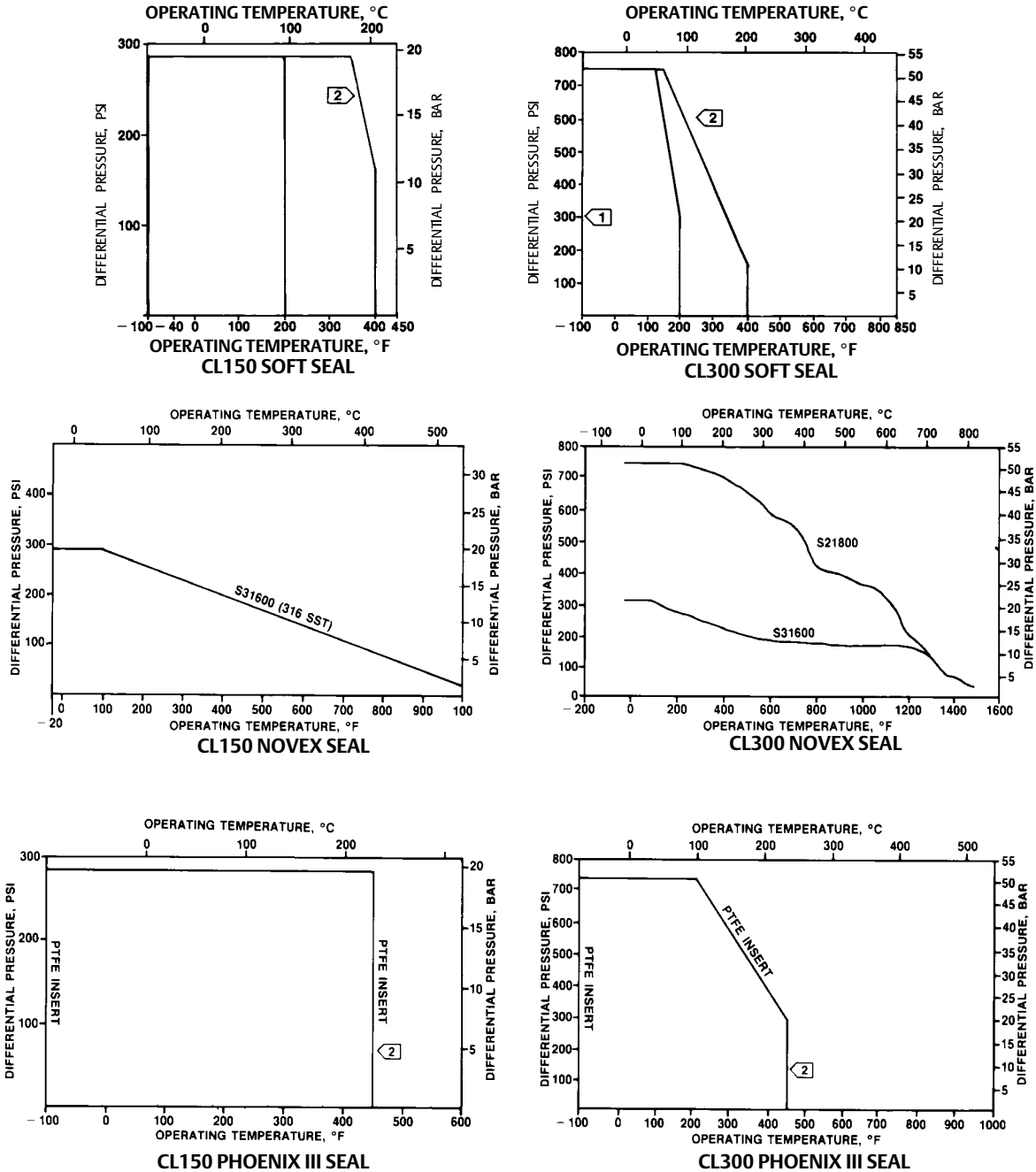


Table 4. Valve Body Material Pressure/Temperature Ratings⁽¹⁾

TEMPERATURE RANGE	PRESSURE RANGE			
	WCC	CF8M	WCC	CF8M
	CL150		CL300	
°C	Bar			
-254 to -29	---	19.0	---	49.6
-29 to 38	20	19.0	51.7	49.6
93	17.9	16.2	51.7	42.7
149	15.9	14.8	50.3	38.6
204	13.8	13.4	48.6	35.5
260	11.7	11.7	45.9	33.1
316	9.7	9.7	41.7	31.0
343	8.6	8.6	40.7	30.3
371	7.6	7.6	38.3	30.0
399	6.6	6.6	34.8	29.3
427	5.5	5.5	28.3	29.0
454	---	4.5	---	29.0
482	---	3.4	---	28.6
510	---	2.4	---	26.5
538	---	1.4	---	25.2
°F	Psi			
-450 to -20	---	275	---	720
-20 to 100	290	275	750	720
200	260	235	750	620
300	230	215	730	560
400	200	195	705	515
500	170	170	665	480
600	140	140	605	450
650	125	125	590	440
700	110	110	555	435
750	95	95	505	425
800	80	80	410	420
850	---	65	---	420
900	---	50	---	415
950	---	35	---	385
1000	---	20	---	365

1. For pressure/temperature ratings of other materials, contact your [Emerson Process Management sales office](#).

Figure 4. Maximum Pressure/Temperature Ratings for Soft Seal, NOVEX Seal and Phoenix III Seal, CL150 and CL300



C0759-1

Note
 1) Because of potential erosive and premature seal failure that can occur, throttling PTFE seals at differential pressures greater than 300 psid at disk angles less than 20 degrees open is not recommended.
 2) Temperature limitations do not account for the additional limitations imposed by the backup O-ring used with this seal. To determine the effective temperature limitation of the appropriate seal backup O-ring combination, refer to table 2.

Figure 5. Dimensions and Weights, CL150 Double-Flange Valves (also see tables 5 and 7)

