

FCD FCATB0100-00

Mark 100

Technical Bulletin



Long stroke lengths, fine control and superior capacity in smaller sizes

The Flowserve Mark 100 globe control offers the highest flow capacity, as well as fast, easy maintenance in both gas and liquid control. The Mark 100 also has longer stroke lengths and finer control—resulting in superior process control and smaller valve sizes.

With a clamped-in seat ring, the Mark 100 has been designed for easy maintenance and flexibility. The seat retainer (cage) in the Mark 100 can be changed out to provide an exceptional variety of severe service options, including anti-cavitation and anti-noise.

This bulletin has been designed to provide clear, easy to find information, allowing the user to specify and apply the Mark 100 control valve. Further sizing details are available in *Performance!*, the Flowserve control valve sizing program. Please contact your local Flowserve representative for further details.

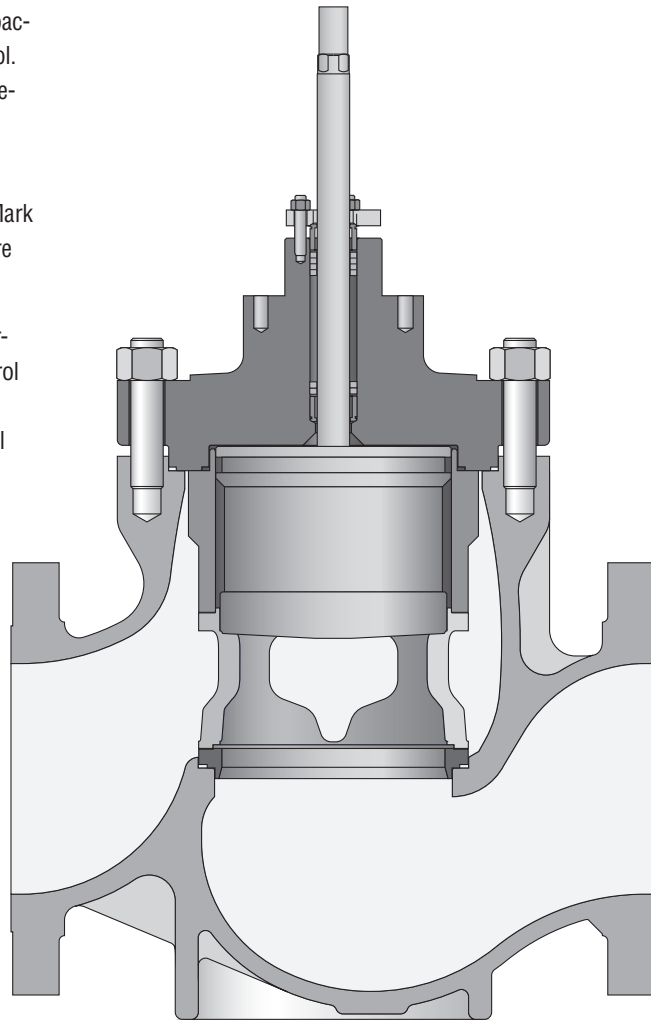


Figure 1: Mark 100 Ultra-Capacity Control Valve

Table 1: Specifications

Style	Globe
Sizes	6 inch through 16 inch
Pressure Classes	ANSI 150 through 600
End Connections	Flanged, butt weld
Face to Face	ISA 75.03, flanged; ISA 75.05, butt weld
Face Finish	Standard: 125-250 Optional: 250-500
Bonnet	Standard, extended
Packing Options	PTFE Vee-ring, PTFE square, Graphite, graphite-braided, SureGuard, SureGuard XT, SafeGuard, others on request
Trim Types	
Standard	Equal Percent, Linear, Quick Open
Low Noise	MegaStream, Stealth, TigerTooth
Anti-Cavitation	CavControl, ChannelStream, TigerTooth
Trim Materials	400 series, 300 series stainless steels
Leakage Rates	ANSI Class IV, VI (with optional soft seat), Class V

