

Model 380, 381, 382 Control Valves

Technical Sales Bulletin



Figure 1 Model 380 Control Valve with DFC Actuator

The Dyna-Flo 380 series of valves are heavy duty globe style control valves designed for high pressure applications. These valves are used in all kinds of demanding applications, including oil and gas production and chemical process.

Both Models 380 and 381 are cage guided control valves with balanced plugs. Model 380 control valves are capable of Class V shutoff at process temperatures below 450°F (232°C). Model 381 control valves are well suited for general applications that do not require tight shutoff. Model 382 control valves are top guided valves with an unbalanced plug capable of Class V shutoff.

380 Series control valves can be used in either snap on/off acting or throttling applications of either liquids or gasses. A bolted bonnet is standard and a typical actuator is a Dyna-Flo Model DFC or DFO linear actuator.

Features

High Quality Construction

Dyna-Flo uses only materials that have been proven to provide superior, trouble free performance. All materials comply with ASME and ASTM specifications.

Versatility

A wide range of trim options including Low Noise and Anti-Cavitation make the 380 a highly versatile control valve.

Field Service Friendly

No special tools are required to change or inspect trim. Top access makes in-line service easy.

Industrial High Quality External Coatings

Our standard industrial high quality external coatings provide long lasting resistance to the harshest environments.

Pressure Drop Capabilities

The Model 380 can shut off against inlet pressure equal to ASME B16.34 rating.

Sour Gas Service Capability

The 380 Series can be constructed out of materials that comply with the recommendations of the National Association of Corrosion Engineers (NACE) MR-0175.

Shut Off Classification

Seat leakage options range from ASME / FCI class II to class V.

Emissions Reducing Packing

Help prevent the loss of process media and reduce packing maintenance with the use of Dyna-Flo's Live Loaded PTFE packing systems.

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SPECIFICATIONS

Configurations

See Table 1

Consult your Dyna-Flo sales office for other available configurations.

Sizes and Connection Styles

Models 380, 381, 382

Size: 3" & 4"

Rating: ASME 2500

Connections: RF / RTJ

Maximum Inlet Temperatures and Pressures

Consistent with ASME class rating as per ASME B16.34, unless limited by either material, pressure or temperature limitations. For pressure / temperature charts see Figure 4.

Maximum Pressure Drops

Same as maximum inlet pressure unless otherwise rated by specific trim construction.

Standard Seat Leakage Classifications

See Table 1.

Dimensions

Valve Dimensions

See Table 3 & 4.

Valve Dimensions

See Figure 2.

Approximate Valve Body Weights

See Table 2.

Valve Body to Bonnet Bolting

Standard service body to bonnet:

B7 Studs

2H Nuts

Characteristics

- Equal Percentage (Standard)
- Modified Equal Percentage (Same cage as Equal Percentage, different travel)
- Linear
- Anti-Cavitation 3-Stage

Flow Direction

- Model 380 - Flow Down
- Model 381 - Flow Down
- Model 382 - Flow Up

Packing Type

The standard packing is PTFE V-Ring. Live loaded low emission, graphite and other packing arrangements are also available.

Valve Sizing Coefficients

See Table 7 & 8.

Valve Travel and Yoke Boss Sizes

See Table 9.

Trim Materials

See Table 10.

Valve Bolting Temperature Limitations

See Table 11.

Valve Parts List, Material and Temperature Limitations

See Table 5, 6, 10, & 11.

See Figure 3, 4, 5, & 6.

For more information and other options contact your Dyna-Flo sales office.

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Table 1

Valve Design Configurations

Valve Model	Size (inch)	Shut Off Class Capability	Valve Plug	Guide	Seat
380	3 & 4	IV Standard	Balanced	Cage	Metal
	3 & 4	V Optional Standard For Anti-Cavitation Trim	Balanced	Cage	Metal
381	3	II Standard	Balanced	Cage	Metal
	3	III Optional	Balanced	Cage	Metal
	4	V Standard	Balanced	Cage	Metal
382	3 & 4	IV Standard	Unbalanced	Top	Metal
	3 & 4	V Optional Standard For Anti-Cavitation Trim	Unbalanced	Top	Metal

Table 2

Approximate Weights lb (kg)

Valve Size (inch)	Class	Body Flanged
3	2500	286 (130)
4	2500	510 (231)

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Table 3

Standard Valve Dimensions

Inches (mm) (Refer to Figure 2)

Valve Size	ASME Class	Dimension	
		A	B
3"	2500 RF	19.62 (498)	5.69 (145)
	2500 RTJ	19.88 (505)	5.69 (145)
4"	2500 RF	22.62 (575)	6.62 (168)
	2500 RTJ	23.00 (584)	6.62 (168)

Table 4

Dimension C for Standard Bonnet Diameters

Inches (mm) (Refer to Figure 2)