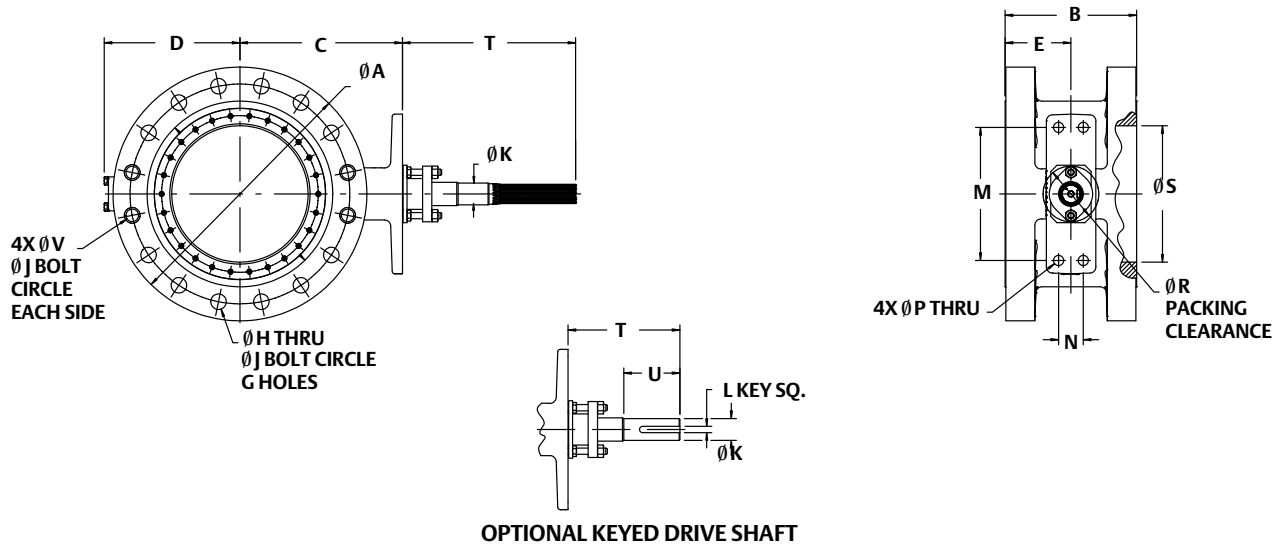


Table 5. CL150, Double-Flange Dimensions

VALVE SIZE, NPS	CL150 DIMENSION A, C, D, E, & H THROUGH U																			
	A	B ⁽³⁾	C	D	E ⁽³⁾	G ⁽³⁾	H	J	K		L	M	N	P	R	S	T		U	V
	mm																			
3	191	114	143	132	57.2	4	19.1	152	14.3	14.3	3.18	117	---	14.2	65.0	85.9	187	102	47.8	---
4	229	127	159	154	63.5	4	19.1	191	15.9	17.5	4.76	117	---	14.2	69.9	111	187	102	47.8	5/8-11
6	279	140	206	186	69.9	4	22.2	241	22.2	23.8	6.35	152	31.8	14.2	79.2	160	214	102	47.8	3/4-10
8	343	152	222	198	76.2	4	22.2	298	22.2	23.8	6.35	152	31.8	14.2	79.2	202	214	102	47.8	3/4-10
10	406	165	279	203	82.6	8	25.4	362	28.4	28.6	6.35	235	46.0	17.5	88.9	265	208	102	47.8	7/8-9
12	483	178	305	236	88.9	8	25.4	432	31.8	31.8	6.35	235	46.0	17.5	88.9	316	208	102	47.8	7/8-9
14	533	191	327	295	95.3	8	28.4	476	31.8	30.2	6.35	235	46.0	17.5	117	338	208	146	64	1-8
16	597	216	371	318	108	12	28.4	540	31.8	31.8	6.35	235	46.0	17.5	117	384	208	146	64	1-8
18	635	222	400	349	111	12	31.8	578	39.7	38.1	9.53	273	50.8	20.6	133	432	356	229	79	1-1/8-8
20	699	229	432	381	114	16	31.8	635	44.5	44.5	9.53	273	50.8	20.6	133	480	356	229	79	1-1/8-8
24	813	267	492	438	133	16	35.0	749	57.2	57.2	12.7	337	76.2	23.9	155	594	356	254	105	1-1/4-8