Table 2: Standard Trim Flow Capacities

Valve Size	Rating Class	Trim Size	Linear		Equal Percent	
			Under	Over	Under	Over
6	150-600	6.13	511	429	511	429
		5.00	341	286	341	286
		4.00	218	183	218	183
8	150-600	7.75	806	700	806	700
		6.25	524	455	524	455
		5.00	335	291	335	291
10	150-600	9.75	1265	1116	1265	1116
		8.00	852	751	852	751
		6.50	562	496	562	496
12	150-600	11.25	1705	1504	1705	1504
		9.00	1091	963	1091	963
		7.50	758	668	758	668
14	150-600	13.50	2376	2134	2376	2134
		11.00	1577	1417	1577	1417
		9.00	1056	948	1056	948
16	150-600	15.00	3021	2765	3021	2765
		12.00	1933	1770	1933	1770
		10.00	1343	1229	1343	1229

For complete C_v curves, refer to the Sizing and Selection manual or the Performance! sizing software.

Table 3: Standard Actuator Sizing Data

Size	Rating Class	Trim Size	Seat Area		Sleeve Diameter		Sleeve Area		Off Balance Area		Stem Diameter		Stem Area		Stroke	
			in ²	mm ²	in.	mm	in ²	mm ²	in ²	mm ²	in.	mm	in ²	mm ²	in.	mm
6	150 / 600	6.13	29.46	19009	6.500	165	33.18	21408	2.59	1673	1.125	28.6	0.99	641	3	76
		5.00	19.64	12668	5.250	133	21.65	13966	0.89	573	1.125	28.6	0.99	641	3	76
		4.00	12.57	8107	4.250	108	14.19	9152	0.49	319	1.125	28.6	0.99	641	3	76
8	150 / 600	7.75	47.17	30434	8.188	208	52.66	33971	4.36	2811	1.125	28.6	0.99	641	4	102
		6.25	30.68	19793	6.560	167	33.80	21805	1.99	1286	1.125	28.6	0.99	641	4	102
		5.00	19.64	12668	5.250	133	21.65	13966	0.89	573	1.125	28.6	0.99	641	4	102
10	150 / 600	9.75	74.66	48169	10.250	260	82.52	53236	6.35	4099	1.500	38.1	1.77	1140	5	127
		8.00	50.27	32429	8.375	213	55.09	35541	3.32	2144	1.500	38.1	1.77	1140	5	127
		6.50	33.18	21408	6.812	173	36.45	23513	1.76	1137	1.500	38.1	1.77	1140	5	127
12	150 / 600	11.25	99.40	64130	11.875	302	110.75	71454	9.35	6033	2.000	50.8	3.14	2027	6	152
		9.00	63.62	41043	9.438	240	69.96	45135	4.34	2802	2.000	50.8	3.14	2027	6	152
		7.50	44.18	28502	7.875	200	48.71	31424	2.53	1631	2.000	50.8	3.14	2027	6	152
14	150 / 600	13.50	143.14	92347	14.125	359	156.70	101096	11.56	7458	2.000	50.8	3.14	2027	7	178
		11.00	95.03	61312	11.560	294	104.96	67713	7.92	5111	2.000	50.8	3.14	2027	7	178
		9.00	63.62	41043	9.438	240	69.96	45135	4.34	2802	2.000	50.8	3.14	2027	7	178
16	150 / 600	15.00	176.71	114009	15.750	400	194.83	125695	15.61	10073	2.500	63.5	4.91	3167	8	203
		12.00	113.01	72966	12.625	321	125.19	80764	9.59	6186	2.500	63.5	4.91	3167	8	203
		10.00	78.54	50671	10.500	267	86.59	55865	5.55	3581	2.500	63.5	4.91	3167	8	203

Standard actuator size is 100 for all sizes and rating classes.

For packing friction data, refer to VLAIM0040, Standard and Environmental Packing Systems, or the Performance! sizing software.