Valve Size (Inch)	Dimension C		
	2-13/16 (71) Yoke Boss Diameter	3-9/16 (90) Yoke Boss Diameter	5 (127) Yoke Boss Diameter
3	13.19 (335)	13.19 (335)	14.62 (371)
4	—	13.69 (348)	16.00 (406)

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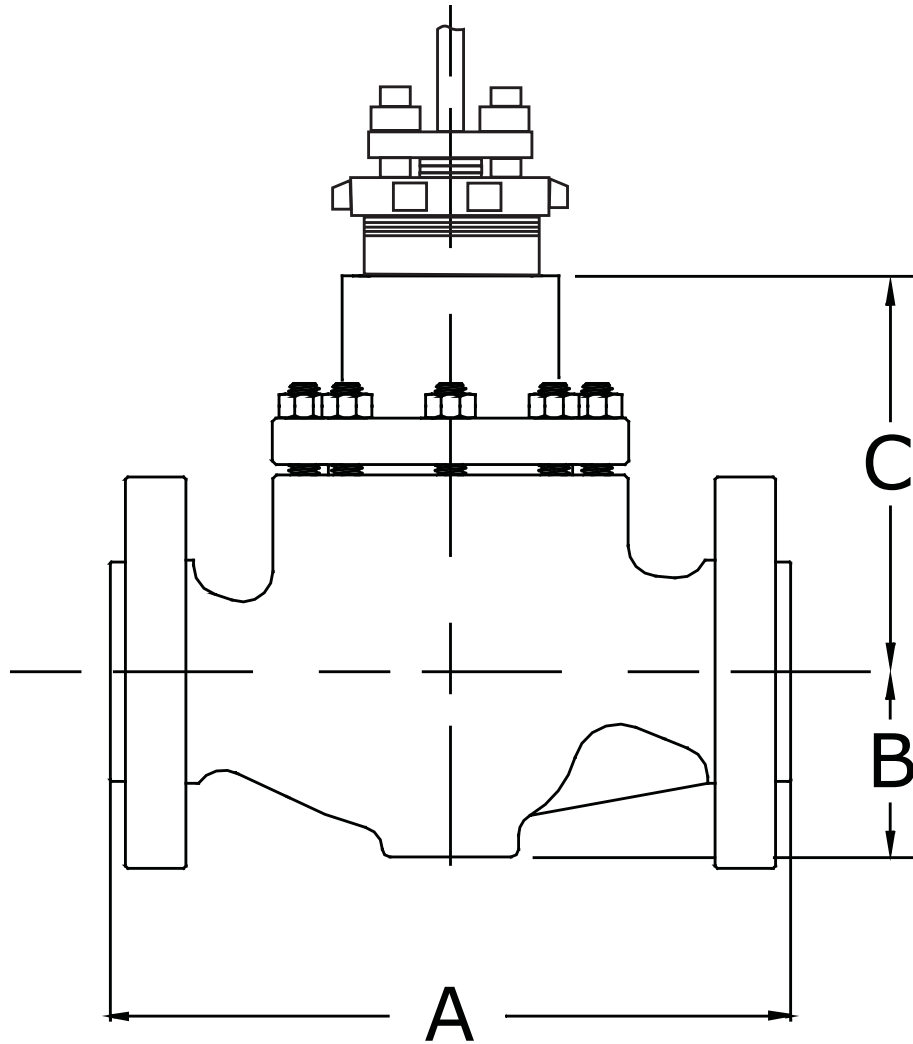


Figure 2 Typical Valve Dimension Diagram



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Table 5

Typical Construction Materials

Key	Part Description	Standard Construction	NACE Construction
1	BODY	LCC	LCC
2	BONNET	LCC	LCC
3	PACKING BOX RING	S31600*	S31600*
4	PACKING SPRING	S30400	-
5	LANTERN RING	-	S31600*
6	RETAINING RING	S30200	S30200
7	SPECIAL WASHER	S30400	-
8	V-RING PACKING SET	PTFE	PTFE (Double)
9	PACKING FOLLOWER	S31600*	S31600*
10	STEM WIPER	FELT	FELT
11	CAGE	S17400	S17400 DH1150
12	VALVE PLUG - STEM ASSEMBLY	S41600 HT PLUG - S20910 STEM	S31600* with Alloy 6 SEAT & GUIDE - S20910 Stem
13	SEAT RING	S41600 HT	S31600* / Alloy 6
14	SEAL RING - PISTION RING	CPTFE - R30003	CPTFE - R30003
15	BACKUP RING	S31600*	S31600*
16	PACKING FLANGE	CARBON STEEL (PLATED)	CARBON STEEL (PLATED)
17	PACKING NUT	2H	2H
18	PACKING STUD	B7	B7
19	BONNET STUD	B7	B7M
20	BONNET NUT	2H	2HM
21	SEAT RING O-RING	FLUROELASTOMER	FLUROELASTOMER
21A	SEAT RING GASKET	N06600 / GRAPHITE	N06600 / GRAPHITE
22	BONNET GASKET	N04400	N04400
22A	CAGE GASLET	N04400	N04400
23	SEAT RING RETAINER	S17400 DH1150	S17400 DH1150
24	PISTONG RING	GRAPHITE	GRAPHITE

* All S31600 barstock is dual grade S31600/S31603 (316/316L).