	Inches																			
3	7.50	4.50	5.62	5.18	2.25	4	3/4	6.00	9/16	9/16	1/8	4.62	---	0.56	2.56	3.38	7.38	4.00	1.88	---
4	9.00	5.00	6.25	6.06	2.50	4	3/4	7.50	5/8	11/16	3/16	4.62	---	0.56	2.75	4.38	7.38	4.00	1.88	5/8-11
6	11.00	5.50	8.12	7.31	2.75	4	7/8	9.50	7/8	15/16	1/4	6.00	1.25	0.56	3.12	6.28	8.44	4.00	1.88	3/4-10
8	13.50	6.00	8.75	7.81	3.00	4	7/8	11.75	7/8	15/16	1/4	6.00	1.25	0.56	3.12	7.97	8.44	4.00	1.88	3/4-10
10	16.00	6.50	11.00	8.00	3.25	8	1	14.25	1-1/8	1-1/8	1/4	9.25	1.81	0.69	3.50	10.44	8.19	4.00	1.88	7/8-9
12	19.00	7.00	12.00	9.31	3.50	8	1	17.00	1-1/4	1-1/4	1/4	9.25	1.81	0.69	3.50	12.44	8.19	4.00	1.88	7/8-9
14	21.00	7.50	12.88	11.62	3.75	8	1-1/8	18.75	1-1/4	1-3/16	1/4	9.25	1.81	0.69	4.62	13.31	8.19	5.75	2.50	1-8
16	23.50	8.50	14.62	12.50	4.25	12	1-1/8	21.25	1-1/4	1-1/4	1/4	9.25	1.81	0.69	4.62	15.12	8.19	5.75	2.50	1-8
18	25.00	8.75	15.75	13.75	4.38	12	1-1/4	22.75	1-9/16	1-1/2	3/8	10.75	2.00	0.81	5.25	17.00	14	9.00	3.12	1-1/8-8
20	27.50	9.00	17.00	15.00	4.50	16	1-1/4	25.00	1-3/4	1-3/4	3/8	10.75	2.00	0.81	5.25	18.88	14	9.00	3.12	1-1/8-8
24	32.00	10.50	19.38	17.25	5.25	16	1-3/8	29.50	2-1/4	2-1/4	1/2	13.25	3.00	0.94	6.12	23.38	14	10.00	4.12	1-1/4-8

