FLOWSERVE

TECHNICAL BULLETIN

Mark 100

Experience In Motion

Long stroke lengths for fine control with superior capacity in smaller valve 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 providing finer control — resulting in superior process control in 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.

The plug is always pressure-balanced to allow smaller and more economical actuators. Flow over or under the plug is available.

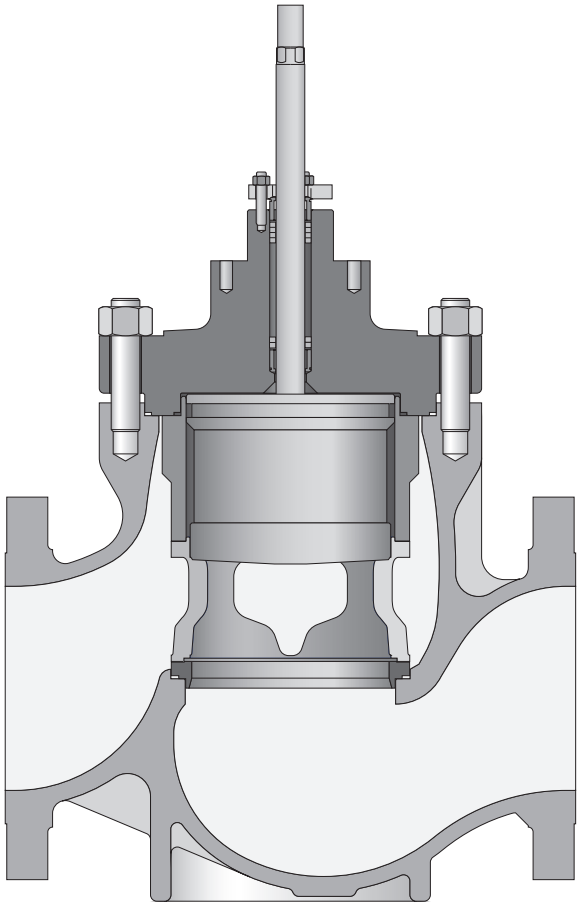


Figure 1: Mark 100 Ultra-Capacity Control Valve

Style	Globe
Sizes	6 inch through 16 inch
Pressure Classes	ANSI 150 through 600
End Connections	Flanged, buttweld
Face to Face	ISA 75.03, flanged; ISA 75.05, buttweld
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
Anti-Cavitation	CavControl, ChannelStream, Diamondback
Trim Materials	400 series, 300 series stainless steels
Leakage Rates	ANSI Class IV, VI (with optional soft seat), Class V

Table 1: Specifications

Valve Size	Rating Class	Trim Size	Stroke		Linear		Equal Percent	
			in.	mm	Under	Over	Under	Over
6	150-600	6.13	3	76	511	429	511	429
		5.00	3	76	341	286	341	286
		4.00	2.5	64	218	183	218	183
8	150-600	7.75	4	102	806	700	806	700
		6.25	4	102	524	455	524	455
		5.00	3	76	335	291	335	291
10	150-600	9.75	5	127	1265	1116	1265	1116
		8.00	5	127	852	751	852	751
		6.50	4	102	562	496	562	496
12	150-600	11.25	6	152	1705	1504	1705	1504
		9.00	6	152	1091	963	1091	963
		7.50	5	127	758	668	758	668
14	150-600	13.50	7	178	2376	2134	2376	2134
		11.00	6	152	1577	1417	1577	1417
		9.00	5	127	1056	948	1056	948
16	150-600	15.00	8	203	3021	2765	3021	2765
		12.00	7	178	1933	1770	1933	1770
		10.00	6	152	1343	1229	1343	1229
18	150-300	16.50	9	229	3995	3905	3995	3905
		13.50	8	203	2674	2614	2674	2614
		11.00	7	178	1790	1750	1790	1750
	600	16.50	9	229	3870	3922	3870	3622
		13.50	8	203	2591	2625	2591	2625
		11.00	7	178	1734	1758	1734	1758
20	150-300	18.50	10	254	4862	4973	4890	4521
		15.00	9	229	3196	3269	3215	2972
		12.00	8	203	2106	2149	2113	1954
	600	18.50	10	254	4872	5068	4811	4646
		15.00	9	229	3203	3332	3163	3054
		12.00	8	203	2106	2190	2079	7847
24	150-300	24.00	12	305	8660	7715	8660	7715
		19.50	11	279	5717	5093	5717	5093
		15.50	10	254	3774	3362	3774	3362
	600	24.00	12	305	7874	7825	7825	7835
		19.50	11	279	5180	5166	5166	5172
		15.50	10	254	3420	3410	3410	3415
30	150-300	28.00	15	381	10925	10277	10925	10277
		23.00	14	356	7372	6934	7372	6934
		18.50	13	330	4974	4679	4974	4679
	600	28.50	15	381	10707	10064	10707	10064
		23.00	14	356	7224	6791	7224	6791
		18.50	13	330	4875	4582	4875	4582

