Fisher™ A11 High-Performance Butterfly Valve, NPS 30-72

The Fisher A11 High-Performance Butterfly Valve maintains tight shutoff, and can be specified for a wide range of pressure and temperature conditions, including cryogenic applications.

The A11 valve is available in either a wafer or a lugged design. A keyed shaft can combine with a variety of handlevers, handwheels, or pneumatic piston diaphragm actuators. These combinations help make the A11 valve a reliable, high-performance butterfly valve for both throttling and on-off applications in the process industries.

The A11 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 helps provide excellent shutoff against the full ASME class pressure range for the A11 valve.

W9134

Features

- Excellent Shutoff Integrity—The pressure-assisted seal design provides tight shutoff and permits the use of smaller, less expensive actuators in applications requiring full ASME B16.34 shutoff capabilities.
- Excellent Emissions Capabilities— The optional live-loaded packing systems are designed with very smooth shaft surfaces and live-loading to provide improved sealing, guiding, and loading force transmission.
- 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.
- High-Temperature/Cryogenic Capabilities— Optional valve constructions allow this valve to meet both high-temperature and cryogenic applications.
- Easy Installation—The valve body self-centers on the line flange bolts as a fast, accurate means of centering the valve in the pipeline.
- 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.
- True Bidirectional Shutoff Performance—A feature of the valve design is that the torque necessary to open and close the valve is the same regardless of the direction in which the differential pressure is applied.

Standard Seal Configurations

- Standard Soft Seal — A resilient dynamic seal with an elastomeric back-up ring for low to moderate temperature applications.

- Metal Seal—This stainless steel seal is available for severe service and high-temperature applications to 704°C (1300°F) for NACE applications and 816°C (1500°F) for other applications.

- NOVEX Seal—The NOVEX stainless steel seal is available for severe service, Cryogenic, and high-temperature applications to 816°C (1500°F). Available for CL150/150, 150, and 300, up to NPS 36 only.

- Phoenix III Seal—This three-component, metal-and-polymeric seal is available for severe service with low to moderate temperature applications.

- Cryo-Tight Cryogenic Seal—This resilient dynamic seal is available with or without an aluminum back-up ring for low temperature applications.

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Specifications

Available Configurations and Sizes

■ Wafer (flangeless) or ■ Lugged (single-flange)

Available Sizes
CL150/150[1]*:* NPS 30 through 72
CL150: NPS 30 through 72
CL300: NPS 30 through 72

End Connection Style

Wafer or lugged style bodies designed to fit between raised-face mating flanges of appropriate class pressure rating
ASME B16.47 Class A and MSS-SP-44
NPS 30 through 48: CL150 and 300
Consult your Emerson sales office or Local Business Partner for valves compatible with API 605 and ASME B16.47 Class B flanges

Maximum Inlet Pressure[1]

Valve Body: Consistent with CL150 and 300 pressure/temperature ratings per ASME B16.34, see table 8

Seal: see figure 1

Materials of Construction

See table 1
Disk Hard Surfacing: Metal, NOVEX, Phoenix III and cryogenic seals require the disk to be coated, regardless of the valve class

Maximum Temperature Capabilities[1]

See table 1

High-Temperature and Cryogenic Applications: Contact your Emerson sales office or Local Business Partner for information

Shutoff Classification per ANSI/FCI 70-2 and IEC 60534-4

Standard Soft Seal: Class VI
Metal Seal: Class IV (reverse direction only)
NOVEX Seal: Class IV (Class VI optional, reverse direction only)
Phoenix III Seal: Class VI (reverse direction only)
Cryogenic Seal (Reverse direction only):
CTFE: Class IV
CTFE with Aluminum Backup Ring: Class VI

Flow Characteristic

Modified equal percentage

Flow Coefficients

See Fisher Catalog 12

Noise Levels

See Fisher Catalog 12 for sound pressure level prediction

Available Actuators

■ Spring-return pneumatic actuators,
■ double-acting pneumatic actuators,
■ electric actuators, and
■ handwheel