1. Splined shaft connection.
2. Optional keyed shaft connection.
3. ISO 5752 Butterfly Valve Short Series

Figure 6. Dimensions and Weights, CL300 Double-Flange Valves (also see tables 6 and 7)

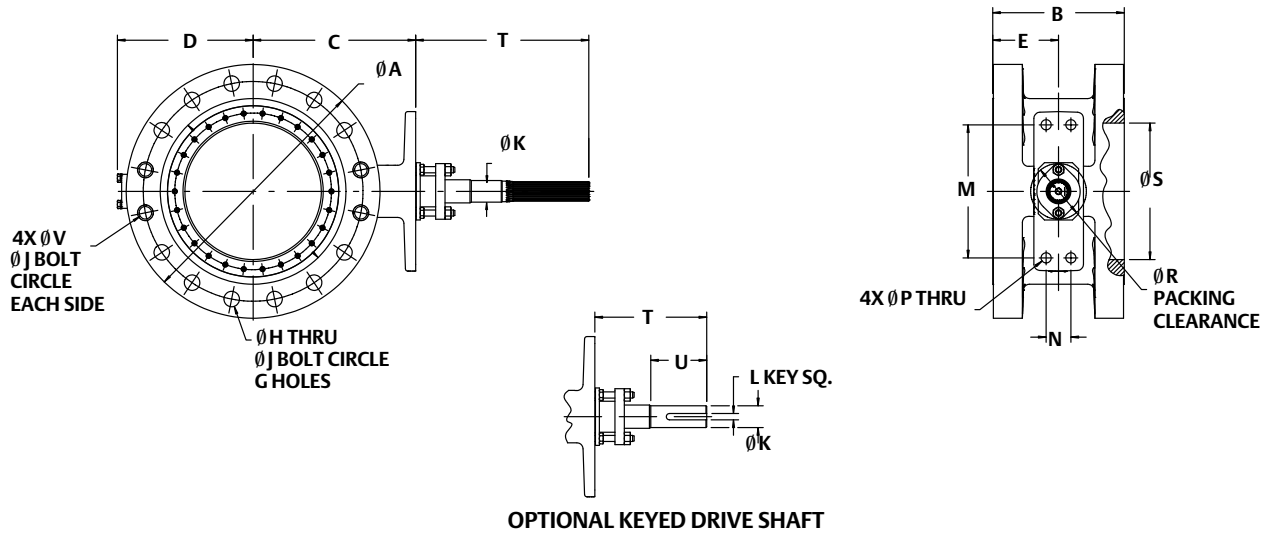


Table 6. CL300, Double-Flange Dimensions

VALVE SIZE, NPS	CL300 DIMENSION A, C, D, E, & H THROUGH U																			
	A	B ⁽³⁾	C	D	E ⁽³⁾	G ⁽³⁾	H	J	K		L	M	N	P	R	S	T		U	V
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
mm																				
3	210	180	143	121	90.2	8	22.2	168	14.3	14.3	3.05	117	---	14.2	65.0	85.9	187	102	47.8	---
4	254	191	159	145	95.0	8	22.2	200	15.9	17.5	4.83	117	---	14.2	69.9	112	187	102	47.8	---
6	318	210	207	181	105	12	22.2	270	22.2	23.8	6.35	152	31.8	14.2	79.2	163	214	102	47.8	---
8	387	230	249	215	115	12	25.4	330	31.8	31.8	6.35	235	46.0	17.5	105	195	208	102	47.8	---
10	448	250	324	263	125	16	31.8	387	38.1	41.3	9.65	235	46.0	17.5	105	246	208	152	66.5	---
12	521	270	334	279	135	12	31.8	451	44.5	47.6	12.7	273	50.8	20.6	118	291	356	229	76.2	1-1/8-8
14	584	290	363	319	145	16	31.8	514	44.5	44.5	9.50	273	50.8	20.6	124	321	356	229	79.5	1-1/8-8
16	648	310	397	353	155	16	34.8	572	44.5	44.5	9.50	273	50.8	20.6	130	383	356	229	79.5	1-1/4-8
18	711	330	419	384	165	20	34.8	629	57.2	57.2	12.7	337	76.2	23.9	143	430	356	254	105	1-1/4-8
20	767	350	483	416	175	20	34.8	686	76.2	69.9	15.7	337	76.2	23.9	187	468	265	273	124	1-1/4-8
24	914	390	546	483	195	20	41.1	813	76.2	69.9	15.7	337	76.2	23.9	202	551	265	273	124	1-1/2-8
Inches																				
3	8.25	7.09	5.63	4.78	3.55	8	0.875	6.62	9/16	9/16	0.12	4.62	---	0.56	2.56	3.38	7.38	4.00	1.88	---
