

Model 2000 Control Valves

Technical Sales Bulletin



Figure 1 Dyna-Flo Model DF2000 with DFC Actuator

The Model DF2000 Control Valves are heavy duty globe style control valves used in all kinds of demanding oil and gas applications, from well head to gas plant and beyond.

The Model DF2000 control valves are post guided, single port valves that can be used for either throttling or on-off control of either liquids or gasses.

The actuator for the Model DF2000 valve is typically a Dyna-Flo Model DFC or DFO linear actuators. These heavy duty actuators are spring return diaphragm style, and can be used with or without a valve positioner.

The Model DF2000 control valves are manufactured to a high level of quality specifications to ensure superior performance and customer satisfaction.

Features

Configuration

Globe valve with screwed-on bonnet, unbalanced, post-guided valve plug, screwed-in metal seat ring construction, and push-down-to close valve plug action.

Low Temperature Construction Standard

Grade LCC low temperature steel, rated to -50°F (-46°C), is standard for the valve body and bonnet.

Severe Service Capable

Constructions are available for service in very erosive applications using a valve plug with a tungsten carbide tip and a seat ring with a full-bore tungsten carbide insert.

Valve Sizes and Flange Ratings

The Model DF2000 is available in a 1" and 2" body size, with NPT, RF, or RTJ end connections, in ASME Class 150-2500.

Easy Maintenance

The screwed bonnet/body joint, and seat ring allow repair or maintenance with a minimum of tools.

Shut Off Capability

The standard shut off classification is ANSI/FCI 70.2 and IEC 60534-4 Class IV. Class V is a readily available option.

Superior Construction

The latest in CNC manufacturing and the heavy duty design positively align the valve plug in the seat ring for high pressure drop applications.

NACE Service Capability is Standard

The standard construction materials comply with the recommendations of the National Association of Corrosion Engineers (NACE) MR0175, 2002.



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SPECIFICATIONS

Valve Size, Flange Ratings, and Connections

Size: 1" and 2" (Globe and Angle Body).
Rating: ASME 150/300/600/900/1500/2500.
Connections: RF / RTJ / NPT.

Rated Inlet Pressure and Temperature

Per ASME B16.34
Also refer to Table 1.

Maximum Allowable Pressure Drops (Refer to Tables 9 & 10)

Flow-to-open: Capable of full rated pressure drops.
Flow-to-close: For more information contact your Dyna-Flo Sales Office.

Valve Assembly Temperature Capabilities

-50 to 450°F (-46 to 232°C).

Construction Materials

Refer to Figures 3 & 4 for valve diagram.
Refer to Table 8 for construction materials.

Dimensions

Valve and Actuator assembly diagram - Refer to Figure 2.
Valve and Actuator assembly dimensions - Refer to Tables 3 - 7.

Flow Direction

Typically up through seat ring and out past valve plug.

Flow Characteristic

Dyna-Form Equal Percent
Dyna-Flute 1 Flute (Equal Percent)
Dyna-Flute 3 Flute (Equal Percent)

Port, Yoke Boss Diameter, Stem Diameters, and Travel

Refer to Table 11.

Valve Sizing Coefficients

For standard coefficients at maximum travel, refer to Tables 12 & 13. For full list of coefficients refer to document P-CVSM.

Valve Body and Actuator

Approximate Weights - Refer to Table 2.

Options

- Trim in Tungsten Carbide.
- Anti-corrosion coating of internal body passage.
- Live loaded low emission packing.

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

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Table 1

Rated Inlet Pressure and Temperature						
Valve Size	Body Type	Class [◇]	Temperature		Maximum Pressure	
			°F	°C	Psi	bar
1 and 2 Inch	NPT	3750 Psig (259 bar) (1500 ASME)	100	38	3,750	259
			450	232	3,425	236
		6250 Psig (431 bar) (2500 ASME) (2" Body Only)	100	38	6,250	431
			450	232	5,710	394
	Flanged	150 ASME	100	38	290	20
			450	232	185	13
		300 ASME	100	38	750	52
			450	232	685	47
		600 ASME	100	38	1,500	103
			450	232	1,370	94
		1500 ASME	100	38	3,750	259
			450	232	3,425	236
		2500 ASME (2" Body Only)	100	38	6,250	431
			450	232	5,710	394

◇ Indicates Class or Cold Working Pressure Limit

Table 2

Approximate Valve Body and Standard Actuator Assembly Weights - Pounds (Kilograms)					
DF2000	Valve Only	DFC [DFO] 1069	DFC [DFO] 2069	DFC [DFO] 2105	DFC [DFO] 2156
1 Inch NPT	25 (11)	73 (33) [65 (29)]	N/A	N/A	N/A
1 Inch 150 to 600	45 (20)	93 (42) [85 (39)]	N/A	N/A	N/A
1 Inch 900/1500	75 (34)	123 (56) [115 (52)]	N/A	N/A	N/A
2 Inch NPT	75 (34)	N/A	125 (57) [126 (57)]	165 (75) [157 (71)]	196 (89) [182 (83)]
2 Inch 150 to 600	95 (43)	N/A	145 (66) [146 (66)]	185 (84) [177 (80)]	216 (98) [202 (92)]
2 Inch 900/1500	115 (52)	N/A	165 (75) [166 (75)]	205 (93) [197 (89)]	236 (107) [222 (101)]
2 Inch 2500	115 (52)	N/A	165 (75) [166 (75)]	205 (93) [197 (89)]	236 (107) [222 (101)]