Disk Rotation

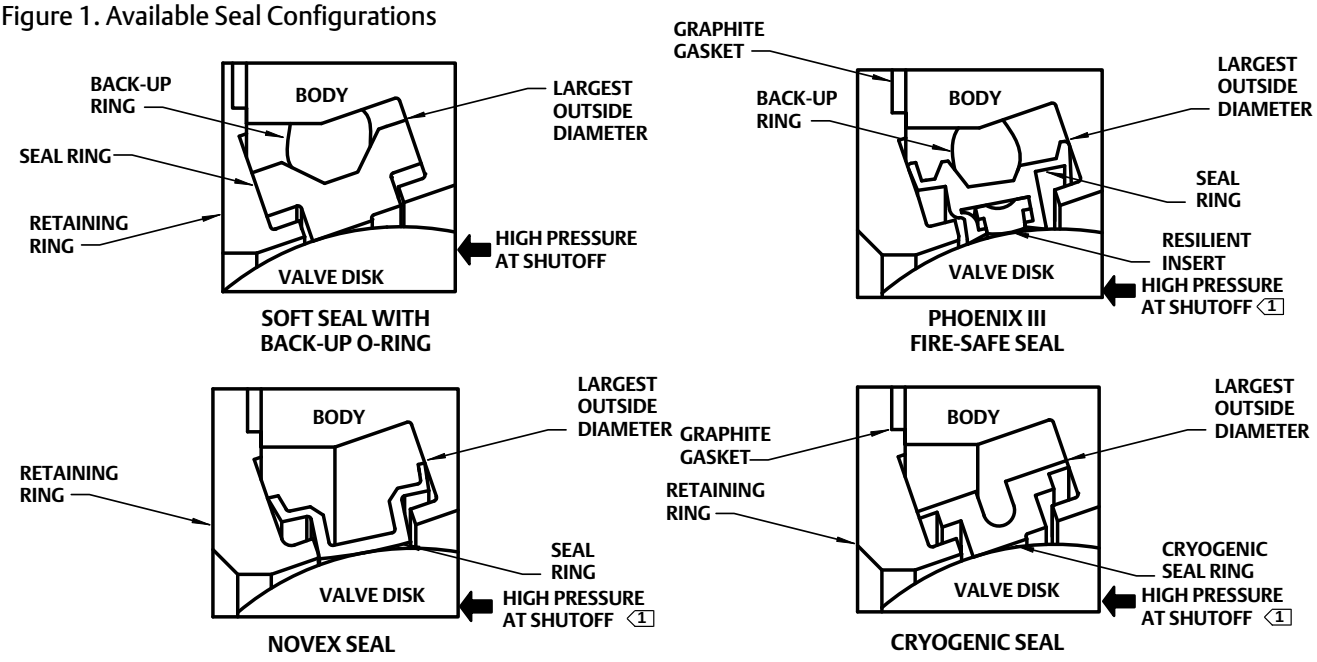
Clockwise (CW) to close

Valve Dimensions and Approximate Weights

See figures 2, 3, and 4
For general packing guidelines, see Bulletin 59.3:042 Packing Selection Guidelines for Rotary Valves (D102093X012)

1. The pressure/temperature limits in this bulletin, and any applicable code or standard limitation, should not be exceeded.

Figure 1. Available Seal Configurations



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.

Installation

Preferred valve orientation for the A11 valve is reverse flow direction. Reverse flow direction is into the side of the valve body opposite the retaining ring or into the shaft side of the disk.

For erosive and many severe service applications, valves with bidirectional seals can and should be installed with the shaft horizontal and in the forward flow direction to prevent direct impingement of the process media on the seal, and to minimize the exposure of the shaft bearings to the process media.

The standard soft seal and the Phoenix III seal both offer bidirectional shutoff. Valves using either metal, NOVEX, or cryogenic seals are unidirectional and must be installed in the reverse flow orientation.

For assistance in selecting the appropriate combination of actuator action and open valve position, consult your Emerson sales office or Local Business Partner.

Dimensions and weights for wafer-style and lugged valves are shown in figures 2, 3, and 4.