4	10.00	7.50	6.25	5.72	3.74	8	0.875	7.87	5/8	11/16	0.19	4.62	---	0.56	2.75	4.39	7.38	4.00	1.88	---
6	12.50	8.27	8.13	7.12	4.14	12	0.875	10.62	7/8	15/16	0.25	6.00	1.25	0.56	3.12	6.40	8.44	4.00	1.88	---
8	15.25	9.06	9.81	8.47	4.53	12	1.00	13.00	1-1/4	1-1/4	0.25	9.25	1.81	0.69	4.12	7.68	8.19	4.00	1.88	---
10	17.62	9.84	12.75	10.36	4.92	16	1.25	15.25	1-1/2	1-5/8	0.38	9.25	1.81	0.69	4.12	9.68	8.19	6.00	2.62	---
12	20.50	10.63	13.13	11.00	5.32	12	1.25	17.75	1-3/4	1-7/8	0.50	10.75	2.00	0.81	4.63	11.46	14	9.00	3.00	1-1/8-8
14	23.00	11.41	14.31	12.56	5.70	16	1.25	20.25	1-3/4	1-3/4	0.38	10.75	2.00	0.81	4.88	12.65	14	9.00	3.13	1-1/8-8
16	25.50	12.20	15.63	13.88	6.10	16	1.37	22.50	1-3/4	1-3/4	0.38	10.75	2.00	0.81	5.12	15.07	14	9.00	3.13	1-1/4-8
18	28.00	13.00	16.50	15.12	6.50	20	1.37	24.75	2-1/4	2-1/4	0.50	13.25	3.00	0.94	5.62	16.91	14	10.00	4.13	1-1/4-8
20	30.20	13.78	19.00	16.38	6.89	20	1.37	27.00	3	2-3/4	0.62	13.25	3.00	0.94	7.38	18.93	10.44	10.75	4.88	1-1/4-8
24	36.00	15.35	21.50	19.00	7.67	20	1.62	32.00	3	2-3/4	0.62	13.25	3.00	0.94	7.94	21.69	10.44	10.75	4.88	1-1/2-8

1. Splined shaft connection.
2. Optional keyed shaft connection.
3. ISO 5752 Butterfly Valve Long Series

Product Bulletin

51.6:A31D
November 2015

A31D Valve
D500213X012

Table 7. Valve Weights

SIZE NPS	CL150		CL300	
	kg	lb	kg	lb
3	15	33	28	63
4	25	56	35	77
6	34	76	65	143
8	54	118	156	343
10	81	178	176	388
12	110	243	294	649
14	152	335	345	760
16	201	443	563	1240
18	243	535	591	1303
20	277	611	706	1556
24	434	956	1307	2881

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