Table 2: Standard Trim Flow Capacities

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

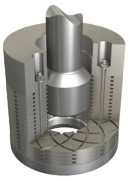
Trim	Description	
CavControl	Anti-Cavitation, controls cavitation by directing the bubbles away from metal surfaces	
ChannelStream	Anti-Cavitation, eliminates cavitation through staged pressure drops	
MegaStream	Anti-Noise, eliminates noise through staged pressure drops, attenuation and frequency shifting	
Diamondback	Anti-Cavitation, eliminates cavitation through staged pressure drops. Ideal for slurry applications or fluids with large particles	

Table 3: Severe Service Trim Options

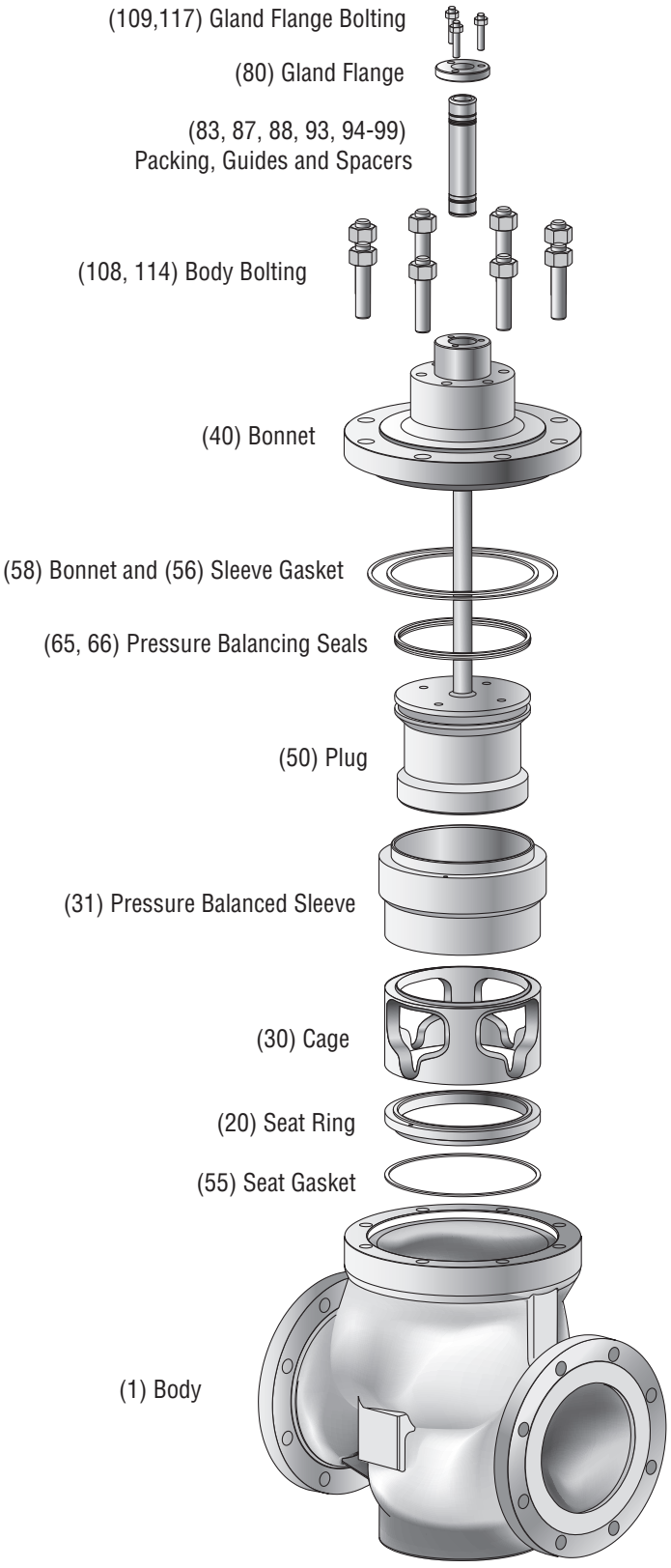


Figure 2: Exploded View

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, Inconel X-750
Carbon Single Seal	65	Carbon
Carbon Triple Seal	65	Carbon
Gland Flange	80	Carbon Steel/Plated[1], Stainless Steel[2]
Gland Flange Bolting	109, 117	Carbon Steel, 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, Ultimet, 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-Ring1, 2, PTFE/Glass V-ring, QuickSet 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 SS1, 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

Table 4: Materials of Construction

* 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

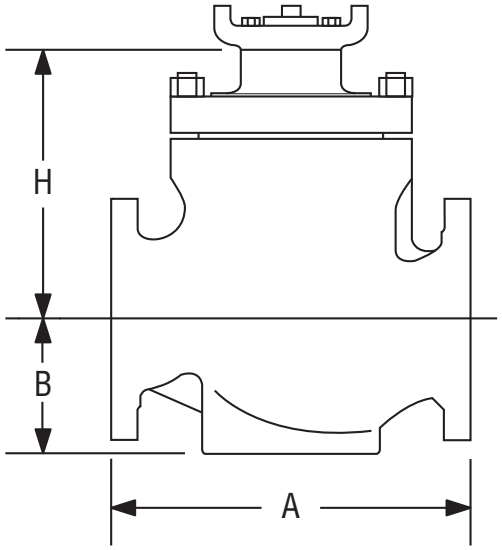