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Table 3

Model DF2000 Globe Body Dimensions - Inch (mm)

Valve Size	End Connection	A	C
1 Inch	NPT ASME 1500	6.62 (168)	1.81 (46)
	150# RF	8.12 (206)	1.81 (46)
	300# RF	8.62 (219)	1.81 (46)
	300# RTJ	9.12 (232)	1.81 (46)
	600# RF	9.12 (232)	1.81 (46)
	600# RTJ	9.12 (232)	1.81 (46)
	900# and 1500# RF	10.00 (254)	1.81 (46)
	900# and 1500# RTJ	10.00 (254)	1.81 (46)
2 Inch	NPT ASME 1500	9.00 (229)	1.81 (46)
	NPT ASME 2500	10.50 (267)	3.25 (83)
	150# RF	10.50 (267)	2.75 (70)
	300# RF	10.50 (267)	2.75 (70)
	600# RF	11.25 (286)	2.75 (70)
	600# RTJ	11.38 (289)	2.75 (70)
	900# and 1500# RF	12.12 (308)	2.75 (70)
	900# and 1500# RTJ	12.25 (311)	2.75 (70)
	2500# RF	15.38 (391)	3.25 (83)
	2500# RTJ	15.50 (394)	3.25 (83)
3 Inch X 2 Inch	150# RF	11.75 (299)	2.75 (70)
	150# RTJ	12.25 (311)	2.75 (70)
	300# RF	12.50 (318)	2.75 (70)
	300# RTJ	13.12 (333)	2.75 (70)
	600# RF	13.25 (337)	2.75 (70)
	600# RTJ	13.38 (340)	2.75 (70)
	900# RF	17.38 (441)	2.75 (70)
	900# RTJ	17.50 (445)	2.75 (70)
	1500# RF	18.13 (461)	2.75 (70)
	1500# RTJ	18.25 (464)	2.75 (70)
	2500# RF	19.62 (498)	3.25 (83)
	2500# RTJ	19.88 (505)	3.25 (83)

Refer to Figure 3 Valve Actuator Schematic.

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Table 3 - Continued

Model DF2000 Globe Body Dimensions - Inch (mm)

Valve Size	End Connection	A	C
4 Inch X 2 Inch	150# RF	13.88 (353)	2.75 (70)
	150# RTJ	14.38 (365)	2.75 (70)
	300# RF	14.50 (368)	2.75 (70)
	300# RTJ	15.12 (384)	2.75 (70)
	600# RF	15.50 (394)	2.75 (70)
	600# RTJ	15.62 (397)	2.75 (70)
	900# RF	20.12 (511)	2.75 (70)
	900# RTJ	20.25 (514)	2.75 (70)
	1500# RF	20.88 (530)	2.75 (70)
	1500# RTJ	21.00 (533)	2.75 (70)
	2500# RF	22.62 (575)	3.25 (83)
	2500# RTJ	23.00 (584)	3.25 (83)

Refer to Figure 3 Valve Actuator Schematic.

