

# Design D and DA Control Valves

Design D and DA single-port, high-pressure valves (figure 1) are widely used in oil and gas production industries. These valves are especially useful for either throttling or on/off control of liquids or gases which are gritty, sticky, or which have a tendency to build up on internal valve parts. The Design DA valve is also useful in angle piping or other applications where a self-draining valve is desired.

## Features

- **Heavy-Duty Construction**—Massive guiding (figure 2) positively aligns the valve plug in the seat ring for high pressure drop applications. The screwed-in seat ring completely encloses the seat ring gasket.
- **Easy Maintenance**—Screwed bonnet/body joint allows repair or maintenance with a minimum of tools.
- **Severe Service Capability**—Valve is available with VTC (ceramic) trim for service in very erosive applications. The valve plug is also available with a tungsten carbide tip and the seat ring can be fitted with a full-bore tungsten carbide insert for erosive service.
- **Meets Variety of Specifications**—Valve body and end connection constructions are available for API as well as ANSI standards.
- **NACE Trim Standard**—NACE trim and bolting materials are standard for all applications. These constructions comply with the recommendations of the National Association of Corrosion Engineers (NACE) MR0175.



W7859

Figure 1. Design D Valve with Type 657 Actuator



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## NACE Standard MR0175 Compliance

Fisher's standard manufacturing processes and procedures assure that all materials used in control valves specified with sour service trim comply with the chemical and physical requirements of NACE standard MR0175.

This compliance yields a product of a very specific part control and material specification. Incoming raw materials are tightly controlled by specifications which cover chemical composition, forming, hardness, heat treatment, and finish. In addition, the

subsequent machining, welding, and heat treatment of the materials as they are processed into finished parts is strictly controlled. Due to this strict start-to-finish control, Fisher has a high degree of confidence that the parts and assemblies provided comply with NACE guidelines.

In most cases, it is unnecessary to request additional testing and documentation to assure compliance with the NACE standard. However, in those cases where documentation is required, the following can be provided: hardness test data; certificate of compliance to specification; heat treat documentation; or chemical and physical test data.

The requirements of the NACE standard are very specific and the application of the standard to control valve materials is quite complex. There are, however, some general guidelines that are always followed:

- All carbon steel valve bodies and bonnets are heat treated to a hardness of Rockwell C22 maximum.
- Martensitic and cast precipitation hardening stainless steel are not used.
- Control valve packings are jam style only.
- Valve stems are made from Nitronic 50.
- Primary trim materials are 316 stainless steel and CoCr-A (alloy 6).
- No machining operations that cause work-hardening of the materials are performed in the manufacturing process.
- Plating and coatings are used only over suitable base metals and are not intended for corrosion protection.
- Bolting in NACE Class III material is provided as standard. Bolting in NACE Class II material is available as an option for temperatures to 232°C (450°F).

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Table 1. Valve Sizes, Port Diameters, and End Connections

VALVE SIZE, INCHES	PORT DIAMETER (INCHES)	SCREWED VALVE BODIES				FLANGED VALVE BODIES			
		3600 psi	6000 psi	9000 psi (WCC Steel Design DA Only)	10,000 psi (Except WCC Steel Design DA)	ANSI			API
						Class 150 through 600	Class 900 and 1500	Class 2500	
1	1/4, 3/8, 1/2, 3/4	X <sup>(1)</sup>	X	---	---	---	X	X	---
2	1/4, 3/8, 1/2 3/4, 1, 1-1/4	X	X	X	X	X	X	X	X

1. 'X' indicates available construction.

Table 2. Rated Inlet Pressures and Temperatures

VALVE SIZE, INCHES	TYPE	CLASS OR COLD WORKING PRESSURE LIMIT	PRESSURE <sup>(1)</sup>		TEMPERATURE	
			bar	psi	°C	°F
1 or 2	Screwed	ANSI 900 and 1500	259 236	3750 3425	38 232	100 450
		ANSI 2500	431 394	6250 5710	38 232	100 450
		9000	621	9000	38	100
		10,000	689	10,000	38	100
1 or 2	Flanged	ANSI 150	20.0 12.8	290 185	38 232	100 450
		ANSI 300	51.7 47.2	750 685	38 232	100 450
		ANSI 600	103.4 94.5	1500 1370	38 232	100 450
		ANSI 900 and 1500	259 236	3750 3425	38 232	100 450
		ANSI 2500	431 394	6250 5710	38 232	100 450
		API 10,000	689 689 689	Spec A 10,000 Spec B 10,000 Spec C 10,000	121 38 121	250 100 250