Table 1. Material Temperature Ranges

PART NAME	MATERIAL	TEMP °C	TEMP °F
Valve Body(1)	WCC Steel, SA-516-70 or SA-105	-29 to 427	-20 to 800
	CF8M	-254 to 538	-425 to 1000
	CF8M/CF10M (316/316H) dual-certified	over 538 to 816	over 1000 to 1500
	LCC	-45 to 343	-50 to 650
Disk(4)	WCC Steel	-29 to 427	-20 to 800
	CF8M	-254 to 538	-425 to 1000
	CF8M/CF10M (316/316H) dual-certified	over 538 to 816	over 1000 to 1500
Disk Seating Surface Coating	Chrome Plating	-254 to 427	-425 to 800
	Chromium Coat	-254 to 593	-425 to 1100
	Chromium Carbide Coating	-254 to 816	-425 to 1500
Shaft	S17400 (H1025)	-73 to 427	-100 to 800
	S17400 (H1150M)	-196 to 427	-320 to 800
	N05500	-254 to 482	-425 to 900
	N07718	-254 to 704	-425 to 1300
	S20910	-196 to 593	-320 to 1100
	N07750	over 593 to 816	over 1100 to 1500
Bearings(3)	PEEK	-73 to 260	-100 to 500
	PTFE Composition	-254 to 163	-425 to 325
	S31600 (316 SST Nitrided)	-254 to 816	-425 to 1500
	R30006 (Alloy 6)		
Seal Ring	Soft - PTFE	-62 to 232	-80 to 450
	Metal - All	See table 2	
Backup Ring	Used with Soft Seal		
	Fluorocarbon	-29 to 204	-20 to 400
	EPR	-54 to 182	-65 to 360
	Nitrile	-29 to 93	-20 to 200
	Chloroprene	-43 to 149	-45 to 300
	Used with Phoenix III Seal		
	Fluorocarbon	-40 to 232	-40 to 450
	EPR	-62 to 204	-80 to 400
	Nitrile	-40 to 149	-40 to 300
	Chloroprene	-54 to 149	-65 to 300
	Used with Cryogenic Seal		
	Aluminum	-254 to 149	-425 to 300
Packing	PTFE V-Ring	-254 to 232	-425 to 450
	PTFE Live-Loaded	-254 to 232	-425 to 450
	Square Ring Graphite for Oxidizing Service	-254 to 538	-425 to 1000
	Square Ring Graphite for Non-oxidizing Service	-254 to 816	-425 to 1500
	Graphite Live-Loaded	-198 to 315	-325 to 600

1. Special gasket retainer bolts are required for over 538°C (1000° F).
2. Special retaining ring screws for single flange valves over 538°C (1000°F).
3. Special thrust bearings are required for high temperature applications over 343°C (650°F) (with 6 and 12 inch extensions). Constructions with carbon steel valves and SST disks may require special thrust bearings at temperatures greater than 343°C (650°F).
4. At temperatures over 254°C (450°F), the disk material should be the same as the valve body material.

Table 2. Temperature Limits for Metal Seal

SEAL TYPE	PRESSURE RATING	SEAL MATERIAL	MAXIMUM TEMPERATURE LIMITS		BACKUP RING
			°C	°F	
Metal	CL150/150, and 150(2)	S31600 w/ CF8M disk S31600 w/ WCC disk(2)	538 232	1000 450	No
	300	S31600 w/ CF8M disk S31600 w/ WCC disk(2)	816 232	1500 450	No

1. When used with CF8M disks, S20910 is the preferred seal material. When used with WCC disks, S17400 H1150M is the preferred material.
2. For valves with WCC disks at temperatures over 254°C (450°F), contact your Emerson sales office or Local Business Partner for seal material selection.

Table 3. Trim Descriptions - CL150/150, CL150, and CL300

Trim Type	Trim Number	Temperature Range	Disk Material	Disk Edge Coating	Seal Type	Seal Material	Shaft	Bearings	Packing
Standard	550(1)	-29 to 204°C -20 to 400°F	CF8M or WCC	None	Soft	PTFE	S17400 H1025	PEEK	PTFE
	552	-46 to 232°C -50 to 450°F	CF8M or WCC	Chrome Plated	NOVEX(5)	S31600	S17400 H1025	PEEK	PTFE
	554	-40 to 232°C -40 to 450°F	CF8M or WCC	Chrome Plated	Phoenix III	S31600/PTFE	S17400 H1025	PEEK	PTFE
	555	-46 to 316°C -50 to 600°F	CF8M or WCC	Chrome Plated	NOVEX(5)	S31600	S17400 H1025	316 SST Nitrided	Graphite
	556	-46 to 427°C -50 to 800°F	CF8M or WCC	Chromium Coat	NOVEX(5)	S31600	S17400 H1025	316 SST Nitrided	Graphite
High-Temperature	564H(2)	-46 to 427°C -50 to 800°F	CF8M or WCC	Chromium Coat	NOVEX(5)	S31600	S17400 H1025	316 SST Nitrided	Graphite
	566H(3)	–46 to 538°C –50 to 1000°F	CF8M	Chromium Coat	NOVEX(5)	S31600	N07718	316 SST Nitrided	Graphite
Cryogenic	567C(4)	-196 to 163°C -320 to 325°F	CF8M	Chrome Plated	NOVEX(5)	S31600	S17400 H1150M	PTFE Composition	PTFE

1. Trim 550 is furnished as standard trim in all CL150/150, 150, and 300 A11 valves.
2. Trim includes 6-inch shaft extension.
3. Trim includes 12-inch shaft extension.
4. Trim includes Cryogenic shaft extension, see table 4 for extension length.
5. NPS 42 and 48 will have an S31600 metal seal ring in place of the S31600 NOVEX seal ring.