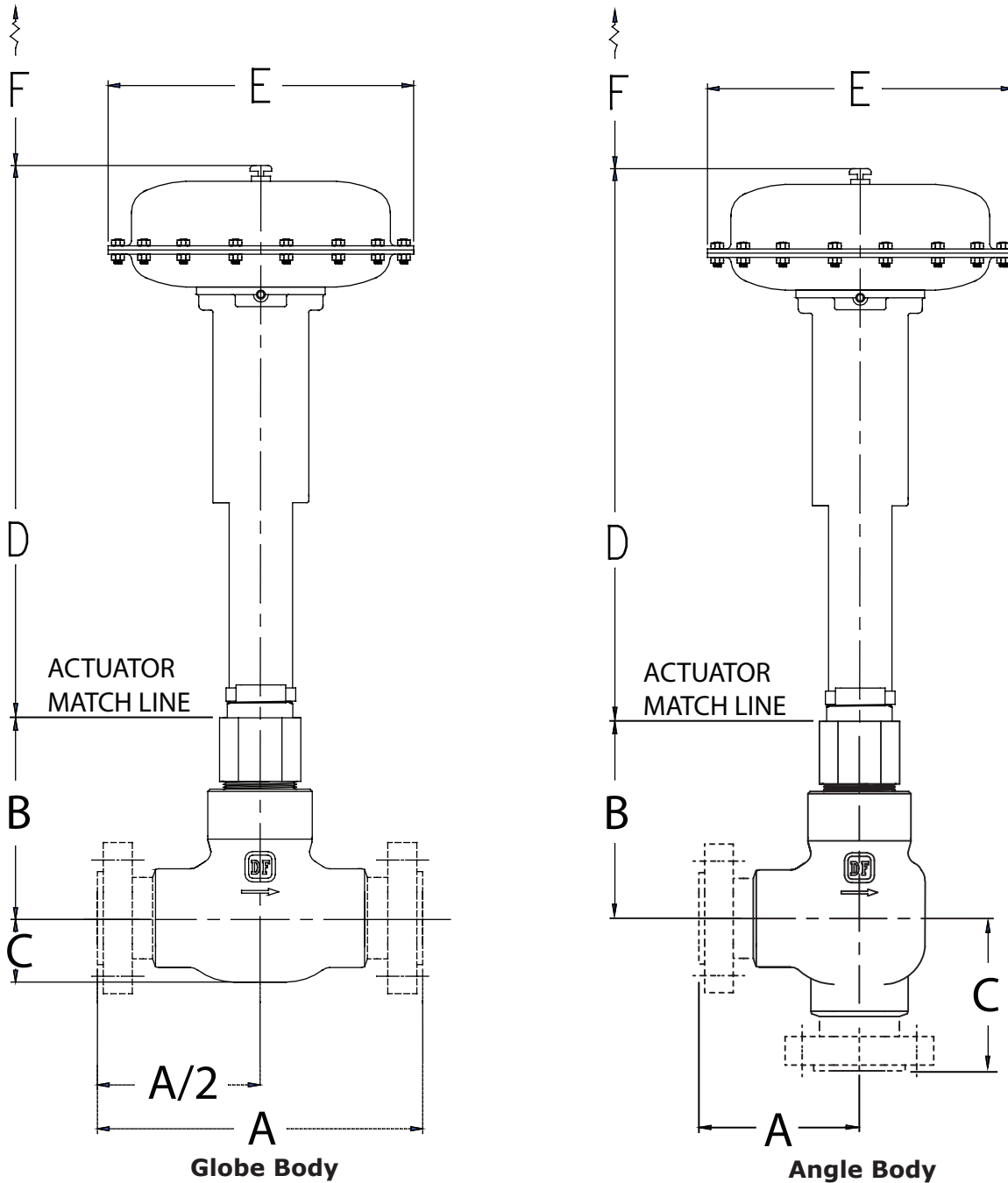
Table 4

Globe Body Valve Dimensions (Refer to Figure 3)

Valve		B		
Size (Inch)	End Connection (ASME Class)	Stem Diameter inch (mm)		
		3/8 (9.5)	1/2 (12.7)	3/4 (19.1)
1	NPT (1500)	6.80 (173)	7.19 (183)	---
2	NPT (1500 & 2500)	---	8.53 (217)	8.25 (210)
1	RF & RTJ (150-600)	6.80 (173)	7.19 (183)	---
2	RF & RTJ (150-600)	---	8.53 (217)	8.25 (210)
1	RF & RTJ (900-1500)	6.80 (172)	7.19 (183)	---
2	RF & RTJ (900-1500)	---	8.53 (217)	8.25 (210)
2	RF & RTJ (2500)	---	8.53 (217)	8.25 (210)

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Note: Valve with or without flanges. Model DFC Actuator Shown

Figure 2 Valve Actuator Schematic (Refer to Tables 13-17)

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Table 5

Angle Body Dimensions - Inch (mm)

Valve Size	End Connection	A	C
1 Inch	NPT ASME 1500	3.00 (76)	3.50 (89)
	300# RF	4.31 (109)	4.31 (109)
	300# RTJ	4.56 (116)	4.56 (116)
	600# RF	4.56 (116)	4.56 (116)
	600# RTJ	4.56 (116)	4.56 (116)
	900# and 1500# RF	5.00 (127)	5.00 (127)
	900# and 1500# RTJ	5.00 (127)	5.00 (127)
2 Inch	NPT ASME 1500	4.00 (102)	4.88 (124)
	NPT ASME 2500	4.50 (114)	5.12 (130)
	300# RF	6.12 (155)	6.12 (155)
	300# RTJ	6.44 (164)	6.44 (164)
	600# RF	6.50 (165)	6.50 (165)
	600# RTJ	6.56 (167)	6.56 (167)
	900# and 1500# RF	7.00 (178)	7.00 (178)
	900# and 1500# RTJ	7.06 (179)	7.06 (179)
	2500# RF	7.69 (195)	7.69 (195)
	2500# RTJ	7.75 (197)	7.75 (197)

Refer to Figure 3 Valve Actuator Schematic

Table 6

Angle Body Valve Dimensions (Refer to Figure 3)