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Table 6

Typical Construction Materials Continued

Key	Part Description	Standard CF8M Construction
1	BODY	CF8M
2	BONNET	CF8M
3	PACKING BOX RING	S31600*
4	PACKING SPRING	-
5	LANTERN RING	S31600*
6	RETAINING RING	S30200
7	SPECIAL WASHER	-
8	PACKING SET	PTFE (Double)
9	PACKING FOLLOWER	S31600*
10	UPPER WIPER	FELT
11	CAGE	S31600* / ENC
12	VALVE PLUG - STEM ASSEMBLY	S31600* with Alloy 6 SEAT & GUIDE - S20910 Stem
13	SEAT RING	S31600* / Alloy 6
14	SEAL RING - PISTON RING	CPTFE - R30003
15	BACKUP RING	S31600*
16	PACKING FLANGE	CARBON STEEL (PLATED)
17	PACKING NUT	8M
18	PACKING STUD	B8M
19	BONNET STUD	B8M
20	BONNET NUT	8M
21	SEAT RING O-RING	FLUOROELASTOMER
21A	SEAT RING GASKET	N06600 / GRAPHITE
22	BONNET GASKET	N04400
22A	CAGE GASKET	N04400
23	SEAT RING RETAINER	S17400 DH1150
24	PISTON RINGS (381 only)	GRAPHITE

* All S31600 barstock is dual grade S31600/S31603 (316/316L).

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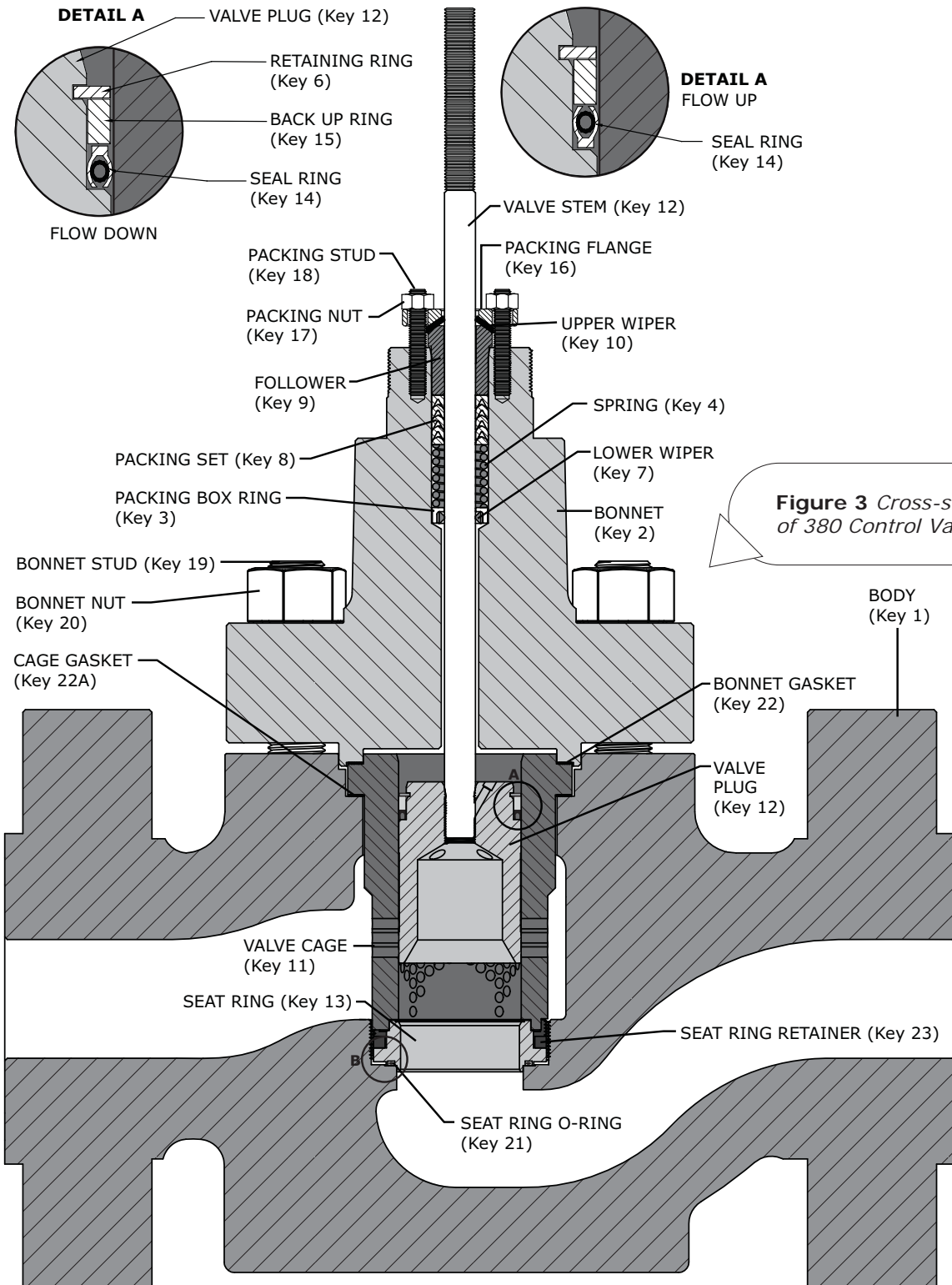
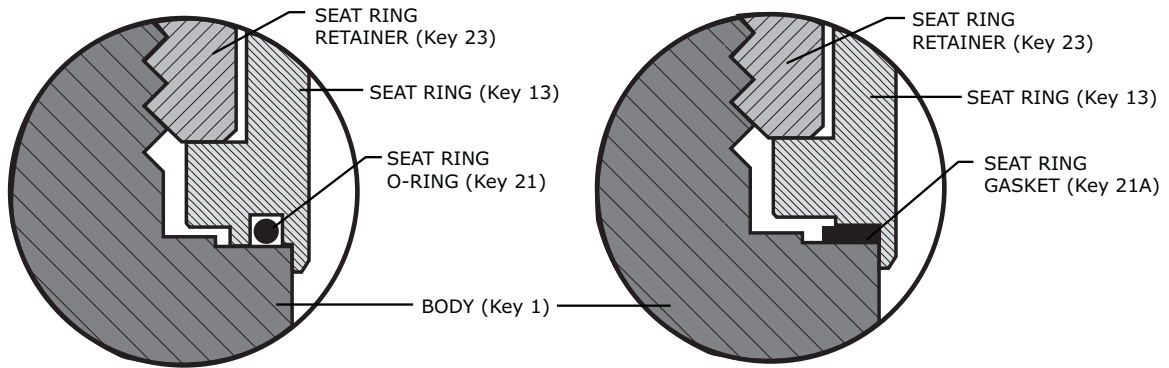