Table 4. Cryogenic Shaft Extension Lengths(1)

CRYOGENIC EXTENSION LENGTH, INCH FOR VALVE BODY SIZE, NPS			
30	**36**	**42**	**48**
36	36	36	36

1. Extension length measured from center of valve body to bottom of packing flange.

Table 5. Dimensions and Weights Wafer and Lugged Style CL150/150

VALVE SIZE, NPS	A		B	C	D	E	F	H	J	K	L	M(1)	R	KEY SQ SIZE	APPROX WEIGHT
	Wafer	Lugged													
	mm														kg
30	864	994	121	559	516	295	95.25	337	See Thread Info Below	76.2	See Thread Info Below	744	57.2	12.7	528
36	1029	1178	149	683	613	295	95.25	337		76.2		888	57.2	12.7	806
42	1207	1356	210	762	695	314	114.3	337		76.2		1032	69.9	15.9	1302
48	1364	1524	229	889	826	314	114.3	305		152		1180	69.9	15.9	1904
	Inches														lbs
30	34.00	39.12	4.75	22.00	20.31	11.62	3.75	13.25	1-1/4-8	3.00	7/8-9	29.30	2.25	1/2	1164
36	40.50	46.38	5.88	26.88	24.12	11.62	3.75	13.25	1-1/2-8	3.00	7/8-9	34.96	2.25	1/2	1778
42	47.50	53.38	8.25	30.00	27.38	12.38	4.5	13.25	1-1/2-8	3.00	7/8-9	40.64	2.75	5/8	2871
48	53.69	60.00	9.00	35.00	32.50	12.38	4.5	12.00	1-1/2-8	6.00	1-1/4-7	46.47	2.75	5/8	4198

1. M dimension is disk chordal swing diameter.

Figure 2. Dimensions Wafer and Lugged Style CL150/150 (also see table 5)