Valve		B		
Size (inch)	End Connection (ASME Class)	Stem Diameter inch (mm)		
		3/8 (9.5)	1/2 (12.7)	3/4 (19.1)
1	NPT (1500)	5.25 (133)	6.00 (152)	5.50 (140)
2	NPT (1500 & 2500)	---	6.38 (162)	6.19 (157)
1	RF & RTJ (150-600)	5.31 (135)	6.06 (154)	5.56 (141)
2	RF & RTJ (150-600)	---	6.44 (164)	6.25 (159)
1	RF & RTJ (900-1500)	5.31 (135)	6.06 (154)	5.56 (141)
2	RF & RTJ (900-1500)	---	6.44 (164)	6.25 (159)
2	RF & RTJ (2500)	---	6.44 (164)	6.25 (159)



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Table 7

Model DFC and DFO Outline Dimensions - Inch (mm)

Actuator Size	D		E	F
	DFC	DFO		
1069	22.68 (576)	19.25 (489)	13.12 (333)	5.00 (127)
2069	23.38 (594)	21.20 (538)	13.12 (333)	6.88 (175)
2105	30.25 (768)	25.72 (653)	16.00 (406)	6.88 (175)
2156	30.25 (768)	25.72 (653)	18.62 (473)	6.88 (175)
3105	30.91 (785)	28.10 (714)	16.00 (406)	9.12 (232)
3156	30.91 (785)	28.10 (714)	18.62 (473)	9.12 (232)
3220	36.48 (927)	32.69 (830)	21.10 (536)	9.12 (232)

Table 8

Model DF2000 Standard Construction Materials

Description	Material	
	LCC	CF8M (Optional)
Body	LCC	CF8M (Optional)
Flanges	A350-LF2	A182-F316 (Optional)
Bonnet & Bushing Assembly	LCC (A350-LF2*)	
	A182-F316	
Bushing	S17400 DH1150	
Bonnet Gasket	S30400	
Lower Wiper	PTFE	
Packing Box Ring	S31600**	
Packing Set (2 Required)	PTFE	
Packing Spacer	S31600**	
Packing Follower	S31600**	
Packing Flange	Plated Steel	
Stem Wiper	Felt	
Packing Nut (2 Required)	2H	
Packing Stud (2 Required)	B7	
Yoke Nut	Zinc Plated Steel	
Seat Ring Gasket	S30400	
Seat Ring*	S31600** / Alloy 6	
Plug & Stem Assembly*	S31600** / Alloy 6 & S20910	

*Dyna-Flo reserves the right to substitute a cast material with the forged bar equivalent in the event a casting is not available.

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

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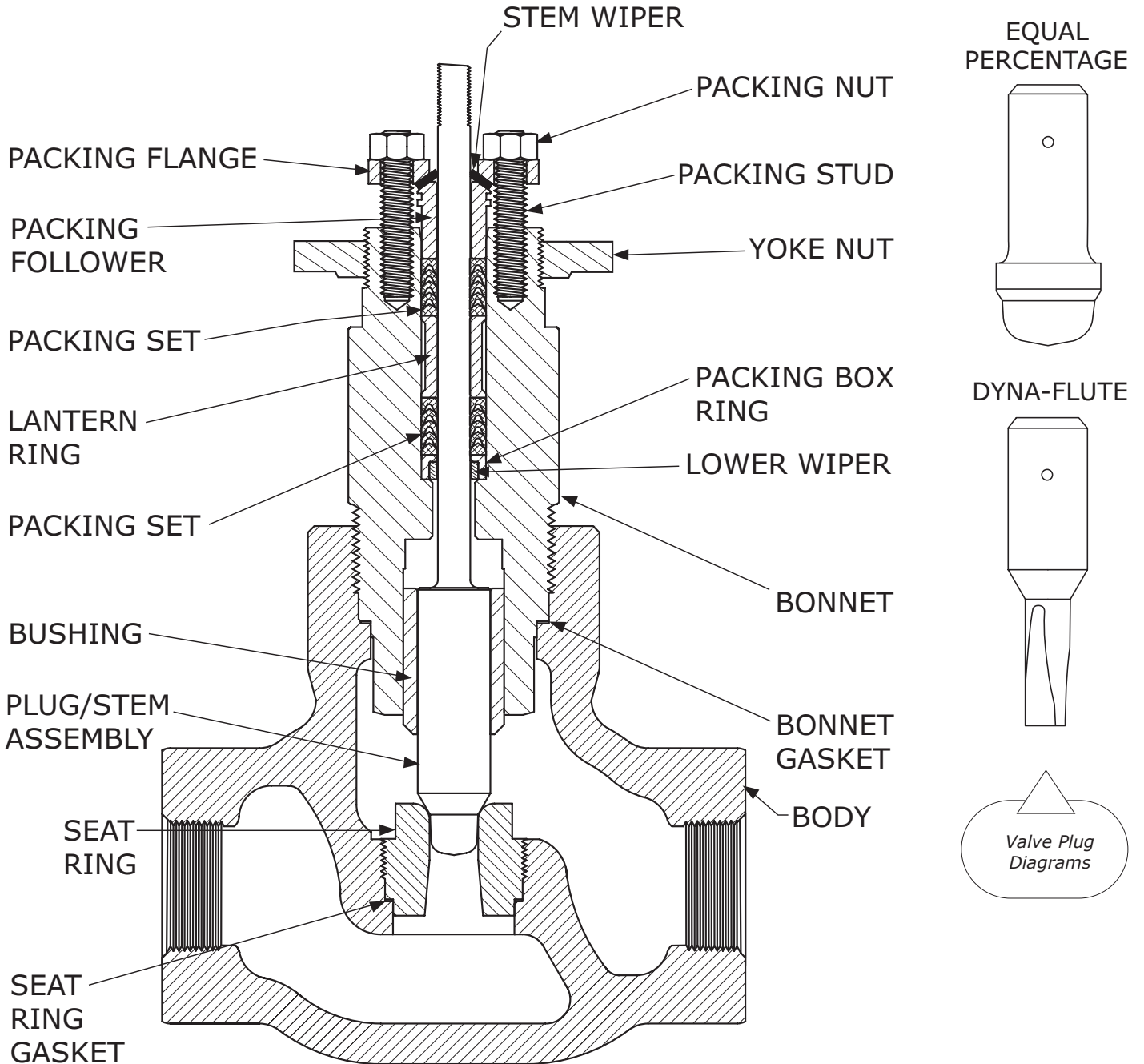