Figure 2: Exploded View

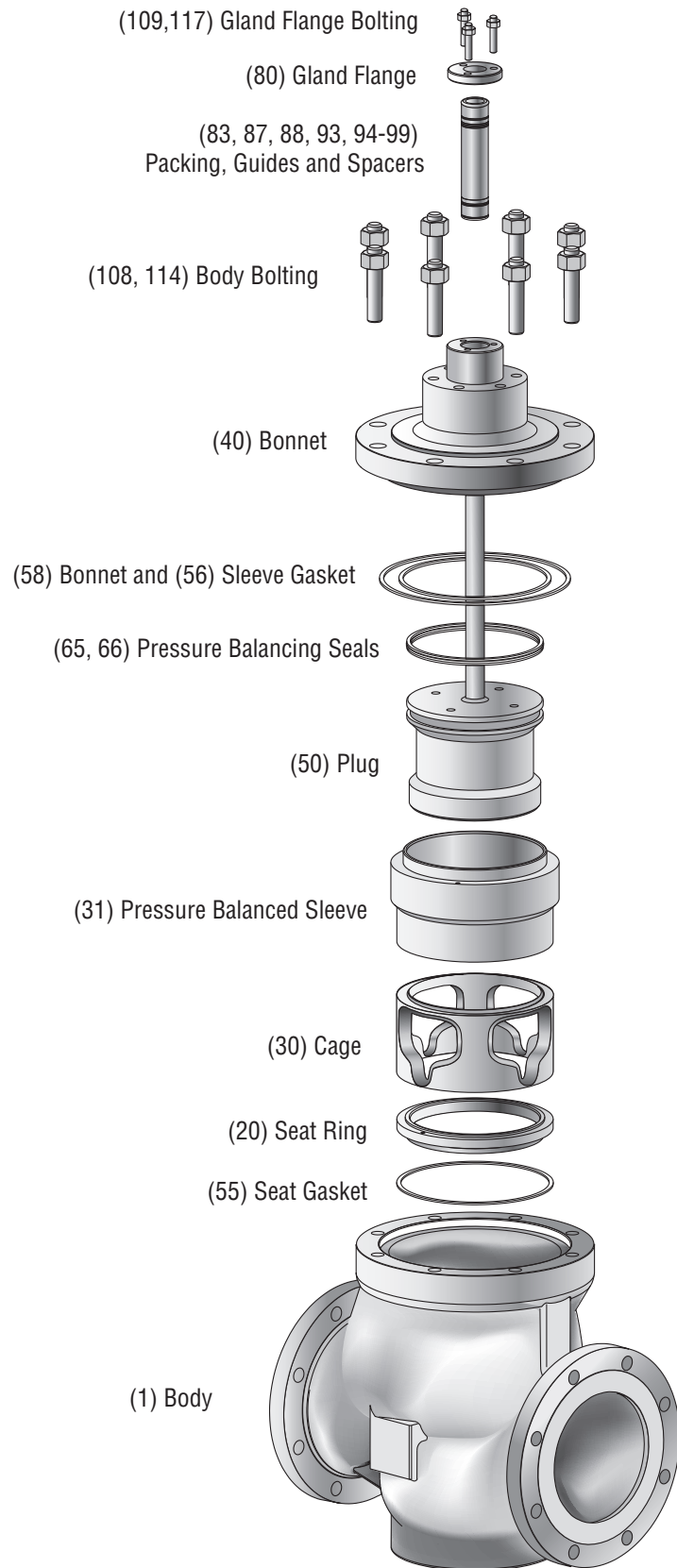


Table 4: Materials of Construction

Part	Item	Available Materials
Body	1	Carbon Steel ¹ , 316 SS ² , Chrome-moly WC9, Low Temp CS, 316L SS, 304L SS, 304 SS, Others
Seat Ring*	20	316 SS ^{1,2} , 410 SS HT, 416 SS HT, 17-4PH, 420 SS HT, Monel, Titanium, 316L SS, 304L SS, 304 SS, Others
Plug*	50	316 SS, 416 SS HT ^{1,2} , 17-4PH, 420 SS HT, Monel, Bronze, 316L SS, 304L SS, 304 SS, Other
Plug Stem	51	17-4PH ^{1,2} , 316 SS, 316 SS / Alloy 6, 416 SS HT, Other
Cage	30	316 SS ^{1,2} , Al-Bronze, 410 SS HT, 416 SS HT, 17-4PH, 316L SS, 304L SS, 304 SS, Others
Pressure Balanced Sleeve	31	316 SS ^{1,2} , 410 Annealed, 410 SS HT, 420 SS HT, 316 SS w/ Alloy 6, Other
Bonnet	40	Carbon Steel ¹ , 316 SS ² , Chrome-moly WC9, Low Temp CS, 316L SS, 304L SS, 304 SS, Others
Seat Gasket	55	PTFE ^{1,2} , Spiral Graphite
Sleeve Gasket	56	PTFE ^{1,2} , Spiral Graphite
Bonnet Gasket	58	PTFE ^{1,2} , Spiral Graphite
Seal Types		
O-Ring Seal	65	Buna, Viton, EPDM, Kalrez
	66	Carbon-Filled PTFE, PEEK, Vespel, Ryton
PTFE Seal	65	PTFE, Glass-Loaded PTFE
Metal Mult-Seal	65	Rene 41 and Rene 41 (set), Rene 41, Iconel X-750 (set)
Carbon Single Seal	65	Carbon
Carbon Triple Seal	65	Carbon (set)