Figure 3: Dimensions

Seal Style	ANSI Shutoff	Lower		Upper	
		ºF	ºC	ºF	ºC
Buna O-ring	Class V	-40	-40	250	121
Viton O-ring	Class V	-15	-26	400	204
EPDM O-ring	Class V	-50	-46	350	177
Filled PTFE Seal Rings	Class IV	-200	-129	400	204
Spring Energized Seals	Class V	-325	-198	350	177
Carbon Seals	Class IV**	-20	-29	-1200*	-684*
Metal Multi Seals	Class IV**	-425	-245	1600	871

Table 5: Pressure Balanced Seal Limits

* 800 F or 426 C in oxidizing service

**Limited to Class III for severe service trims with reduced Cv

Valve Size	Pressure Class	Face to Face (per ISA 75.0[3], 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	236
	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	12.4	315
	300	36.50	927	24.70	627	12.8	325
	600	38.25	972	24.70	627	13.8	351
16	150	40.00	1016	26.90	683	13.3	338
	300	41.62	1057	26.90	683	14.11	358
	600	43.62	1108	26.90	683	15.8	401
18	150	52.00	1321	30.70	780	16.6	422
	300	52.00	1321	30.70	780	16.6	422
	600	56.00	1422	30.70	780	17.2	437
20	150	58.00	1473	33.20	843	18.5	470
	300	58.00	1473	33.20	843	18.5	470
	600	62.00	1575	33.20	843	19.3	490
24	150	70.00	1778	41.40	1052	22.4	569
	300	70.00	1778	41.40	1052	22.4	569
	600	75.00	1905	41.40	1052	23.2	589
30	150	84.00	2134	47.30	1201	25.9	658
	300	84.00	2134	47.30	1201	25.9	658
	600	92.00	2337	47.30	1201	29.6	752