Figure 3 Typical DF2000 Globe Body Assembly with NPT Connections

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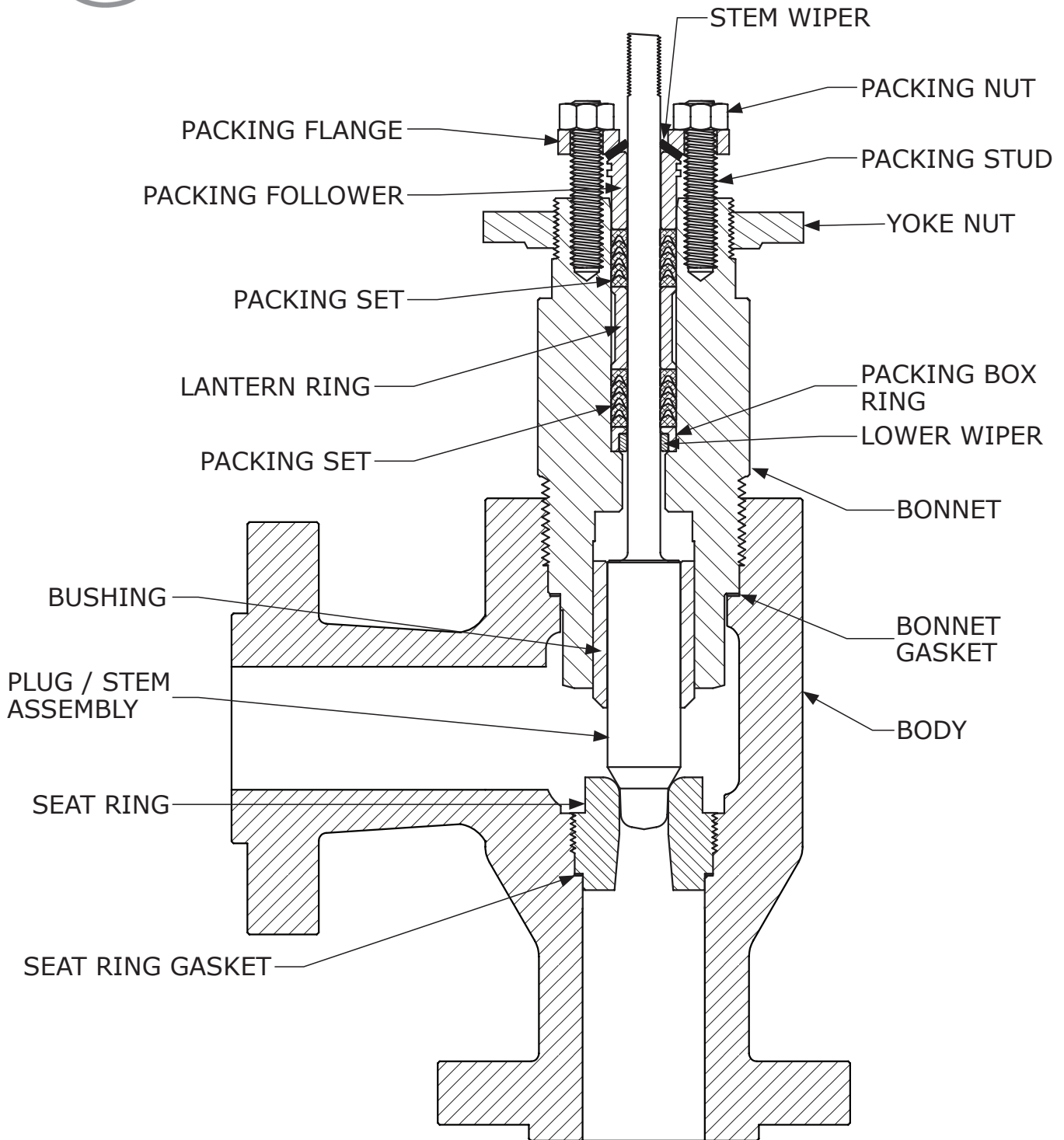