Part	Item	Available Materials
Gland Flange	80	Carbon Steel / Plated ¹ , Stainless Steel ²
Gland Flange Bolting	109, 117	Carbon Steel ¹ , Stainless Steel ²
Lower Guide	83	316 SS / GL PTFE ^{1,2} , 316 SS / Graphite, Bronze C93200, Alloy 6, 316L SS / GL PTFE, 316L SS / Graphite, 304L SS / GL PTFE, 304L SS / Graphite, 304 SS / GL PTFE, 304 SS / Graphite, Ultemet, Others
Upper Guide	87	316 SS / GL PTFE ^{1,2} , 316 SS / Graphite, Bronze C93200, Al Bronze C95200, 316L SS / GL PTFE, 316L SS / Graphite, 304L SS / GL PTFE, 304L SS / Graphite, 304 SS / GL PTFE, 304 SS / Graphite, Others
Packing	88	PTFE V-Ring ^{1,2} , PTFE/Glass V-ring, Quick-Set 9001, Braided PTFE, AFPI, Graphite Rib/Braid, Safeguard, Sureguard, 1303 FEP, Chesterton 5800E, Sureguard XT, Latty 3260 LM, Latty 3260 LM/6118, KVSP 500 (LL), TA-Luft Double Graphite, Others
Anti-Extrusion Spacer	93	316 SS, Monel, Titanium, 316L SS, 304L SS, 304 SS ^{1,2} , Others
Body Bolting	108	B7-2H Zinc-coated ¹ , B7-2H Oxide-coated, B7M-2HM (NACE), PTFE B7-2H, B8-8 (304 SS) ² , B8M-8M (NACE), L7-7, L7M-7M (NACE), B16-16, B7-2H Uncoated, L7M-7M Uncoated (NACE), Others
Packing Spacers	94-99	316 SS ^{1,2} , Monel, Titanium, 316L SS, 304L SS, 304 SS, Others

* The Seat Ring and Plug have Trim Facing on the seating surfaces of Alloy 6, Full Bore Alloy 6 and others.

¹ Standard, Carbon Steel Construction

² Standard, Stainless Steel Construction

Figure 3: Dimensions

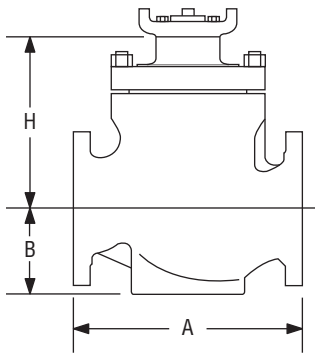


Table 5: Pressure Balanced Seal Limits

Seal Style	ANSI Shutoff	Lower		Upper	
		°F	°C	°F	°C
Buna O-ring	Class V	-60	-51	250	121
Viton O-ring	Class V	0	-18	400	204
EPDM O-ring	Class V	-20	-29	350	177
Filled PTFE Seal Rings	Class IV	-60	-51	400	204
Spring Energized Seals	Class V	-350	-212	300	149
Carbon Seals	Class IV	0	-18	1100	593
Metal Multi Seals	Class III	300	149	1600	871