Table 6: Dimensions

Size	Class	Typ Actuator Size	Weight*		Minimum Shipping Crate Dimensions					
					Width		Length		Height	
			lbs	kg	in.	m	in.	m	in.	m
6	150	50	412	187	18	0.46	43	1.09	13	0.33
	300		466	212	19	0.48	43	1.09	14	0.36
	600		593	270	20	0.51	44	1.12	15	0.38
8	150	100	630	286	22	0.56	53	1.35	15	0.38
	300		630	286	23	0.58	54	1.37	16	0.41
	600		834	379	25	0.64	55	1.40	17	0.43
10	150	100	977	444	27	0.69	61	1.55	18	0.46
	300		1492	678	29	0.74	62	1.57	19	0.48
	600		1600	727	31	0.79	63	1.60	20	0.51
12	150	100	1325	602	30	0.76	65	1.65	22	0.56
	300		1643	747	31	0.79	65	1.65	23	0.58
	600		2227	1012	33	0.84	66	1.68	24	0.61
14	150	100	2110	959	36	0.91	70	1.78	25	0.64
	300		2485	1130	38	0.97	71	1.80	26	0.66
	600		3305	1502	39	0.99	73	1.85	27	0.69
16	150	200	2525	1148	41	1.04	74	1.88	28	0.71
	300		3175	1443	43	1.09	75	1.91	29	0.74
	600		4225	1920	45	1.14	77	1.96	30	0.76
18	150	200	4525	1057	53	1.35	92	2.34	32	0.81
	300		4925	2239	53	1.35	92	2.34	32	0.81
	600		6475	2943	57	1.45	93	2.36	33	0.84
20	150	200	5195	2361	59	1.50	97	2.46	35	0.89
	300		5775	2625	59	1.50	97	2.46	35	0.89
	600		7670	3486	63	1.60	98	2.49	36	0.91
24	150	200	9710	4414	71	1.80	109	2.77	47	1.19
	300		10810	4914	71	1.80	109	2.77	47	1.19
	600		14460	6573	76	1.93	109	2.77	47	1.19
30	150	300	13990	6359	85	2.16	123	3.12	51	1.30
	300		15184	6902	85	2.16	123	3.12	51	1.30
	600		19475	8852	93	2.36	128	3.25	51	1.30