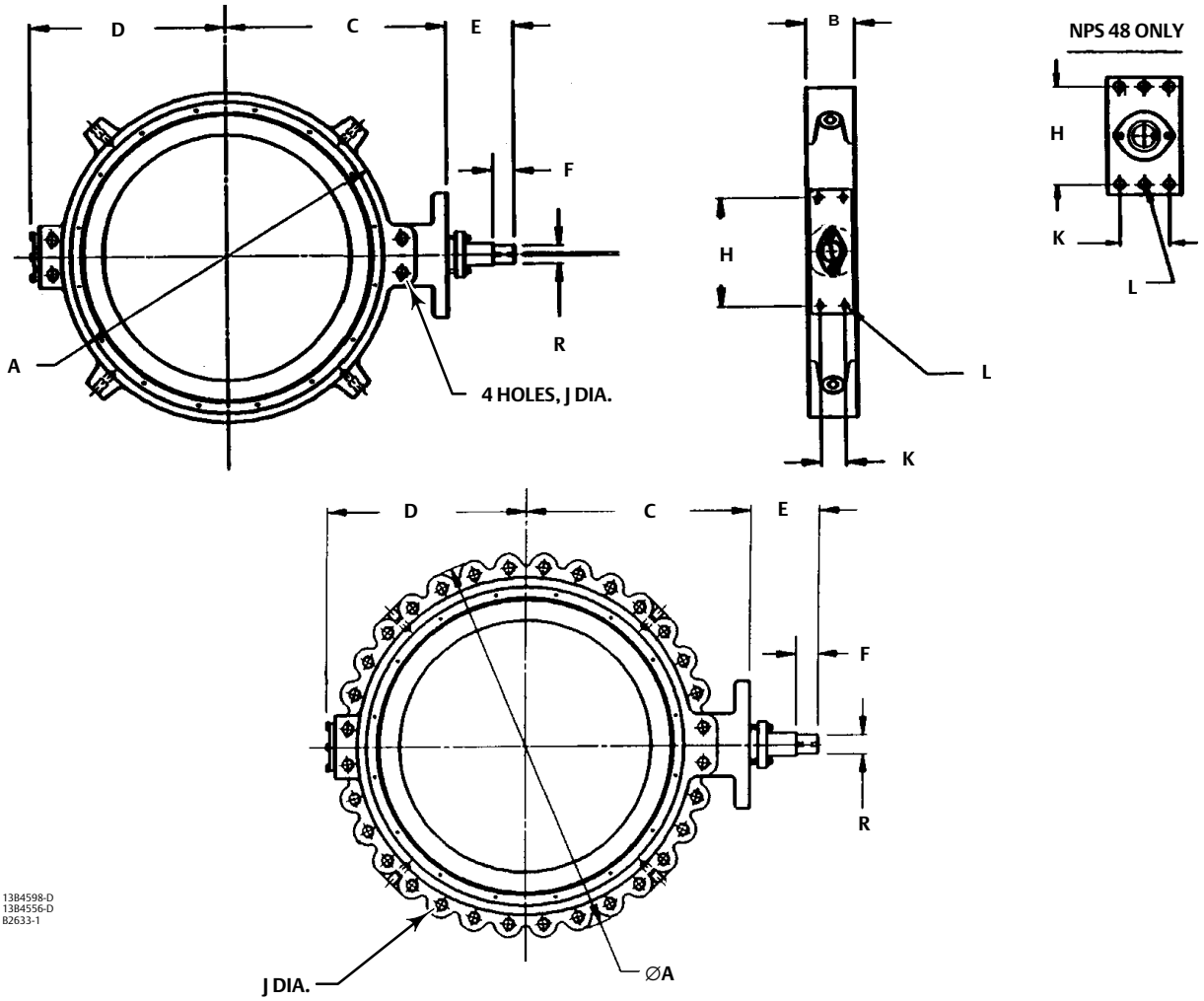


Table 6. Dimensions and Weights Wafer and Lugged Style CL150

VALVE SIZE, NPS	A		B	C	D	E	F	H	J	K	L	M(1)	R	KEY SQ SIZE	APPROX WEIGHT
	Wafer	Single Flange													
	mm														kg
30	866.6	991	158.8	590.6	520.7	314.5	114.3	336.6	See Thread Info Below	76.2	See Thread Info Below	735.8	69.9	15.9	528
36	1031.7	1175	177.8	657.4	619.3	314.5	114.3	304.8		152.4		887.7	69.9	15.9	806
42	1050	1360	228.6	838.2	730.3	314.5	114.3	304.8		152.4		1028.2	69.9	15.9	1302
48	1371.6	1524	260.4	901.7	797.1	314.5	114.3	508.0		203.2		1110.9	69.9	15.9	1904
	Inches														lbs
30	34.12	39.00	6.25	23.25	20.50	12.38	4.5	13.25	1-1/4-8	3.00	7/8-9	28.97	2-3/4	5/8	1164
36	40.62	46.25	7.00	25.88	24.38	12.38	4.5	12.00	1-1/2-8	6.00	1-1/4-7	34.95	2-3/4	5/8	1778
42	47.50	53.56	9.00	33.00	28.75	12.38	4.5	12.00	1-1/2-8	6.00	1-1/4-7	40.48	2-3/4	5/8	2871
48	54.00	60.00	10.25	35.50	31.38	12.38	4.5	20.00	1-1/2-8	8.00	1-1/4-7	46.09	2-3/4	5/8	4198

1. M dimension is disk chordal swing diameter.

Figure 3. Dimensions Wafer and Lugged Style CL150 (also see table 6)