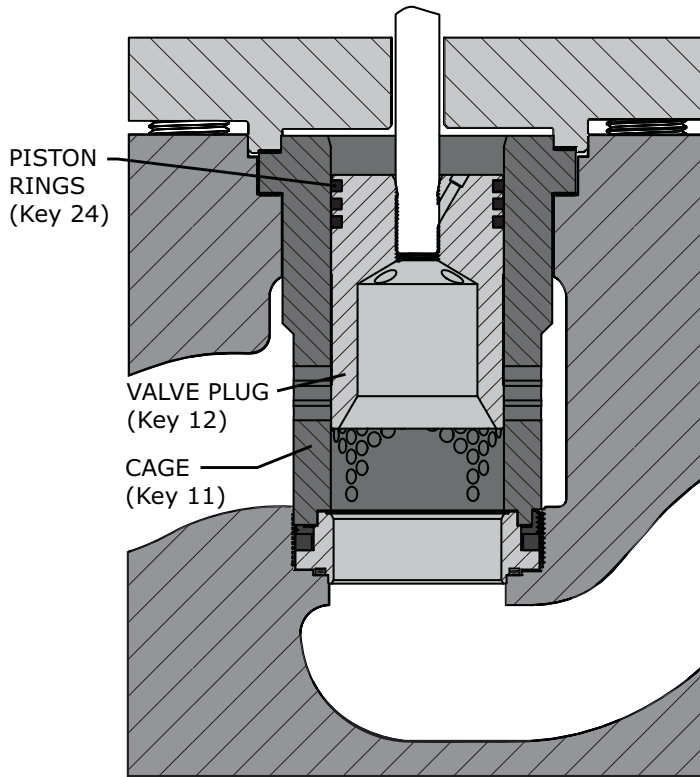
Figure 3 Cross-section of 380 Control Valve