1. LCC steel body per ASME B16.34 except C5 steel for all API bodies.

Table 3. Flow Down Pressure Drop Limits - Ceramic Trim Only

VALVE SIZE, INCHES	SEAT RING DIAMETER, mm (INCHES)					
	6.4 (1/4)	9.5 (3/8)	12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)
	Pressure Drop, bar					
1	414	414	414	193	---	---
2	689	689	689	462	262	165
	Pressure Drop, psi					
1	6000	6000	6000	2800	---	---
2	10,000	10,000	10,000	6700	3800	2400

Table 4. Materials for Standard Trim Constructions

VALVE MATERIAL	BONNET MATERIAL	PLUG AND SEAT RING	VALVE STEM
LCC/HT	LF2 HT	S31600 (316 stainless steel) hard faced with CoCr-A (Alloy 6)	Nitronic 50
WCC			

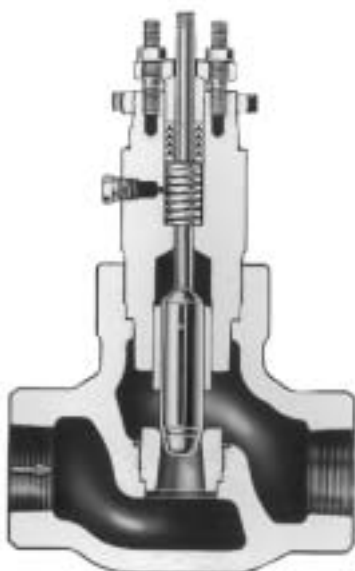
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Table 5. Flow Coefficient ( $C_v$  at Maximum Valve Plug Travel)

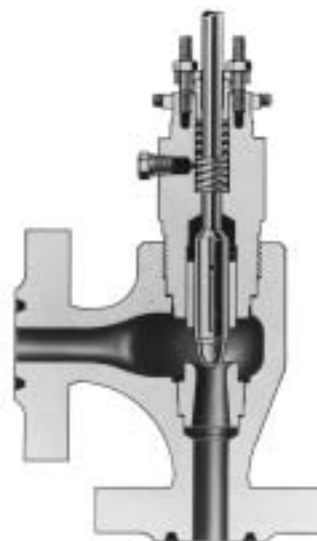
VALVE SIZE, INCHES	PORT DIAMETER, mm (INCHES)	EQUAL PERCENTAGE DESIGN D	EQUAL PERCENTAGE DESIGN DA
		Flow Up	Flow Down
1	6.4 (1/4)	1.66	3.21
	9.5 (3/8)	4.03	7.06
	12.7 (1/2)	6.51	11.2
	19.1 (3/4)	12.3	16.8
2	6.4 (1/4)	1.66	3.21
	9.5 (3/8)	4.03	7.06
	12.7 (1/2)	6.82	12.1
	19.1 (3/4)	14.1	21.2
	25.4 (1)	23.7	31.8
	31.8 (1-1/4)	34.5	44.9

Table 6. Port, Yoke Boss, Stem Diameters, and Rated Travel Specifications in mm (Inches)

VALVE SIZE, INCHES	PORT DIAMETER	STANDARD			OPTIONAL		
		Yoke Boss Diameter	Stem Diameter	Rated Travel	Yoke Boss Diameter	Stem Diameter	Rated Travel
1	6.4 (1/4)	54 (2-1/8)	9.5 (3/8)	19.1 (3/4)	71 (2-13/16)	12.7 (1/2)	19.1 (3/4)
	9.5 (3/8)				90 (3-9/16)	19.1 (3/4)	19.1 (3/4)
	12.7 (1/2)						
	19.1 (3/4)						
2	6.4 (1/4)	71 (2-13/16)	12.7 (1/2)	19.1 (3/4)	90 (3-9/16)	19.1 (3/4)	19.1 (3/4)
	9.5 (3/8)						
	12.7 (1/2)						
	19.1 (3/4)						
	25.4 (1)						
	31.8 (1-1/4)						



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Figure 2. Typical Constructions

## **Installation**

Valve orientation of the Design D and DA does not affect operation, but to facilitate changing trim parts, the valve stem should be vertical with the actuator above the valve. Proper flow direction is indicated by the arrow on the valve.

Dimensions are shown in figures 3 and 4.