Table 7: Shipping Weights and Crate Dimensions

* Approximate combined body and standard actuator weight

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	6.312	160	31.29	20188	0.83	535	1.125	28.6	0.99	641	3	76
		5.00	19.64	12668	5.188	132	21.14	13638	0.51	329	1.125	28.6	0.99	641	3	76
		4.00	12.57	8107	4.250	108	14.19	9152	0.63	406	1.125	28.6	0.99	641	2.5	64
8	150-600	7.75	47.17	30434	7.938	202	49.49	31929	1.32	852	1.125	28.6	0.99	641	4	102
		6.25	30.68	19793	6.438	164	32.55	21002	0.88	568	1.125	28.6	0.99	641	4	102
		5.00	19.64	12668	5.188	132	21.14	13638	0.51	329	1.125	28.6	0.99	641	3	76
10	150-600	9.75	74.66	48169	9.938	252	77.57	50044	1.14	735	1.500	38.1	1.77	1140	5	127
		8.00	50.27	32429	8.250	210	53.46	34488	1.42	916	1.500	38.1	1.77	1140	5	127
		6.50	33.18	21408	6.813	173	36.46	23520	1.51	974	1.500	38.1	1.77	1140	4	102
12	150-600	11.25	99.40	64130	11.562	294	104.99	67737	2.45	1581	2.000	50.8	3.14	2027	6	152
		9.00	63.62	41043	9.375	238	69.03	44535	2.27	1465	2.000	50.8	3.14	2027	6	152
		7.50	44.18	28502	8.000	203	50.27	32429	2.95	1903	2.000	50.8	3.14	2027	5	127
14	150-600	13.50	143.14	92347	13.750	349	148.49	95799	2.21	1426	2.000	50.8	3.14	2027	7	152
		11.00	95.03	61312	11.312	287	100.50	64839	2.33	1503	2.000	50.8	3.14	2027	6	152
		9.00	63.62	41043	9.375	238	69.03	44535	2.27	1465	2.000	50.8	3.14	2027	5	127
16	150-600	15.00	176.71	114009	15.375	391	185.66	119781	4.04	2606	2.500	63.5	4.91	3167	8	203
		12.00	113.01	72966	12.500	318	122.72	79173	4.71	3039	2.500	63.5	4.91	3167	7	178
		10.00	78.54	50671	10.562	268	87.66	56526	4.17	2690	2.500	63.5	4.91	3167	6	152
18	150-600	16.50	213.82	137951	16.813	427	222.00	143226	3.25	2097	2.500	63.5	4.91	3167	9	229
		13.50	143.14	92347	13.938	354	152.58	98437	4.53	2923	2.500	63.5	4.91	3167	8	203
		11.00	95.03	61312	11.500	292	103.87	67012	3.93	2535	2.500	63.5	4.91	3167	7	178
20	150-600	18.50	268.80	173421	18.813	478	277.96	179329	4.23	2729	2.500	63.5	4.91	3167	10	254
		15.00	176.71	114009	15.375	391	185.66	119781	4.04	2606	2.500	63.5	4.91	3167	9	229
		12.00	113.10	72966	12.500	318	122.72	79173	4.71	3039	2.500	63.5	4.91	3167	8	203
24	150-600	24.00	452.39	291864	24.250	616	461.86	297976	4.57	2948	2.500	63.5	4.91	3167	12	305
		19.50	298.65	192676	19.813	503	308.30	198900	4.72	3045	2.500	63.5	4.91	3167	11	279
		15.50	188.69	121736	15.875	403	197.93	127698	4.33	2794	2.500	63.5	4.91	3167	10	254
30	150-600	28.00	615.75	397259	28.132	719	629.55	406161	6.73	4342	3.00	76.2	7.07	4560	15	381
		23.00	415.48	268048	23.375	594	429.13	276860	6.59	4252	3.00	76.2	7.07	4560	14	356
		18.50	268.80	173421	18.938	481	281.68	181730	5.81	3748	3.00	76.2	7.07	4560	13	330

Table 8: Standard Actuator Sizing Data

Standard actuator size is 100 for all valve sizes up through 14”; size 200 for valve sizes 16” - 20”; and size 300 for valve sizes 24” and 30”.
For packing friction data, refer to VLAIM0040, Standard and Environmental Packing Systems, or the Performance! sizing software.