Figure 4 Typical DF2000 Angle Body Assembly with Flanged Connections

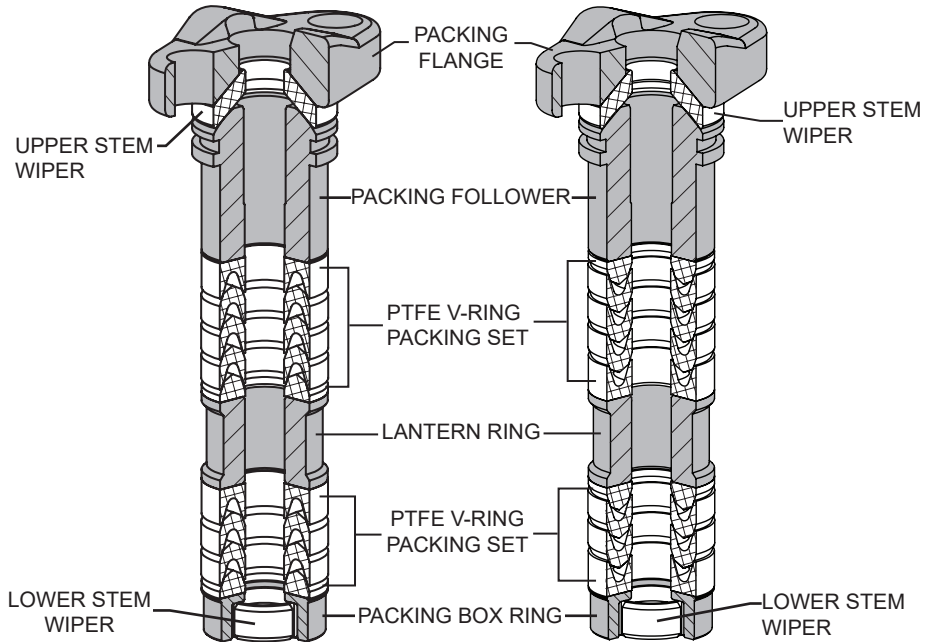
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DOUBLE PTFE V-RING PACKING

DOUBLE PTFE V-RING VACUUM PACKING



DOUBLE PTFE V-RING PRESSURE / VACUUM PACKING

GRAPHITE PACKING

LIVE LOADED PTFE PACKING

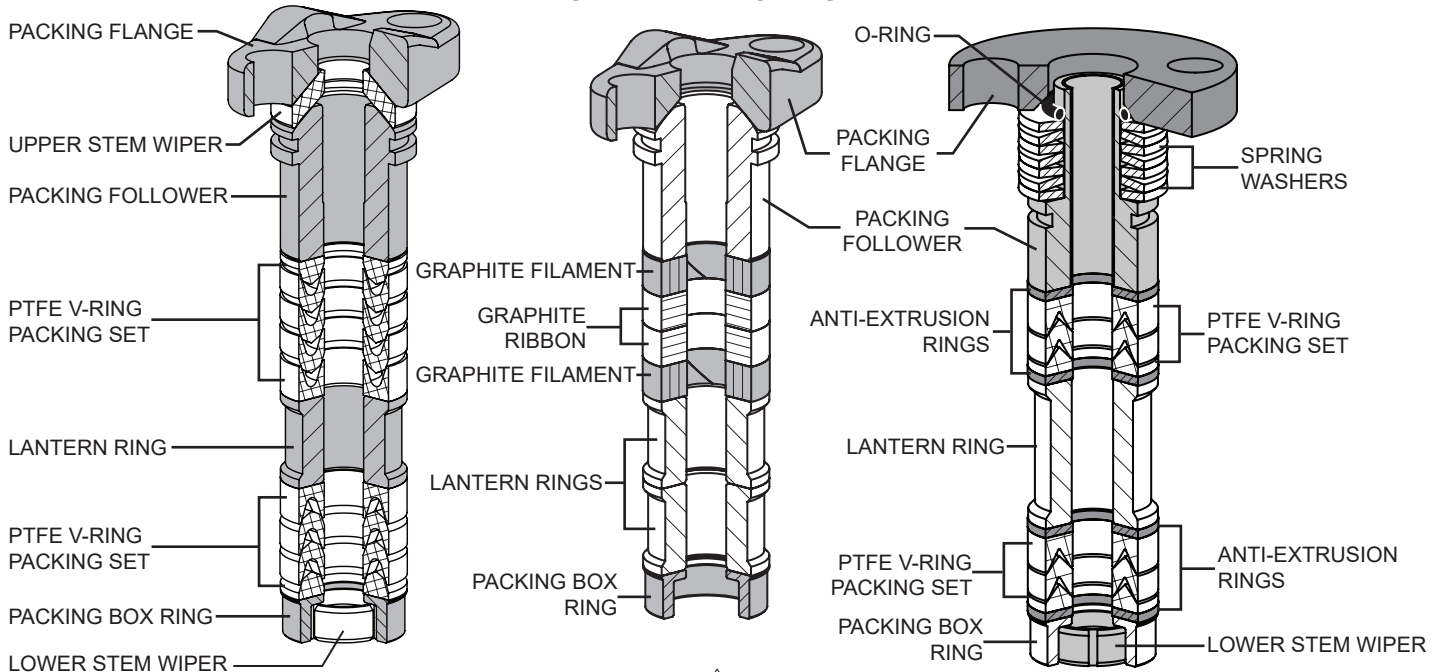


Figure 5 Typical Packing Arrangements



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Table 9

Fail Closed Actuator Maximum Shut-off Capabilities with 6 to 30 psig Signal, 35 Psig Supply