## **Ordering Information**

**Note: Fisher does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for proper selection, use, and maintenance of any Fisher product remains solely with the purchaser and end-user.**

When ordering, specify:

### **Application**

1. Type of application
  - a. Throttling or on-off
  - b. Reducing or relief
2. Controlled fluid (include chemical analysis of fluid, if possible)
3. Specific gravity of controlled fluid
4. Fluid temperature

5. Range of flowing inlet pressure
6. Pressure drops
  - a. Range of flowing pressure drops
  - b. Maximum at shutoff
7. Flow rates
  - a. Minimum controlled flow
  - b. Normal flow
  - c. Maximum flow
8. Maximum permissible noise level, if critical
9. Shutoff classification required
10. Line size and schedule

### **Valve**

Refer to the specifications. Review the description for each specification. Indicate the desired choice whenever there is a selection (■) to be made. Always indicate the body design being ordered as identified in the available configuration specification.

### **Actuator and Accessories**

Refer to separate bulletins covering actuators and accessories for ordering information.

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Table 7. Design D Dimensions

FLANGED VALVE SIZE, INCHES	ANSI								D—All Ratings		
	Class 150		Class 300			Class 600					
	A-Raised Face	G	A		G	A		G	Stem Size		
			Raised Face	Ring-Type Joint		Raised Face	Ring-Type Joint		9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm											
1	206	46	219	232	46	232	232	46	173	192	179
2	267	70	267	---	70	286	289	70	---	217	213
Inches											
1	8.12	1.81	8.62	9.12	1.81	9.12	9.12	1.81	6.81	7.56	7.06
2	10.50	2.75	10.50	---	2.75	11.25	11.38	2.75	---	8.56	8.38

Table 8. Design D Dimensions

FLANGED VALVE SIZE, INCHES	ANSI						API				D—All Ratings		
	Class 900 and 1500		Class 2500				10,000 lb.						
	A		G	A		G	A			G	Stem Size		
	Raised Face	Ring-Type Joint		Raised Face	Ring-Type Joint		Spec A	Spec B	Spec C		9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm													
1	254	254	46	308	308	54	---	---	---	---	173	192	179
2	308	311	70	391	394	83	364	397	360	83	---	217	213
Inches													
1	10.00	10.00	1.81	12.12	12.12	2.12	---	---	---	---	6.81 <sup>(1)</sup>	7.56 <sup>(1)</sup>	7.06 <sup>(1)</sup>
2	12.12	12.25	2.75	15.38	15.50	3.25	14.34	15.62	14.19	3.25	---	8.56	8.38
1. Not applicable for 10,000 lb. API.													

1. Not applicable for 10,000 lb. API.

Table 9. Design D Dimensions

SCREWED VALVE SIZE, INCHES	3600 psi		6000 psi and 9000 psi		D—All Ratings		
					Stem Size		
	A	G	A	G	9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm							
1 <sup>(1)</sup>	168	46	197	54	172	192	178
2	229	70	267	83	---	216	211
Inches							
1 <sup>(1)</sup>	6.62	1.81	7.75	2.12	6.75	7.50	7.00
2	9.00	2.75	10.50	3.25	---	8.50	8.31

1. For 3600 psi and 6000 psi only.

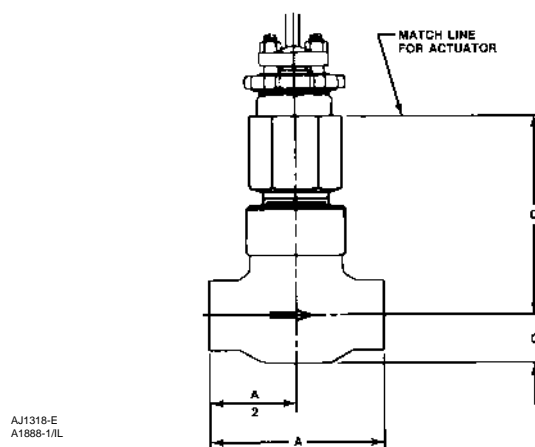


Figure 3. Design D Dimensions (also see tables 7, 8, and 9)

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Table 10. Design DA Dimensions

FLANGED VALVE SIZE, INCHES	A				D—All Ratings		
	ANSI				Stem Size		
	Class 300		Class 600		Stem Size		
	Raised Face	Ring-Type Joint	Raised Face	Ring-Type Joint	9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm							
1	109	116	116	116	135	154	141
2	155	164	165	167	---	164	159
Inches							
1	4.31	4.56	4.56	4.56	5.31	6.06	5.56
2	6.12	6.44	6.50	6.56	---	6.44	6.25

Table 11. Design DA Dimensions

FLANGED VALVE SIZE, INCHES	A							D—All Ratings		
	ANSI				API			Stem Size		
	Class 900 and 1500		Class 2500		10,000 lb.			Stem Size		
	Raised Face	Ring-Type Joint	Raised Face	Ring-Type Joint	Spec A	Spec B	Spec C	9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm										
1	127	127	154	154	---	---	---	135	154	141
2	178	179	195	197	182	198	180	---	164	159
Inches										
1	5.00	5.00	6.06	6.06	---	---	---	5.31	6.06	5.56
2	7.00	7.06	7.69	7.75	7.17	7.81	7.09	---	6.44	6.25