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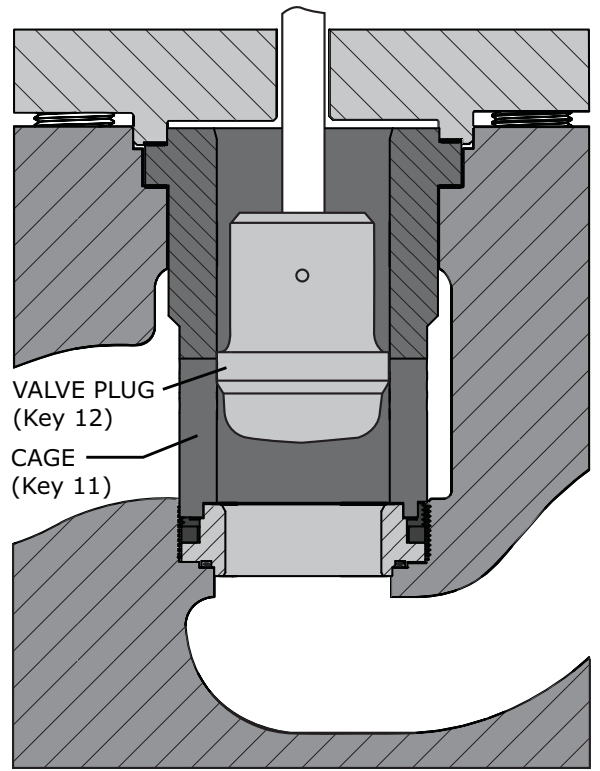
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Figure 4 Detail B - Seat Ring Gasket Options



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Figure 5 Model 381



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Figure 6 Model 382

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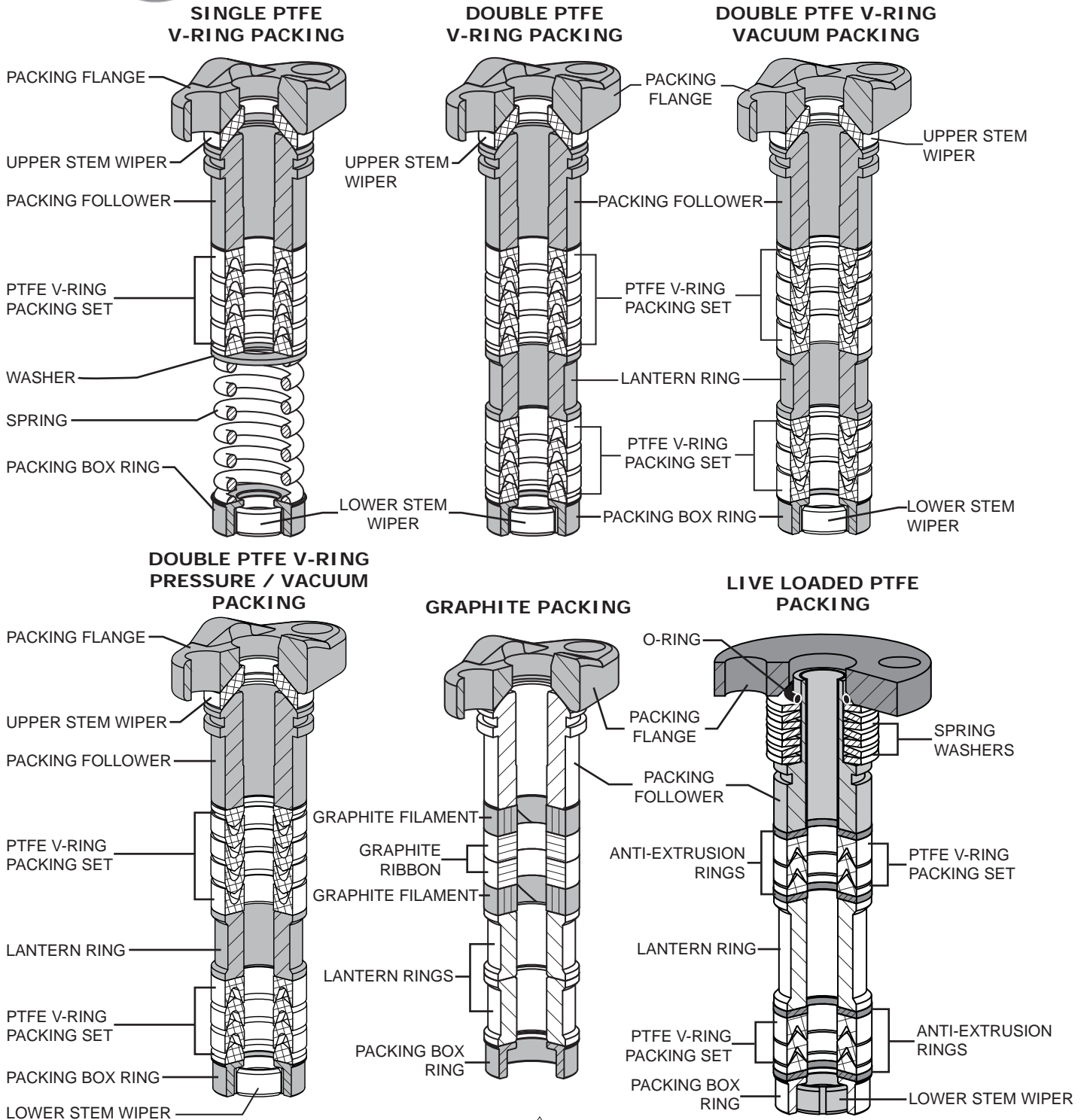