Table 6: Dimensions

Valve Size	Pressure Class	Face to Face (per ISA 75.03, long)		Match to Center		Center to Base	
		A		H		B	
		in.	mm	in.	mm	in.	mm
6	150	17.71	450	13.82	351	6.36	162
	300	18.62	473	13.82	351	6.97	177
	600	20.00	508	13.82	351	7.51	191
8	150	21.38	543	16.57	421	7.74	197
	300	22.38	569	16.57	421	8.35	212
	600	24.00	610	16.57	421	8.89	226
10	150	26.50	673	19.08	485	9.31	237
	300	27.88	708	19.08	485	9.92	252
	600	29.62	752	19.08	485	11.06	281
12	150	29.00	737	21.71	551	10.92	277
	300	30.50	775	21.71	551	11.06	281
	600	32.25	819	21.71	551	12.19	310
14	150	35.00	889	24.70	627	CF	CF
	300	36.50	927	24.70	627	12.75	324
	600	38.25	972	24.70	627	CF	CF
16	150	40.00	1016	26.90	683	CF	CF
	300	41.62	1057	26.90	683	14.11	358
	600	43.62	1108	26.90	683	CF	CF

Table 7: Severe Service Trim Options*

Trim	Description	
CavControl	Anti-Cavitation, controls cavitation by directing the bubbles away from metal surfaces	
ChannelStream	Anti-Cavitation, eliminates cavitation through staged pressure drops	
MegaStream	Anti-Noise, eliminates noise through staged pressure drops, attenuation and frequency shifting	
TigerTooth, noise	Anti-Noise, eliminates noise through staged pressure drops and attenuation	
TigerTooth, cavitation	Anti-Cavitation, eliminates cavitation through staged pressure drops	
Stealth	Anti-noise, eliminates noise through staged pressure drops, attenuation and frequency shifting	

*For full details, see document VLATB0103.

Table 8: Actuator Mounting Data (See Figure 4)

Size	Press. Class	Spud Size		Plug Thread	Plug Thread Depth		Plug Height		Bolt Circle Diameter		No. of Bolts	Bolt Thread	Bolt Depth		Stroke Length	
		A		B	C		D		E		F	G	H		in.	mm
		in.	mm		in.	mm	in.	mm	in.	mm			in.	mm		
6	150	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	3	76.20
	300	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	3	76.20
	600	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	3	76.20
8	150	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	4	101.60
	300	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	4	101.60
	600	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	3/8-16	0.5	12.70	4	101.60
10	150	3.38	85.85	1 1/16-12	2.12	53.85	6.5	165.10	5	127.00	6	3/8-16	0.5	12.70	5	127.00
	300	3.38	85.85	1 1/16-12	2.12	53.85	6.5	165.10	5	127.00	6	3/8-16	0.5	12.70	5	127.00
	600	3.38	85.85	1 1/16-12	2.12	53.85	6.5	165.10	5	127.00	6	3/8-16	0.5	12.70	5	127.00
12	150	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	6	152.40
	300	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	6	152.40
	600	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	6	152.40
14	150	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	7	177.80
	300	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	7	177.80
	600	4.75	120.65	1 1/2-12	2.25	57.15	6.7	170.18	6.5	165.10	6	1/2-13	0.62	15.75	7	177.80
16	150	4.75	120.65	2-12	2.25	57.15	7.19	182.63	6.5	165.10	6	1/2-13	0.62	15.75	8	203.20
	300	4.75	120.65	2-12	2.25	57.15	7.19	182.63	6.5	165.10	6	1/2-13	0.62	15.75	8	203.20
	600	4.75	120.65	2-12	2.25	57.15	7.19	182.63	6.5	165.10	6	1/2-13	0.62	15.75	8	203.20

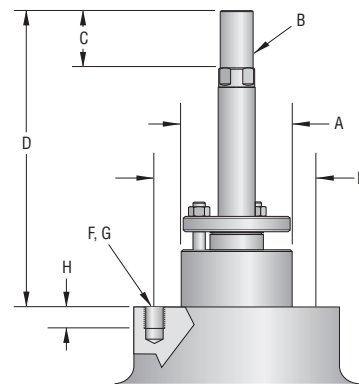
Table 9: Aluminum Actuators

Valve Size	Rating Class	100	200	300	400	600
6	150 / 600	Std	Opt	—	—	—
8	150 / 600	Std	Opt	—	—	—
10	150 / 600	Std	Opt	—	—	—
14	150 / 600	Std	Opt	Opt	Opt	Opt
16	150 / 600	Std	Opt	Opt	Opt	Opt