Table 12. Design DA Dimensions

SCREWED VALVE SIZE, INCHES	3600 psi		6000 psi and 9000 psi		D—All Ratings		
					Stem Size		
	A	G	A	G	9.5 (3/8)	12.7 (1/2)	19.1 (3/4)
mm							
1 <sup>(1)</sup>	76	89	89	102	133	152	140
2	102	124	114	130	---	162	157
Inches							
1 <sup>(1)</sup>	3.00	3.50	3.50	4.00	5.25	6.00	5.50
2	4.00	4.88	4.50	5.12	---	6.38	6.19

1. For 3600 psi and 6000 psi only.

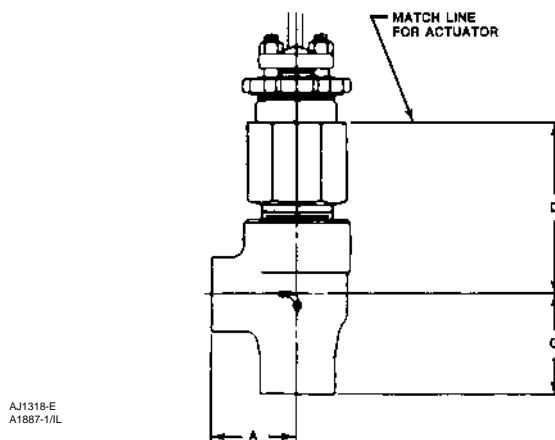


Figure 4. Design DA Dimensions (also see tables 10, 11, and 12)