Size	Press. Class	Spud Size		Plug Thread	Plug Thread Depth		Plug Height		Bolt Circle Diameter		No. of Bolts	Bolt Thread	Bolt Depth		Maximum Std 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	5/8-11	0.75	19.05	3	76.20
	300	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	5/8-11	0.75	19.05	3	76.20
	600	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	5/8-11	0.75	19.05	3	76.20
8	150	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	5/8-11	0.75	19.05	4	101.60
	300	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	5/8-11	0.75	19.05	4	101.60
	600	3.38	85.85	1-12	1.62	41.15	6.07	154.18	5	127.00	6	5/8-11	0.75	19.05	4	101.60
10	150	3.38	85.85	1 5⁄16-12	2.12	53.85	6.5	165.10	5	127.00	6	5/8-11	0.75	19.05	5	127.00
	300	3.38	85.85	1 5⁄16-12	2.12	53.85	6.5	165.10	5	127.00	6	5/8-11	0.75	19.05	5	127.00
	600	3.38	85.85	1 5⁄16-12	2.12	53.85	6.5	165.10	5	127.00	6	5/8-11	0.75	19.05	5	127.00
12	150	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	6	152.40
	300	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	6	152.40
	600	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	6	152.40
14	150	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	7	177.80
	300	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	7	177.80
	600	4.75	120.65	1½-12	2.25	57.15	6.7	170.18	6.5	165.10	6	5/8-11	0.75	19.05	7	177.80
16	150	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	8	203.20
	300	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	8	203.20
	600	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	8	203.20
18	150	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	9	228.60
	300	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	9	228.60
	600	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	9	228.60
20	150	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	10	254.00
	300	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	10	254.00
	600	4.75	120.65	1½-12	2.25	57.15	7.19	182.63	6.5	165.10	6	5/8-11	0.75	19.05	10	254.00
24	150	4.75	120.65	2-12	2.75	69.85	7.5	190.50	6.5	165.10	8	3/4-10	0.88	22.35	12	304.80
	300	4.75	120.65	2-12	2.75	69.85	7.5	190.50	6.5	165.10	8	3/4-10	0.88	22.35	12	304.80
	600	4.75	120.65	2-12	2.75	69.85	7.5	190.50	6.5	165.10	8	3/4-10	0.88	22.35	12	304.80
30	150	6	152.40	2-12	2.75	69.85	7.5	190.50	7.75	196.85	8	3/4-10	0.88	22.35	15	381.00
	300	6	152.40	2-12	2.75	69.85	7.5	190.50	7.75	196.85	8	3/4-10	0.88	22.35	15	381.00
	600	6	152.40	2-12	2.75	69.85	7.5	190.50	7.75	196.85	8	3/4-10	0.88	22.35	15	381.00

Table 9: Actuator Mounting Data (See Figure 4)

*Strokes may be longer for equal percent severe service trim

		Aluminum Actuators					Carbon Steel Actuators - VLC & VL-ES				
Valve Size	**Rating Class**	**[1]00**	**[2]00**	**[3]00**	**400**	**600**	**[1]00**	**[1]50**	**[2]00**	**[3]00***	**400***
6	150 / 600	Std	Opt	—	—	—	Std	Opt	Opt	—	—
8	150 / 600	Std	Opt	—	—	—	Std	Opt	Opt	—	—
10	150 / 600	Std	Opt	—	—	—	Std	Opt	Opt	—	—
12	150 / 600	Std	Opt	Opt	Opt	—	Std	Opt	Opt	Opt	Opt
14	150 / 600	Std	Opt	Opt	Opt	—	Std	Opt	Opt	Opt	Opt
16	150 / 600	Opt	Std	Opt	Opt	Opt	Opt	Opt	Std	Opt	Opt
18	150 / 600	Opt	Std	Opt	Opt	Opt	Opt	Opt	Std	Opt	Opt
20	150 / 600	Opt	Std	Opt	Opt	Opt	Opt	Opt	Std	Opt	Opt
24	150 / 600		Opt	Std	Opt	Opt	—	—	Opt	Std	Opt
30	150 / 600		Opt	Std	Opt	Opt	—	—	Opt	Std	Opt