Table 10: Carbon Steel Actuators

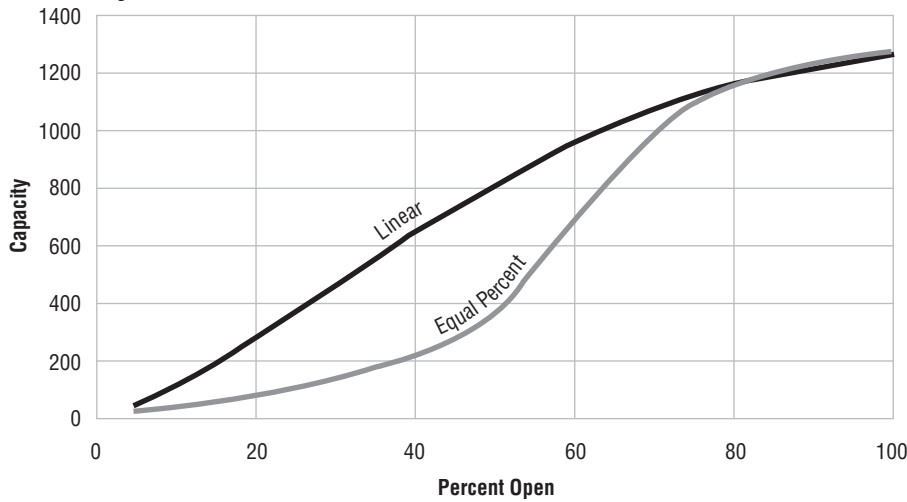
Valve Size	Rating Class	100	150	200	300
6	150 / 600	Std	Opt	—	—
8	150 / 600	Std	Opt	—	—
10	150 / 600	Std	Opt	—	—
12	150 / 600	Std	Opt	Opt	Opt
14	150 / 600	Std	Opt	Opt	Opt
16	150 / 600	Std	Opt	Opt	Opt

Figure 4: Actuator Mounting Dimensions



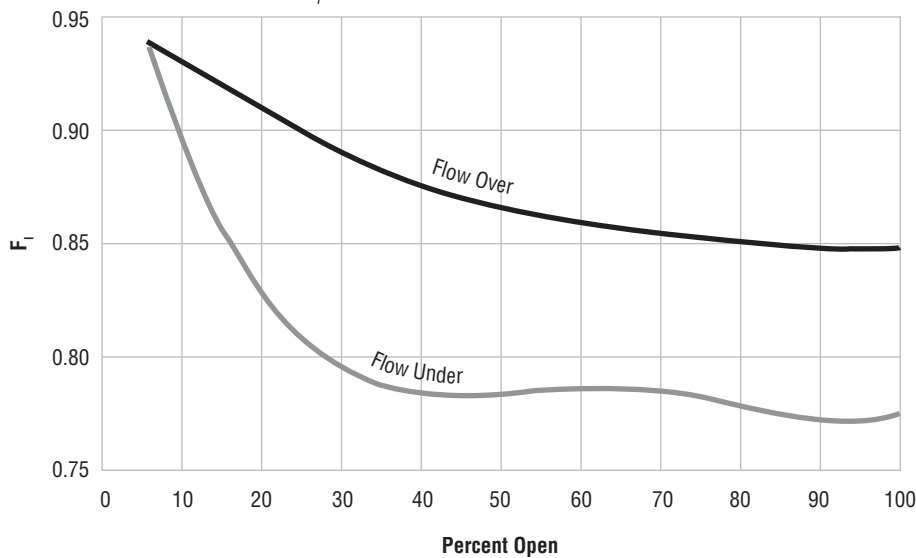
Note: Dimensions are with the plug on the seat.

Figure 5: Characteristic Flow Curves, 10", Full Area



NOTE: Flow curves are representative. See Sizing and Selection manual or *Performance!* sizing software for detailed curves for each trim and valve size.

Figure 6: Mark 100 F_1 Values



NOTE: F_1 values shown represent an equal percentage, full area, standard trim.

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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