# D and DA Valves

## Coefficients

Table 13. Design D, Micro-Form™ Valve Plugs

Micro-Form - Flow Up															Equal Percentage Characteristic	
Valve Size, Inches	Port Diameter		Total Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
	Inches	mm	Inches	mm		10	20	30	40	50	60	70	80	90	100	
1	1/4	6.4	3/4	19	C <sub>v</sub>	0.070	0.115	0.164	0.224	0.315	0.450	0.641	0.921	1.28	1.66	.87
					K <sub>v</sub>	0.061	0.099	0.142	0.194	0.272	0.389	0.554	0.797	1.11	1.44	---
					X <sub>T</sub>	0.783	0.783	0.744	0.691	0.625	0.614	0.608	0.611	0.610	0.611	---
					F <sub>d</sub>	0.12	0.14	0.17	0.20	0.24	0.29	0.35	0.43	0.55	0.68	---
	3/8	9.5	3/4	19	C <sub>v</sub>	0.155	0.260	0.407	0.596	0.858	1.21	1.65	2.22	3.00	4.03	.84
					K <sub>v</sub>	0.134	0.225	0.352	0.516	0.742	1.05	1.43	1.92	2.60	3.49	---
					X <sub>T</sub>	0.625	0.535	0.534	0.539	0.535	0.535	0.538	0.534	0.537	0.536	---
					F <sub>d</sub>	0.11	0.13	0.16	0.19	0.23	0.27	0.33	0.40	0.48	0.56	---
	1/2	12.7	3/4	19	C <sub>v</sub>	0.273	0.436	0.631	0.911	1.30	1.84	2.57	3.65	5.08	6.51	.84
					K <sub>v</sub>	0.236	0.377	0.546	0.788	1.13	1.59	2.22	3.16	4.39	5.63	---
					X <sub>T</sub>	0.673	0.644	0.641	0.590	0.592	0.587	0.586	0.557	0.523	0.549	---
					F <sub>d</sub>	0.11	0.13	0.16	0.19	0.23	0.27	0.33	0.40	0.48	0.56	---
	3/4	19.1	3/4	19	C <sub>v</sub>	0.483	0.775	1.25	1.97	2.89	4.13	5.87	8.16	10.9	12.3	.92
					K <sub>v</sub>	0.418	0.670	1.08	1.70	2.50	3.57	5.08	7.06	9.43	10.6	---
					X <sub>T</sub>	0.571	0.599	0.527	0.473	0.492	0.519	0.537	0.505	0.486	0.628	---
					F <sub>d</sub>	0.10	0.39	0.47	0.18	0.22	0.26	0.31	0.37	0.43	0.49	---
2	1/4	6.4	3/4	19	C <sub>v</sub>	0.070	0.115	0.164	0.224	0.315	0.450	0.641	0.921	1.28	1.66	.87
					K <sub>v</sub>	0.061	0.099	0.142	0.194	0.272	0.389	0.554	0.797	1.11	1.44	---
					X <sub>T</sub>	0.783	0.783	0.744	0.691	0.625	0.614	0.608	0.611	0.610	0.611	---
					F <sub>d</sub>	0.12	0.14	0.17	0.20	0.24	0.29	0.35	0.43	0.55	0.68	---
	3/8	9.5	3/4	19	C <sub>v</sub>	0.155	0.260	0.407	0.596	0.858	1.21	1.65	2.22	3.00	4.03	.84
					K <sub>v</sub>	0.134	0.225	0.352	0.516	0.742	1.05	1.43	1.92	2.60	3.49	---
					X <sub>T</sub>	0.625	0.535	0.534	0.539	0.535	0.535	0.538	0.534	0.537	0.536	---
					F <sub>d</sub>	0.11	0.13	0.16	0.19	0.22	0.27	0.33	0.41	0.50	0.61	---
	1/2	12.7	3/4	19	C <sub>v</sub>	0.348	0.505	0.709	0.998	1.38	1.92	2.69	3.82	5.25	6.82	.81
					K <sub>v</sub>	0.301	0.437	0.613	0.863	1.19	1.66	2.33	3.30	4.54	5.90	---
					X <sub>T</sub>	0.613	0.627	0.585	0.576	0.565	0.553	0.535	0.509	0.490	0.501	---
					F <sub>d</sub>	0.11	0.13	0.16	0.19	0.23	0.27	0.33	0.40	0.48	0.56	---
	3/4	19.1	3/4	19	C <sub>v</sub>	0.613	0.952	1.44	2.06	2.92	4.13	5.87	8.16	11.1	14.1	.81
					K <sub>v</sub>	0.530	0.823	1.25	1.78	2.53	3.57	5.08	7.06	9.60	12.2	---
					X <sub>T</sub>	0.581	0.616	0.581	0.586	0.581	0.573	0.549	0.541	0.529	0.528	---
					F <sub>d</sub>	0.10	0.39	0.47	0.18	0.22	0.26	0.31	0.37	0.43	0.49	---
	1	25.4	3/4	19	C <sub>v</sub>	1.20	1.68	2.44	3.53	5.05	7.28	10.5	14.0	18.4	23.7	.82
					K <sub>v</sub>	1.04	1.45	2.11	3.05	4.37	6.30	9.08	12.1	15.9	20.5	---
					X <sub>T</sub>	0.517	0.569	0.559	0.542	0.544	0.540	0.507	0.508	0.507	0.508	---
					F <sub>d</sub>	0.11	0.12	0.15	0.18	0.21	0.25	0.30	0.35	0.41	0.46	---
	1-1/4	31.8	3/4	19	C <sub>v</sub>	1.32	1.76	2.50	3.66	5.42	8.25	12.7	20.6	29.0	34.5	.85
					K <sub>v</sub>	1.14	1.52	2.16	3.17	4.69	7.14	11.0	17.8	25.1	29.8	---
					X <sub>T</sub>	0.521	0.563	0.548	0.534	0.498	0.503	0.553	0.528	0.524	0.579	---
					F <sub>d</sub>	0.087	0.10	0.12	0.15	0.18	0.22	0.28	0.33	0.39	0.44	---

1. At 100% travel.



Table 14. Design D, Micro-Flute™ Valve Plugs

Micro-Flute - Flow Up															Equal Percentage Characteristic	
Valve Size, Inches	Port Diameter		Total Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
	Inches	mm	Inches	mm		10	20	30	40	50	60	70	80	90	100	
All Sizes 1 and 2	1/4 1 Flute	6.4 1 Flute	3/4	19	C <sub>V</sub>	0.0385	0.0455	0.0560	0.0719	0.0942	0.124	0.162	0.212	0.278	0.354	.87
					K <sub>V</sub>	0.033	0.039	0.048	0.062	0.081	0.107	0.140	0.183	0.240	0.306	---
					X <sub>T</sub>	0.778	0.734	0.690	0.653	0.642	0.635	0.637	0.634	0.632	0.656	---
	1/4 3 Flutes	6.4 3 Flutes	3/4	19	C <sub>V</sub>	0.0562	0.0725	0.101	0.146	0.216	0.312	0.433	0.588	0.802	1.07	.90
					K <sub>V</sub>	0.049	0.063	0.087	0.126	0.187	0.270	0.375	0.509	0.694	0.926	---
					X <sub>T</sub>	0.692	0.648	0.639	0.625	0.600	0.586	0.597	0.613	0.620	0.624	---