Table 10: Actuators

* Only available in VL-ES

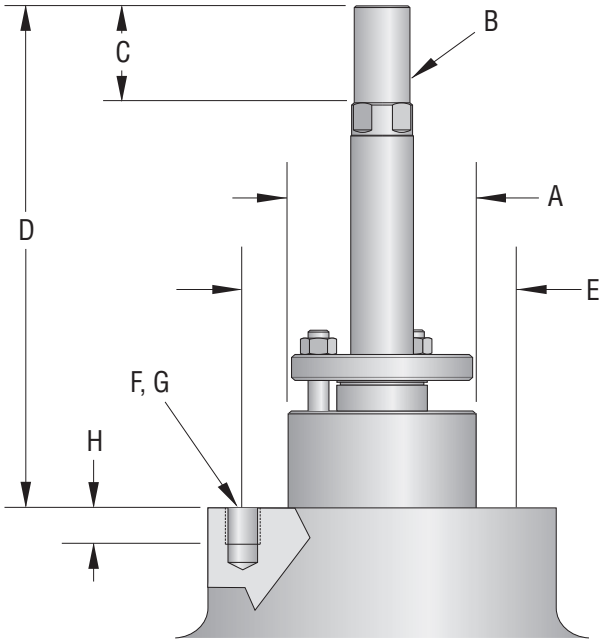


Figure 4: Actuator Mounting Dimensions

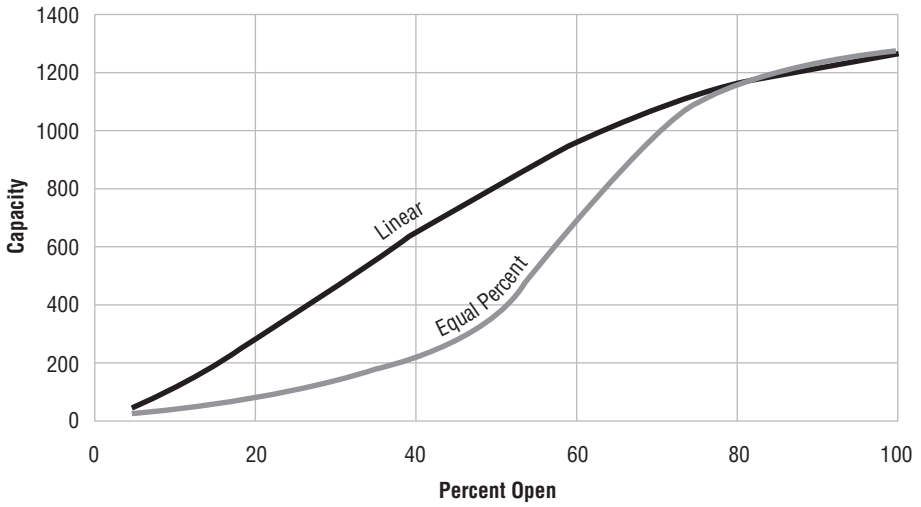


Figure 5: Characteristic Flow Curves, 10", Full Area

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

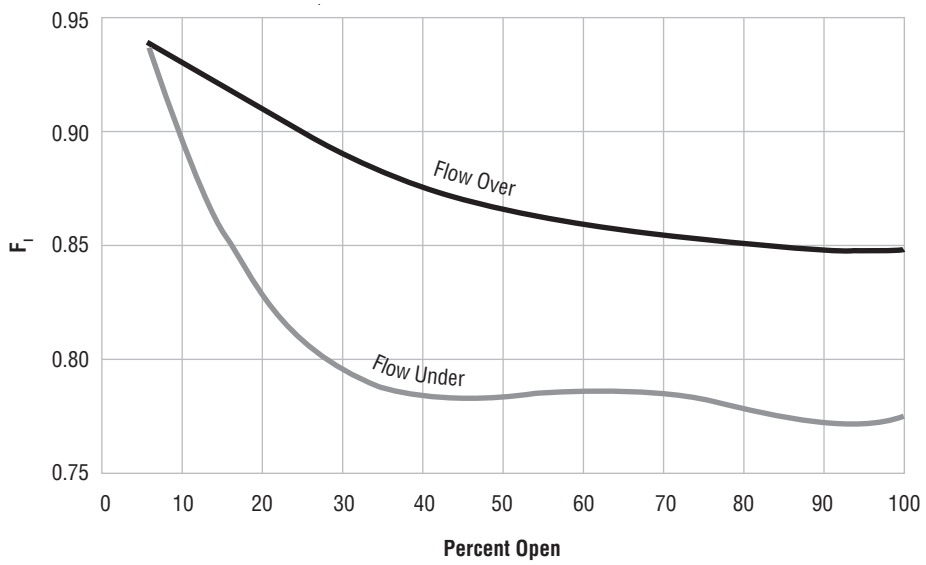


Figure 6: Mark 100 F Values

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

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