1 Inch Valve

Port Size Inch (mm)	DFC Size 1069 Psig (bar)
1/4 (6.4)	3,750 (259) ¹
3/8 (9.5)	3,750 (259) ¹
1/2 (12.7)	3,750 (259) ²
3/4 (19.1)	2,450 (169) ⁴

2 Inch Valve

Port Size Inch (mm)	DFC Size 2069 Psig (bar)	DFC Size 2105 Psig (bar)	DFC Size 2156 Psig (bar)	DFC Size 3220 Psig (bar)
1/4 (6.4)	6,250 (431) ²	6,250 (431) ¹	6,250 (431) ¹	-
3/8 (9.5)	6,250 (431) ²	6,250 (431) ¹	6,250 (431) ¹	-
1/2 (12.7)	5,750 (396) ⁴	6,250 (431) ³	6,250 (431) ³	-
3/4 (19.1)	2,400 (165) ⁴	4,100 (283) ⁵	6,250 (431) ⁶	-
1 (25.4)	1,325 (91) ⁴	2,685 (185) ⁷	3,900 (269) ⁶	5,850 (403) ⁷
1-1/4 (31.8)	820 (57) ⁴	1,689 (116) ⁷	2,474 (171) ⁶	3,655 (252) ⁷

NOTE - All the above actuator fail closed shut-off capabilities are Class IV. A higher shut-off may be achieved by using a higher bench set, contact your Dyna-Flo sales office for additional information.

Bench Set	Psi (bar)
1	10 - 30 (0.69 - 2.07)
2	14 - 30 (0.97 - 2.07)
3	17 - 30 (1.17 - 2.07)
4	18 - 30 (1.24 - 2.07)
5	19 - 30 (1.31 - 2.07)
6	21 - 30 (1.45 - 2.07)
7	22 - 30 (1.52 - 2.07)

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Table 10

Fail Open Actuator Maximum Shut-off Capabilities with 6 to 30 psig Signal, 35 Psig Supply

1 Inch Valve

Port Size Inch (mm)	DFO Size 1069 Psig (bar)
1/4 (6.4)	3,750 (259) ¹
3/8 (9.5)	3,750 (259) ²
1/2 (12.7)	3,750 (259) ⁴
3/4 (19.1)	2,625 (181) ⁶

2 Inch Valve

Port Size Inch (mm)	DFO Size 2069 Psig (bar)	DFO Size 2105 Psig (bar)	DFO Size 2156 Psig (bar)	DFO Size 3220 Psig (bar)
1/4 (6.4)	6,250 (431) ²	6,250 (431) ²	6,250 (431) ³	—
3/8 (9.5)	6,250 (431) ⁴	6,250 (431) ³	6,250 (431) ³	—
1/2 (12.7)	3,750 (259) ⁴	6,250 (431) ³	6,250 (431) ³	—
3/4 (19.1)	1,950 (134) ⁴	4,100 (283) ⁶	5,700 (393) ⁵	6,250 (431) ⁶
1 (25.4)	1,050 (72) ⁴	2,285 (158) ⁶	3,300 (228) ⁵	5,020 (346) ⁶
1-1/4 (31.8)	650 (45) ⁴	1,425 (98) ⁶	2,090 (144) ⁵	3,175 (219) ⁶

NOTE - All the above actuator fail open shut-off capabilities are Class IV. A higher shut-off may be achieved by using a higher bench set, contact your Dyna-Flo sales office for additional information.

Bench Set	Psi (bar)
1	6 - 26 (0.41 - 1.79)
2	6 - 22 (0.41 - 1.52)
3	6 - 19 (0.41 - 1.31)
4	6 - 18 (0.41 - 1.24)
5	6 - 15 (0.41 - 1.03)
6	6 - 14 (0.41 - 0.97)



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Table 11

Port Size, Yoke Boss Diameter, Stem Diameters, and Rated Travel - Inch (mm)