1. At 100% travel.

Table 15. Design DA, Equal Percentage Valve Plug, Flow Down

Flow Down															Equal Percentage Characteristic	
Valve Size, Inches	Port Diameter		Total Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
	Inches	mm	Inches	mm		10	20	30	40	50	60	70	80	90	100	
1	1/4	6.4	3/4	19	C <sub>V</sub>	0.096	0.173	0.294	0.481	0.727	0.995	1.35	1.99	2.73	3.21	0.45
					K <sub>V</sub>	0.0830	0.150	0.254	0.416	0.629	0.861	1.17	1.72	2.36	2.78	---
					X <sub>T</sub>	0.578	0.379	0.271	0.201	0.154	0.144	0.148	0.129	0.127	0.153	---
	3/8	9.5	3/4	19	C <sub>V</sub>	0.189	0.343	0.624	1.05	1.45	1.84	2.47	3.81	5.58	7.06	0.45
					K <sub>V</sub>	0.164	0.297	0.540	0.908	1.25	1.59	2.14	3.30	4.83	6.11	---
					X <sub>T</sub>	0.516	0.355	0.220	0.151	0.152	0.180	0.194	0.163	0.163	0.163	---
	1/2	12.7	3/4	19	C <sub>V</sub>	0.487	0.952	1.40	2.07	2.90	3.55	4.54	6.16	8.79	11.2	0.50
					K <sub>V</sub>	0.421	0.823	1.21	1.79	2.51	3.07	3.93	5.33	7.60	9.69	---
					X <sub>T</sub>	0.226	0.137	0.124	0.111	0.111	0.144	0.174	0.185	0.180	0.186	---
	3/4	19.1	3/4	19	C <sub>V</sub>	0.840	1.58	2.25	2.86	3.82	5.51	8.69	11.8	14.4	16.8	0.67
					K <sub>V</sub>	0.727	1.37	1.95	2.47	3.30	4.77	7.52	10.2	12.5	14.5	---
					X <sub>T</sub>	0.194	0.142	0.168	0.238	0.288	0.292	0.242	0.259	0.318	0.372	---
2	1/4	6.4	3/4	19	C <sub>V</sub>	0.096	0.177	0.353	0.546	0.742	0.995	1.35	1.99	2.73	3.21	0.50
					K <sub>V</sub>	0.083	0.153	0.305	0.472	0.642	0.861	1.17	1.72	2.36	2.78	---
					X <sub>T</sub>	0.578	0.362	0.188	0.156	0.148	0.144	0.148	0.138	0.139	0.164	---
	3/8	9.5	3/4	19	C <sub>V</sub>	0.256	0.445	0.734	1.09	1.45	1.84	2.47	3.81	5.58	7.06	0.45
					K <sub>V</sub>	0.221	0.385	0.635	0.943	1.25	1.59	2.14	3.30	4.83	6.11	---
					X <sub>T</sub>	0.394	0.237	0.164	0.140	0.152	0.180	0.194	0.163	0.163	0.163	---
	1/2	12.7	3/4	19	C <sub>V</sub>	0.641	1.03	1.55	2.20	2.90	3.55	4.63	7.13	9.86	12.1	0.45
					K <sub>V</sub>	0.555	0.891	1.34	1.90	2.51	3.07	4.01	6.17	8.53	10.5	---
					X <sub>T</sub>	0.265	0.195	0.162	0.143	0.146	0.168	0.179	0.165	0.165	0.164	---
	3/4	19.1	3/4	19	C <sub>V</sub>	1.06	1.70	2.25	2.86	3.82	5.51	8.69	13.1	17.4	21.2	0.55
					K <sub>V</sub>	0.917	1.47	1.95	2.47	3.30	4.77	7.52	11.3	15.1	18.3	---
					X <sub>T</sub>	0.209	0.195	0.235	0.295	0.325	0.306	0.245	0.210	0.222	0.235	---
	1	25.4	3/4	19	C <sub>V</sub>	2.04	2.93	3.59	4.32	5.98	8.71	13.0	19.9	26.7	31.8	0.55
					K <sub>V</sub>	1.76	2.53	3.11	3.74	5.17	7.53	11.2	17.2	23.1	27.5	---
					X <sub>T</sub>	0.171	0.176	0.242	0.342	0.343	0.313	0.274	0.227	0.225	0.255	---
	1-1/4	31.8	3/4	19	C <sub>V</sub>	1.72	2.31	3.31	4.71	6.78	10.5	17.6	26.0	35.2	44.9	0.59
					K <sub>V</sub>	1.49	2.00	2.86	4.07	5.86	9.08	15.2	22.5	30.4	38.8	---
					X <sub>T</sub>	0.312	0.311	0.311	0.311	0.310	0.310	0.312	0.311	0.311	0.310	---