Figure 7 Typical Packing Arrangements

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Table 7

Models 380 & 381 Valve Sizing Coefficients

Linear - Flow Down

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/2 (38.1)	C_v	2.76	13.1	31.0	47.3	59.6	68.5	75.3	80.5	83.8	85.8
			X_T	0.684	0.573	0.611	0.667	0.713	0.730	0.734	0.717	0.700	0.705
			F_L	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
4"	3-5/8 (92.1)	2 (50.8)	C_v	2.98	17.2	38.0	57.6	78.7	100	119	130	136	139
			X_T	0.755	0.623	0.570	0.532	0.558	0.631	0.680	0.705	0.696	0.688
			F_L	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88

Equal Percent - Flow Down

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/8 (28.6)	C_v	1.72	2.76	5.33	9.70	15.5	23.2	33.6	46.1	56.9	65.4
			X_T	0.869	0.711	0.604	0.580	0.615	0.647	0.638	0.631	0.669	0.747
			F_L	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
4"	2-7/8 (73)	1-1/2 (38.1)	C_v	2.56	6.52	10.0	12.4	17.2	25.1	33.8	42.7	59.5	81.0
			X_T	0.782	0.584	0.588	0.596	0.565	0.532	0.517	0.525	0.525	0.536
			F_L	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84

Modified Equal Percentage - Flow Down

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/2 (38.1)	C_v	1.93	4.27	9.65	18.1	29.8	45.3	60.4	68.9	74.6	80.9
			X_T	0.804	0.638	0.592	0.623	0.667	0.671	0.675	0.752	0.777	0.709
			F_L	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
4"	2-7/8 (73)	2 (50.8)	C_v	2.98	9.00	12.6	19.6	30.3	44.4	65.8	96.2	114	126
			X_T	0.680	0.576	0.592	0.557	0.525	0.517	0.543	0.596	0.692	0.692
			F_L	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

For quick opening valve characteristics please contact Dyna-Flo Relationships of Note:

$$C_1 = 39.76 \sqrt{X_T}$$

$$C_G = C_v C_1$$

$$K_M = F_L^2$$

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Table 8

Models 382 Valve Sizing Coefficients - Flow Up

Linear - Flow Up

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/2 (38.1)	C _v	2.99	11.6	28.2	45.6	58.7	67.8	75.4	82.1	86.3	88.5
			X _T	0.705	0.663	0.696	0.711	0.731	0.730	0.726	0.711	0.688	0.680
			F _L	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
4"	3-5/8 (92.1)	2 (50.8)	C _v	2.91	15.0	30.5	48.5	68.0	86.7	103	116	123	125
			X _T	0.747	0.818	0.791	0.635	0.622	0.696	0.778	0.796	0.787	0.796
			F _L	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91

Equal Percent - Flow Down

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/8 (28.6)	C _v	1.93	2.85	5.08	9.01	14.8	22.5	32.0	43.0	53.8	64.6
			X _T	0.809	0.756	0.680	0.670	0.705	0.705	0.667	0.651	0.722	0.760
			F _L	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
4"	2-7/8 (73)	1-1/2 (38.1)	C _v	2.34	6.14	9.07	11.2	15.3	22.0	30.2	40.0	53.8	69.5
			X _T	0.855	0.680	0.620	0.655	0.643	0.596	0.554	0.554	0.576	0.631
			F _L	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

Modified Equal Percentage - Flow Down

Valve Size	Port Inches (mm)	Travel Inches (mm)	Coefficient	Percentage of Valve Travel									
				10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3"	2-5/16 (58.7)	1-1/2 (38.1)	C _v	2.10	4.15	8.96	16.8	28.3	42.4	55.7	68.0	78.4	84.0
			X _T	0.826	0.709	0.673	0.730	0.722	0.688	0.730	0.765	0.724	0.705
			F _L	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
4"	2-7/8 (73)	2 (50.8)	C _v	2.74	8.61	11.7	16.5	26.8	42.3	59.7	78.8	106	116
			X _T	---	0.607	0.635	0.639	0.568	0.538	0.576	0.663	0.692	0.778
			F _L	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88