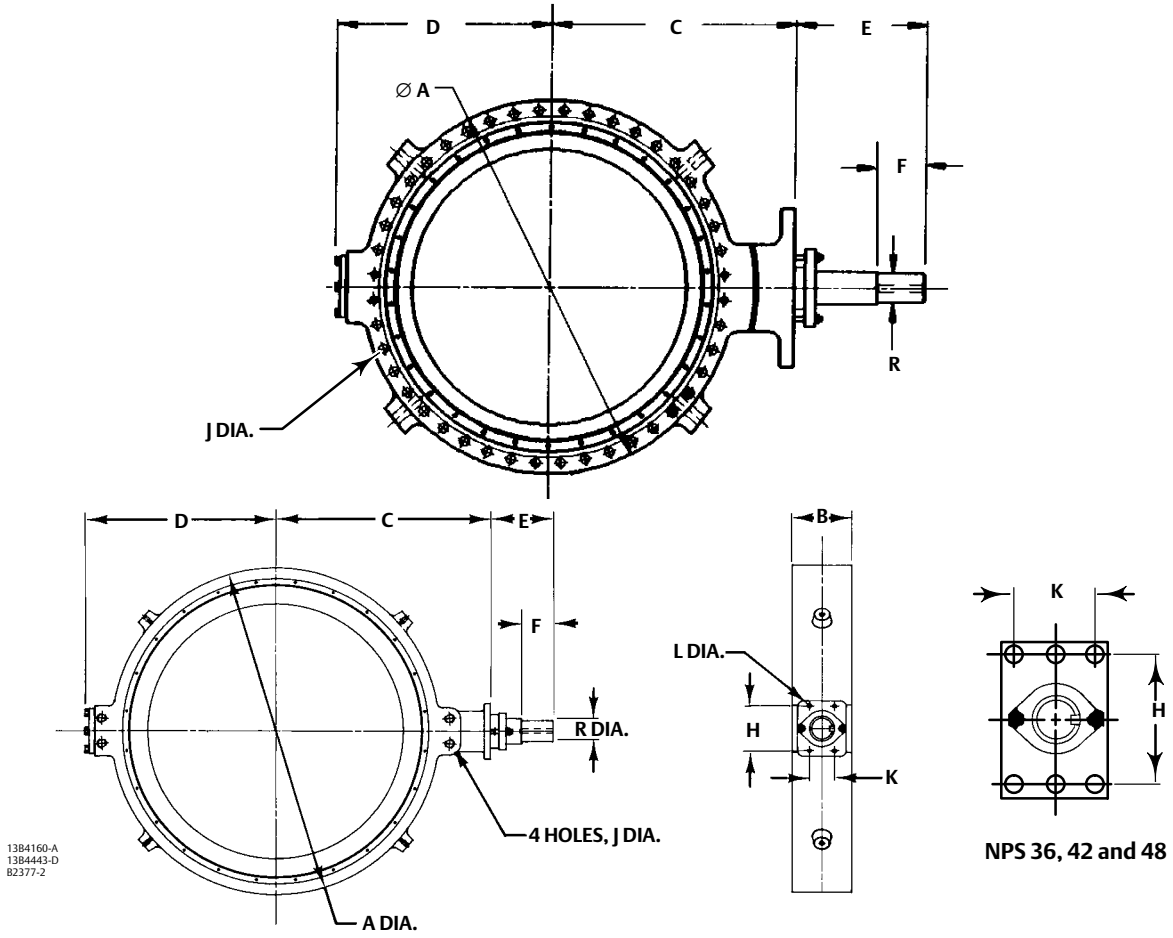
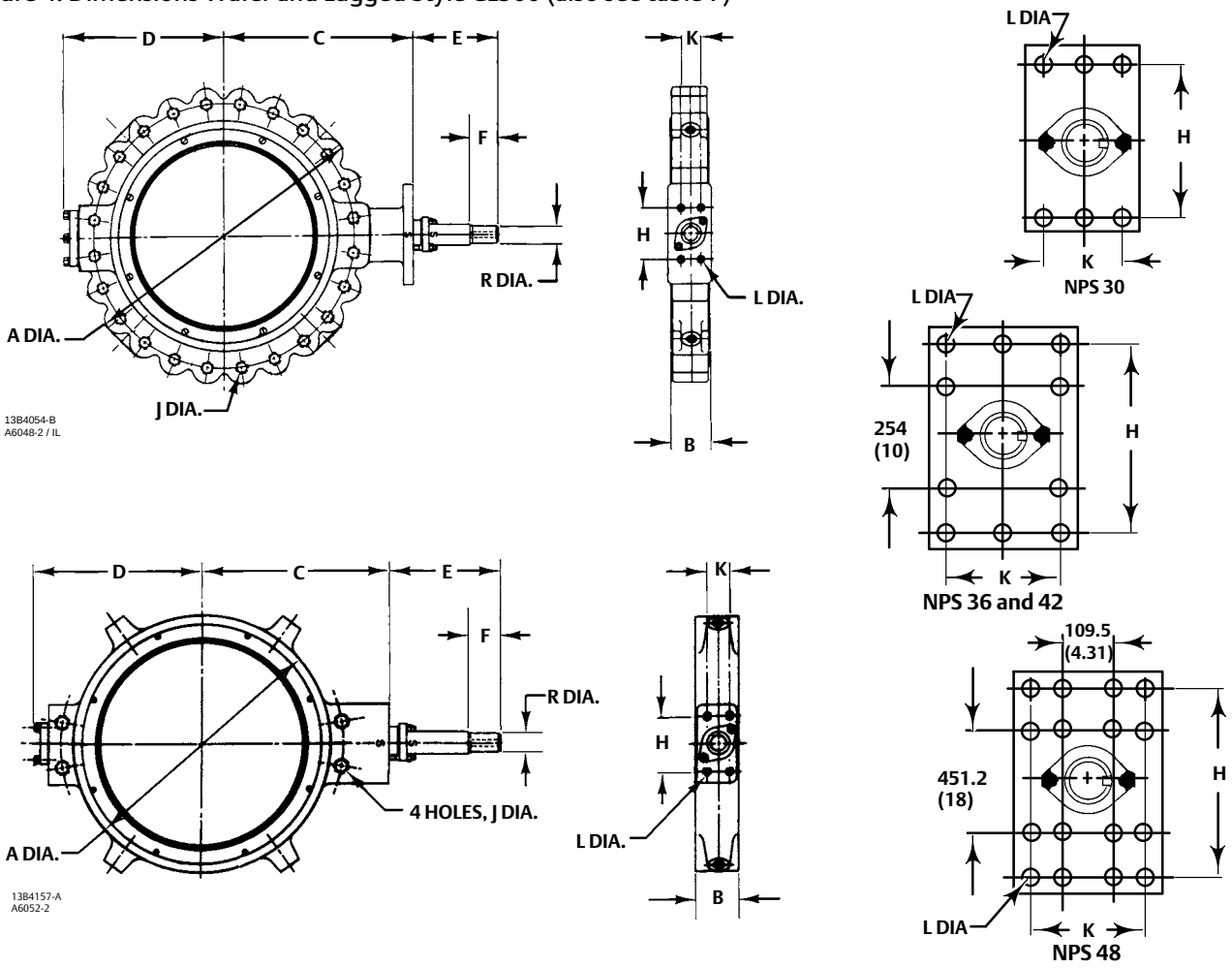