1. At 100% travel.

# D and DA Valves

Table 16. Design DA, Equal Percentage Valve Plug, Flow Up

Flow Up																Equal Percentage Characteristic
Valve Size, Inches	Port Diameter		Total Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										FL <sup>(1)</sup>
	Inches	mm	Inches	mm		10	20	30	40	50	60	70	80	90	100	
1	1/4	6.4	3/4	19	C <sub>V</sub>	0.070	0.115	0.164	0.224	0.315	0.450	0.641	0.921	1.28	1.66	0.87
					K <sub>V</sub>	0.060	0.100	0.142	0.194	0.273	0.389	0.555	0.797	1.11	1.44	---
					X <sub>T</sub>	0.783	0.783	0.744	0.695	0.625	0.614	0.609	0.611	0.610	0.611	---
	3/8	9.5	3/4	19	C <sub>V</sub>	0.155	0.260	0.407	0.596	0.858	1.21	1.65	2.22	3.00	4.03	0.84
					K <sub>V</sub>	0.134	0.225	0.352	0.516	0.742	1.05	1.43	1.92	2.60	3.49	---
					X <sub>T</sub>	0.625	0.535	0.534	0.539	0.535	0.535	0.538	0.534	0.537	0.536	---
	1/2	12.7	3/4	19	C <sub>V</sub>	0.273	0.436	0.631	0.911	1.30	1.84	2.57	3.65	5.08	6.51	0.84
					K <sub>V</sub>	0.236	0.377	0.546	0.788	1.12	1.59	2.22	3.16	4.39	5.63	---
					X <sub>T</sub>	0.673	0.644	0.641	0.590	0.592	0.587	0.586	0.557	0.524	0.549	---
	3/4	19.1	3/4	19	C <sub>V</sub>	0.483	0.775	1.25	1.97	2.89	4.13	5.87	8.16	10.9	12.3	0.92
					K <sub>V</sub>	0.418	0.670	1.08	1.70	2.50	3.57	5.08	7.06	9.43	10.6	---
					X <sub>T</sub>	0.571	0.599	0.527	0.473	0.492	0.519	0.537	0.505	0.486	0.628	---
2	1/4	6.4	3/4	19	C <sub>V</sub>	0.070	0.115	0.164	0.224	0.315	0.450	0.641	0.921	1.28	1.66	0.87
					K <sub>V</sub>	0.061	0.100	0.142	0.194	0.273	0.389	0.555	0.797	1.11	1.44	---
					X <sub>T</sub>	0.783	0.783	0.744	0.695	0.625	0.614	0.609	0.611	0.610	0.611	---
	3/8	9.5	3/4	19	C <sub>V</sub>	0.155	0.260	0.407	0.596	0.858	1.21	1.65	2.22	3.00	4.03	0.84
					K <sub>V</sub>	0.134	0.225	0.352	0.516	0.742	1.05	1.43	1.92	2.60	3.49	---
					X <sub>T</sub>	0.625	0.535	0.534	0.539	0.535	0.535	0.538	0.534	0.537	0.536	---
	1/2	12.7	3/4	19	C <sub>V</sub>	0.348	0.505	0.709	0.989	1.38	1.92	2.69	3.82	5.25	6.82	0.81
					K <sub>V</sub>	0.301	0.437	0.613	0.856	1.19	1.66	2.33	3.30	4.54	5.90	---
					X <sub>T</sub>	0.613	0.627	0.585	0.587	0.565	0.553	0.535	0.509	0.490	0.501	---
	3/4	19.1	3/4	19	C <sub>V</sub>	0.613	0.952	1.44	2.06	2.92	4.13	5.87	8.16	11.1	14.1	0.81
					K <sub>V</sub>	0.530	0.824	1.25	1.78	2.53	3.57	5.08	7.06	9.60	12.2	---
					X <sub>T</sub>	0.582	0.616	0.581	0.586	0.581	0.573	0.549	0.541	0.529	0.528	---
	1	25.4	3/4	19	C <sub>V</sub>	1.20	1.68	2.44	3.53	5.05	7.28	10.5	14.0	18.4	23.7	0.81
					K <sub>V</sub>	1.04	1.45	2.11	3.05	4.37	6.30	9.08	12.1	15.9	20.5	---
					X <sub>T</sub>	0.516	0.569	0.556	0.542	0.544	0.540	0.507	0.508	0.507	0.508	---
	1-1/4	31.8	3/4	19	C <sub>V</sub>	1.32	1.76	2.50	3.66	5.42	8.25	12.7	20.6	29.0	34.5	0.87
					K <sub>V</sub>	1.14	1.52	2.16	3.17	4.69	7.14	11.0	17.8	25.1	29.8	---
					X <sub>T</sub>	0.520	0.563	0.548	0.534	0.498	0.503	0.554	0.528	0.524	0.578	---