For quick opening valve characteristics please contact Dyna-Flo Relationships of Note:

$$C_1 = 39.76 \sqrt{X_T}$$

$$C_G = C_V C_1$$

$$K_M = F_L^2$$

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Table 9

Model 380 Port Diameters, Valve Plug Travel and Yoke Boss Diameter

Valve Size Inch	Port Diameter Inch (mm)	Max Valve Travel Inch (mm)	Yoke Boss Diameter Inch (mm)	
			Stem	Valve
3" Linear & Mod. Equal Percent	2-5/16 (58.7)	1-1/2 (38.1)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
3" Equal Percent	2-5/16 (58.7)	1-1/8 (28.6)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
3" Linear Anti-Cavitation 2-Stage	1-7/8 (47.6)	2.5 (64)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
3" Linear Anti-Cavitation 3-Stage	1-5/16 (33.3)	2.5 (64)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Linear & Mod. Equal Percent	2-7/8 (73)	2 (50.8)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Equal Percent	2-7/8 (73)	1-1/2 (38.1)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Linear Anti-Cavitation 2-Stage	2-7/8 (73)	2-3/4 (70)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Linear Anti-Cavitation 3-Stage	2-5/16 (58.7)	2-3/4 (70)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)

Model 381 & 382 Port Diameters, Valve Plug Travel and Yoke Boss Diameter

Valve Size Inch	Port Diameter Inch (mm)	Max Valve Travel Inch (mm)	Yoke Boss Diameter Inch (mm)	
			Stem	Valve
3" Linear & Mod. Equal Percent	2-5/16 (58.7)	1-1/2 (38.1)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
3" Equal Percent	2-5/16 (58.7)	1-1/8 (28.6)	1/2 (12.7)	2-13/16 (71.4)
			3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Linear & Mod. Equal Percent	2-7/8 (73)	2 (50.8)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)
4" Equal Percent	2-7/8 (73)	1-1/2 (38.1)	3/4 (19.1)*	3-9/16 (90.5)*
			1 (25.4)	5 (127)

NOTE: * - Standard Dimensions



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Table 10

Common Trim Options and Temperature Ratings

Trim Spec ⁴	Valve Plug	Stem	Cage	Seat Ring	Minimum ³ Temperature	Maximum Temperature
					°F (°C)	°F (°C)
S	S41600 HT	S20910	S17400 PH	S41600 HT	-20 (-29)	650 (343) ¹
N	S31600 ⁵ / Alloy 6 Seat and Guide	S20910	S17400 PH DH1150	S31600 ⁵ / Alloy 6	-50 (-46)	650 (343)
C	S31600 ⁵ / Alloy 6 Seat and Guide	S20910	S31600 ⁵ ENC	S31600 ⁵ / Alloy 6	-50 (-46) ²	750 (399) ²

- 1 Maximum temperature limited by body material (LCC body temperature limitation shown).
- 2 Check body material temperature limitations.
- 3 Temperatures need to be considered when specifying trim materials for elevated temperatures in corrosive environments, consult factory for further information.
- 4 Trim Spec relates to Model Numbering System on Page 14.
- 5 All S31600 barstock is dual grade S31600/S31603 (316/316L).

NOTE: Bonnet Bolting refer to Table 12.