Table 7. Dimensions and Weights Wafer and Lugged Style CL300

VALVE SIZE NPS	A		B	C	D	E	F	H	J	K	L	M(1)	R	KEY SQ SIZE	APPROX WEIGHT
	Wafer	Single Flange													
	mm														kg
30	865	1105	241	648	576	314	114.3	508	See Thread Info Below	203	See Thread Info Below	681	70	15.9	952
36	1035	1286	273	740	675	353	152.4	432		203		838	95	22.2	1315
42	1162	1346	299	867	768	363	163.6	432		203		943	102	25.4	2263
48	1315	1484	422	934	888	497	114.3	660		330		1125	146	38.1	3056
	Inches														lbs
30	34.06	43.50	9.50	25.50	22.69	12.38	4.5	20.00	1-3/4-8	8.00	1-1/4-7	26.80	2-3/4	5/8	2100
36	40.75	50.62	10.75	29.12	26.56	13.88	6	17.00	2-8	8.00	1-1/4-7	32.99	3-3/4	7/8	2900
42	45.75	53.00	11.75	34.12	30.25	14.31	6.44	17.00	1-5/8-8	8.00	1-1/4-7	37.13	4	1	4989
48	51.75	58.44	16.62	36.75	34.94	19.56	4.5	26.00	1-7/8-8	13.00	1-1/4-7	44.29	5-3/4	1-1/2	6738

1. M dimension is disk chordal swing diameter.

Figure 4. Dimensions Wafer and Lugged Style CL300 (also see table 7)



Pressure Drops

Pressure drop limits of any given valve are based on valve body, and trim material limits. To find the appropriate pressure drop limitation, choose the desired valve size and temperature range. Then search table 8 for body limitations and table 9 for trim limitations. Information on limits for S31254, CW2M, M35-1 and other alloy constructions can be obtained by contacting your Emerson sales office or Local Business Partner. The lowest number from the tables is the appropriate limit. **The tables for both trim and body limits must be consulted.**

Table 8. Maximum Allowable Shutoff Pressure Drops (Valve Ratings) Based on Carbon Steel and Stainless Steel Valve Types(1) (The tables for both trim and body limits must be consulted)

TEMPERATURE RANGE	PRESSURE RANGE					
	CL150/150		CL150		CL300	
	WCC	CF8M	WCC	CF8M	WCC	CF8M
°C	Bar					
-254 to -29	---	10.3	---	19.0	---	49.6
-29 to 38	10.3	10.3	20	19.0	51.7	49.6
93	9.3	9.0	17.9	16.2	51.7	42.7
149	8.3	7.9	15.9	14.8	50.3	38.6
204	7.2	7.2	13.8	13.4	48.6	35.5
260	6.2	6.2	11.7	11.7	45.9	33.1
316	5.2	5.2	9.7	9.7	41.7	31.0
343	4.5	4.5	8.6	8.6	40.7	30.3
371	4.1	4.1	7.6	7.6	38.3	30.0
399	3.4	3.4	6.6	6.6	34.8	29.3
427	2.8	2.8	5.5	5.5	28.3	29.0
454	---	2.4	---	4.5	---	29.0
482	---	1.7	---	3.4	---	28.6
510	---	1.4	---	2.4	---	26.5
538	---	0.7	---	1.4	---	25.2
°F	Psi					
-450 to -20	---	150	---	275	---	720
-20 to 100	150	150	290	275	750	720
200	135	130	260	235	750	620
300	120	115	230	215	730	560
400	105	105	200	195	705	515
500	90	90	170	170	665	480
600	75	75	140	140	605	450
650	65	65	125	125	590	440
700	60	60	110	110	555	435
750	50	50	95	95	505	425
800	40	40	80	80	410	420
850	---	35	---	65	---	420
900	---	25	---	50	---	415
950	---	20	---	35	---	385
1000	---	10	---	20	---	365