1. At 100% travel.

Table 17. Design DA, Micro-Flute Valve Plug, Flow Down and Flow Up

Micro-Flute - Flow Down														Equal Percentage Characteristic		
Valve Size, Inches	Port Diameter		Total Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
	Inches	mm	Inches	mm		10	20	30	40	50	60	70	80	90	100	
1 and 2	1/4 1 Flute	6.4 1 Flute	3/4	19	C <sub>V</sub>	0.0313	0.0377	0.0470	0.0624	0.0874	0.124	0.175	0.243	0.330	0.407	0.79
					K <sub>V</sub>	0.0271	0.0326	0.0407	0.0540	0.0756	0.107	0.151	0.210	0.286	0.352	---
					X <sub>T</sub>	0.990	0.975	0.867	0.765	0.659	0.569	0.494	0.450	0.450	0.550	---
	1/4 3 Flutes	6.4 3 Flutes	3/4	19	C <sub>V</sub>	0.0612	0.0900	0.136	0.210	0.310	0.430	0.573	0.784	1.12	1.42	0.68
					K <sub>V</sub>	0.0529	0.0779	0.118	0.182	0.268	0.372	0.496	0.678	0.969	1.23	---
					X <sub>T</sub>	0.669	0.520	0.388	0.313	0.295	0.306	0.326	0.326	0.313	0.378	---

Micro-Flute - Flow Up														Equal Percentage Characteristic		
1 and 2	1/4 1 Flute	6.4 1 Flute	3/4	19	C <sub>V</sub>	0.0385	0.0455	0.0560	0.0719	0.0942	0.124	0.162	0.212	0.278	0.354	0.87
					K <sub>V</sub>	0.0333	0.0394	0.0484	0.0622	0.0815	0.107	0.140	0.183	0.241	0.306	---
					X <sub>T</sub>	0.778	0.734	0.690	0.653	0.642	0.635	0.637	0.634	0.632	0.656	---
	1/4 3 Flutes	6.4 3 Flutes	3/4	19	C <sub>V</sub>	0.0562	0.0725	0.101	0.146	0.216	0.312	0.433	0.588	0.802	1.07	0.90
					K <sub>V</sub>	0.049	0.0627	0.0874	0.126	0.187	0.270	0.375	0.509	0.694	0.926	---
					X <sub>T</sub>	0.692	0.648	0.639	0.625	0.600	0.586	0.597	0.613	0.620	0.624	---

1. At 100% travel.

1. At 100% travel.

## Specifications

### Available Configurations

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

**Design DA:** Same as Design D except in angle configuration (figure 2)

### Valve Sizes and End Connections<sup>(1)</sup>

See table 1

### Maximum Inlet Pressures and Temperatures<sup>(1)(2)</sup>

See table 2

### Maximum Allowable Pressure Drops<sup>(2)</sup>

**Flow up:** Capable of full rated pressure drops

**Flow down:** See table 3 for pressure drop limits for ceramic trim

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

**Standard:** Class IV leakage

**Optional:** Class V

### Material Temperature Capabilities

–46 to 232°C (–50 to 450°F)

### Construction Materials

**Body, Bonnet, and Trim:** See table 4.

#### Packing:

**Standard:** ■ Single or ■ double PTFE V-ring packing for pressure service

**Optional:** Double PTFE/Composition

**Standard Gaskets:** S31600 (316 SST)

### Flow Characteristic

Equal percentage

### Flow Direction (see figure 2)

**Design D:** Flow up (through seat ring and past valve plug)

**Design DA:** ■ Flow up (through seat ring and past valve plug) or ■ flow down (past valve plug and through seat ring)

### Flow Coefficients and Noise Level Prediction

See table 5 and the section titled Coefficients in this bulletin or Fisher Catalog 12

### Port, Yoke Boss, Stem Diameters, and Rated Travels

See table 6

### Approximate Weights

**1-Inch:** 34 kg (75 pounds)

**2-Inch:** 45 kg (100 pounds)

### Options

■ Lubricator/isolating valve ■ VTC (ceramic) Trim with equal percentage characteristic (not available with Micro-Flute trim) ■ Tungsten Carbide trim (not available with Micro-Flute trim)

1. DIN (or other) ratings and end connections can usually be supplied; consult your Fisher sales office.

2. The pressure/temperature limits in this bulletin and in any applicable standard limitations should not be exceeded.

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