Valve Size	Port Diameter Inch (mm)	Standard Inch (mm)			Optional Inch (mm)		
		Yoke Boss Diameter	Stem Diameter	Rated Travel	Yoke Boss Diameters	Stem Diameter	Rated Travel
1 Inch	1/4 (6.4)	2-1/8 (54)	3/8 (9.5)	3/4 (19)	2-13/16 (71)	1/2 (12.7)	3/4 (19.1)
	3/8 (9.5)						
	1/2 (12.7)						
	3/4 (19.1)						
2 Inch	1/4 (6.4)	2-13/16 (71)	1/2 (12.7)	3/4 (19)	3-9/16 (90)	3/4 (19)	3/4 (19.1)
	3/8 (9.5)						
	1/2 (12.7)						
	3/4 (19.1)						
	1 (25.4)						
	1-1/4 (31.8)						

Table 12

MAXIMUM SIZING COEFFICIENTS

**FULL PORT
EQUAL PERCENTAGE CHARACTERISTIC
GLOBE BODY VALVE
FLOW UP**

Valve Size Inches	Port Inches (mm)	Coefficient	Percentage of Valve Travel	
			100%	
1	1/4 (6.4)	C _v	1.64	
	3/8 (9.5)	C _v	4.03	
	1/2 (12.7)	C _v	6.50	
	3/4 (19.1)	C _v	12.2	
2	1/4 (6.4)	C _v	1.64	
	3/8 (9.5)	C _v	4.03	
	1/2 (12.7)	C _v	6.82	
	3/4 (19.1)	C _v	14.0	
	1 (25.4)	C _v	23.7	
	1-1/4 (31.8)	C _v	34.5	

NOTE: For the complete list of sizing coefficients refer to catalogue P-CVSM.

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Table 13

MAXIMUM SIZING COEFFICIENTS
FULL PORT
EQUAL PERCENTAGE CHARACTERISTIC
ANGLE BODY VALVE
FLOW UP

Valve Size Inches	Port Inches (mm)	Coefficient	Percentage of Valve Travel
			100%
1	1/4 (6.4)	C _v	1.65
	3/8 (9.5)	C _v	4.04
	1/2 (12.7)	C _v	6.50
	3/4 (19.1)	C _v	12.4
2	1/4 (6.4)	C _v	1.65
	3/8 (9.5)	C _v	4.05
	1/2 (12.7)	C _v	6.80
	3/4 (19.1)	C _v	14.1
	1 (25.4)	C _v	23.5
	1-1/4 (31.8)	C _v	34.5

NOTE: For the complete list of sizing coefficients refer to catalogue P-CVSM.

Our Commitment to Quality

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MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: DF2000-2AFL-S2J2-E4

BODY STYLE					-	
-	GLOBE	A	ANGLE			
VALVE SIZE					2	
1	1 INCH	2	2 INCH			
ASME RATING					A	
A	150	B	300	C	600	
D	900 / 1,500					
F	2,500	K	3" X 2" 150	H	3" X 2" 300	
I	3" X 2" 600					
J	3" X 2" 900	G	3" X 2" 1,500	M	3" X 2" 2,500	
Q	4" X 2" 150					
P	4" X 2" 300	L	4" X 2" 600	R	4" X 2" 900	
S	4" X 2" 1,500					
T	4" X 2" 2,500	E	3,750 PSI CWP (NPT)	N	6,250 PSI CWP (NPT)	
END CONNECTION					F	
F	RF	J	RTJ		N	NPT
BODY MATERIAL					L	
L	LCC		M	CF8M		
TRIM					S	
S	S31600 / ALLOY 6		T	S31600 / TUNGSTEN CARBIDE		
PORT SIZE					2	
2	1/4"	3	3/8"	4	1/2"	
6	3/4"					
8	1"		1	1-1/4"		
PACKING STYLE					J	
J	DOUBLE PTFE V-RING (PRESSURE)			L	LIVE LOADED PTFE (PRESSURE)	
V	DOUBLE PTFE V-RING (VACUUM)			T	LIVE LOADED GRAPHITE (PRESSURE)	
R	DOUBLE PTFE V-RING (VACUUM / PRESSURE)			G	SINGLE GRAPHITE (PRESSURE)	
YOKE BOSS SIZE					2	
1	2-1/8" (3/8" STEM)		2	2-13/16" (1/2" STEM)		
3	3-9/16" (3/4" STEM)					
PAINT					-	
-	DFPS-01 (STANDARD)			2	DFPS-02 (SEVERE SERVICE)	
3	DFPS-03 (HIGH TEMPERATURE)					
CHARACTERISTIC					E	
E	DYNA-FORM (EQUAL PERCENT) - FLOW UP					
F	DYNA-FLUTE 1 FLUTE (EQUAL PERCENT) - FLOW UP					
T	DYNA-FLUTE 3 FLUTE (EQUAL PERCENT) - FLOW UP					
D	DYNA-FORM (EQUAL PERCENT) - FLOW DOWN (ANGLE VALVE ONLY)					
1	DYNA-FLUTE 1 FLUTE (EQUAL PERCENT) - FLOW DOWN (ANGLE VALVE ONLY)					
3	DYNA-FLUTE 3 FLUTE (EQUAL PERCENT) - FLOW DOWN (ANGLE VALVE ONLY)					
SHUT-OFF CLASS					4	
4	CLASS IV		5	CLASS V		

DF2000