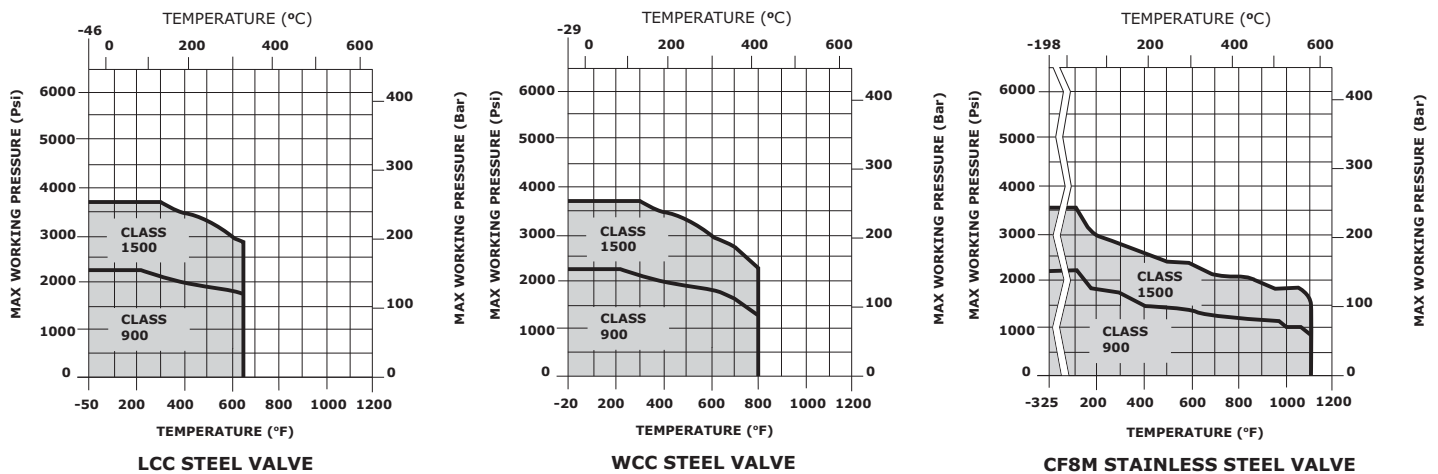


Figure 8 Pressure / Temperature Charts as per ASME B16.34

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Table 11

Materials and Temperature Limits For Parts other than Valve Body and Trim

Part	Material	Minimum Temperature	Maximum Temperature
Backup Ring	S31600*	-325°F (-198°C)	1100°F (593°C)
Retaining Ring	S30200	-425°F (-254°C)	1100°F (593°C)
Seal Ring	PTFE with R30003 Spring	-100°F (-73°C)	450°F (232°C)
Piston Ring	Graphite	-425°F (-254°C)	800°F (427°C)
Cage Gasket	N04400	-325°F (-198°C)	800°F (427°C)
Seat Ring O-Ring	Ethylene-propylene (Anti-Cavitation, NACE)	-40°F (-40°C)	450°F (232°C)
	Nitrile (Standard, NACE)	-20°F (-29°C)	225°F (107°C)
	Fluorocarbon (not for water or steam service) (NACE)	-10°F (-23°C)	400°F (204°C)
Seat Ring Gasket	N06600 / Graphite	-400°F (-240°C)	800°F (427°C)
Packing	PTFE V-Ring	-40°F (-40°C)	450°F (232°C)
	Graphite Ribbon / Filament	-425°F (-254°C)	1000°F (537°C)
Body to Bonnet Studs	B7M (with LCC Body)	-50°F (-46°C)	700°F (371°C)
	B7M (with WCC Body)	-20°F (-29°C)	800°F (427°C)
	B7M (with CF8M Body)	-50°F (-46°C)	450°F (232°C)
	B7 (with LCC Body)	-50°F (-46°C)	650°F (343°C)
	B7 (with WCC Body)	-20°F (-29°C)	800°F (427°C)
	B7 (with CF8M Body)	-55°F (-48°C)	450°F (232°C)
Body to Bonnet Nuts	2HM (with LCC Body)	-50°F (-46°C)	700°F (371°C)
	2HM (with WCC Body)	-20°F (-29°C)	800°F (427°C)
	2HM (with CF8M Body)	-50°F (-46°C)	450°F (232°C)
	2H (with LCC Body)	-50°F (-46°C)	650°F (343°C)
	2H (with WCC Body)	-20°F (-29°C)	800°F (427°C)
	2H (with CF8M Body)	-55°F (-48°C)	450°F (232°C)

* All S31600 barstock is dual grade S31600/S31603 (316/316L).

Our Commitment to Quality

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MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: **380-3DJ-L3FGS-EP-X**

VALVE MODEL						380
380	370	381	381	382	382	
VALVE SIZE						3
3	3 INCH	4	4 INCH			
ASME RATING						D
D	2500					
END CONNECTION						J
F	RF	J	RTJ			
BOLTING						-
-	B7 / 2H (STANDARD)	A	B7M / 2HN	B	B8M / 8M	
C	S17400 DH1150 / 2HM					
BODY MATERIAL						L
L	LCC	W	WCC	M	CF8M	
YOKE BOSS SIZE						2
2	2-13/16"	3	3-9/16"	5	5"	
PORT SIZE						2
F	FULL PORT	R	REDUCED PORT			
SEAT RING STYLE						2
2	O-RING STYLE	3	GASKET SYTLE			
TRIM						S
S	STANDARD	C	CF8M CONSTRUCTION	N	NACE / LOW TEMP.	
CHARACTERISTIC						E
E	EQUAL PERCENT	L	LINEAR	2	ANTI-CAVITATION 2 STAGE	
C	ANTI-CAVITATION 3 STAGE			M	MODIFIED EQUAL PERCENT	
PACKING STYLE						P
P	SINGLE PTFE V-RING (PRESSURE)			J	DOUBLE PTFE V-RING (PRESSURE)	
G	SINGLE GRAPHITE (PRESSURE)			V	DOUBLE PTFE V-RING (VACUUM)	
R	DOUBLE PTFE V-RING (VACUUM / PRESSURE)			L	LIVE LOADED PTFE V-RING (PRESSURE)	
T	LIVE LOADED GRAPHITE (PRESSURE)			D	LIVE LOADED DUPLEX (PRESSURE)	
SPECIAL						X
X	SPECIAL					

NOTE: Modified Equal Percent is a factor of travel and requires no special parts or trim options that differ from Equal Percent.