1. For pressure/temperature rating of other materials, contact your Emerson sales office or Local Business Partner.

Table 9. Maximum Allowable Shutoff Pressure Drops(1)

TRIM NUMBER	TEMPERATURE RANGE	PRESSURE RANGE											
		CL150/150				CL150				CL300			
		Valve Body Size, NPS				Valve Body Size, NPS				Valve Body Size, NPS			
		30	36	42	48	30	36	42	48	30	36	42	48
	°C	Bar											
550	-46 to 38	10.34	10.34	10.34	10.34	32.06	27.85	18.55	12.34	38.47	51.02	46.06	51.02
	38 to 149	10.34	10.34	10.34	10.34	27.58	27.58	18.55	12.34	27.58	27.58	27.58	27.58
	149 to 232	3.447	3.447	3.447	3.447	3.447	3.447	3.447	3.447	3.447	3.447	3.447	3.447
552	-46 to 38	10.34	10.34	10.34	10.34	29.72	23.72	16.27	11.17	32.82	45.44	41.23	61.64
	38 to 149	10.34	10.34	10.34	10.34	25.72	23.72	16.27	11.17	32.82	45.44	41.23	61.64
	149 to 232	10.34	10.34	10.34	10.34	24.2	23.72	16.27	11.17	32.82	45.44	41.23	61.09
554	-46 to 38	10.34	8.136	10.34	4.964	21.24	16	9.584	5.792	26.48	35.78	31.37	48.06
	38 to 149	10.34	8.136	10.34	4.964	17.93	16	9.584	5.792	26.48	35.78	31.37	39.64
	149 to 232	10.34	8.136	10.34	4.964	16.75	16	9.584	5.792	20.68	20.68	20.68	20.68
555, 556	-46 to 38	10.34	10.34	10.34	7.722	22.75	16.62	11.45	7.653	22.75	32.47	29.51	44.33
	38 to 149	10.34	10.34	10.34	7.722	19.65	16.62	11.45	7.653	22.75	32.47	29.51	44.33
	149 to 232	10.34	10.34	10.34	7.722	18.48	16.62	11.45	7.653	22.75	32.47	29.51	44.33
	232 to 316	10.34	10.34	10.34	7.722	17.65	16.96	11.45	7.653	22.75	32.47	29.51	44.33
556	316 to 427	10.34	10.34	10.34	7.446	16.89	16.62	11.17	7.446	22.75	32.47	29.51	44.33
564H, 566H	343 to 427	10.34	10.34	10.34	7.722	16.89	16.96	11.45	7.653	22.75	32.54	29.51	44.33
564H(2), 566H	427 to 538	10.34	10.34	10.34	7.722	24.55	16.96	11.45	7.653	22.75	32.54	29.51	44.33
567C	-196 to -46	10.34	10.34	10.34	10.34	26.34	28.89	20.82	14.34	41.78	55.23	46.61	56.95
	-46 to 149	10.34	10.34	10.34	10.34	17.24	22.89	16.89	14.34	41.78	43.99	36.89	45.23
TRIM NUMBER	°F	Psi											
550	-50 to 100	150	150	150	150	465	404	269	179	558	740	668	740
	100 to 300	150	150	150	150	400	400	269	179	400	400	400	400
	300 to 450	50	50	50	50	50	50	50	50	50	50	50	50
552	-50 to 100	150	150	150	150	431	344	236	162	476	659	598	894
	100 to 300	150	150	150	150	373	344	236	162	476	659	598	894
	300 to 450	150	150	150	150	351	344	236	162	476	659	598	886
554	-50 to 100	150	118	150	72	308	232	139	84	384	519	455	697
	100 to 300	150	118	150	72	260	232	139	84	384	519	455	575
	300 to 450	150	118	150	72	243	232	139	84	300	300	300	300
555, 556	-50 to 100	150	150	150	112	330	241	166	111	330	471	428	643
	100 to 300	150	150	150	112	285	241	166	111	330	471	428	643
	300 to 450	150	150	150	112	268	241	166	111	330	471	428	643
	450 to 600	150	150	150	112	256	246	166	111	330	471	428	643
556	600 to 800	150	150	150	108	245	241	162	108	330	471	428	643
564H, 566H	650 to 800	150	150	150	112	245	246	166	111	330	472	428	643
564H(2), 566H	800 to 1000	150	150	150	112	356	246	166	111	330	472	428	643
567C	-320 to -50	150	150	150	150	382	419	302	208	606	801	676	826
	-50 to 300	150	150	150	150	250	332	245	208	606	638	535	656

1. Consult your Emerson sales office or Local Business Partner if higher pressure drops are required.
2. Trim 564H with optional N07718 shaft for temperatures up to 482°C. (1000°F).

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