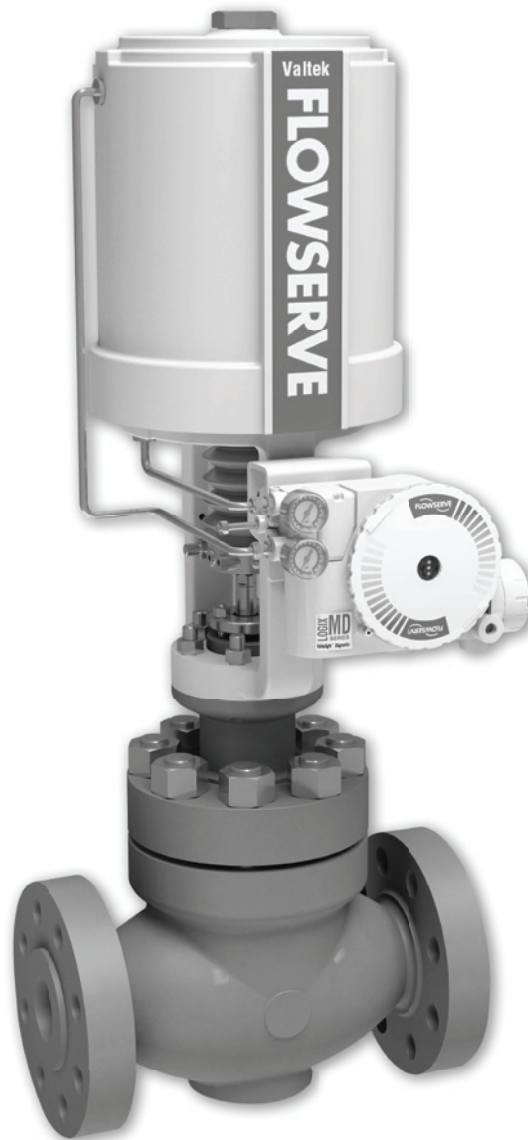




TECHNICAL BULLETIN

Valtek Mark 200 Globe & Angle Control Valve

FCD VLENTB0200 12/12



Valtek Mark 200 High Pressure Control Valve

The Mark 200 high pressure globe control valve designed to handle the most extreme severe service applications also offers high competitive flow capacity. The Mark 200's large galleries include longer stroke lengths which provide finer control and result in more stages of severe service protection in smaller size valves. With a clamped-in (DIN, screwed-in) seat ring, the Mark 200 has been designed for easy maintenance and flexibility. The seat retainer/cage (DIN, seat ring) in the Mark 200 can be changed out to provide an exceptional variety of severe service options, including cavitation control and noise abatement. This bulletin has been designed to provide clear, easy to find information, allowing the user to specify and apply the Mark 200 control valve. Further sizing details are available in *Performance!*, Flowserve's control valve sizing & selection software program (please contact your local Flowserve representative for further details). The Mark 200 plug is typically pressure-balanced to allow smaller and more economical actuators. Flow over or under the plug is available.

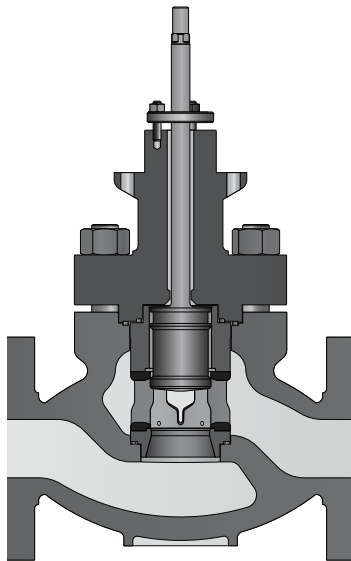


Figure 1: ASME Mark 200 Cut-Away

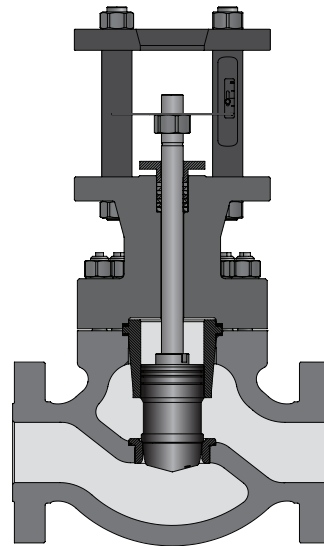


Figure 2: DIN Mark 200 Cut-Away

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Table 1:

Specifications

	ASME	DIN
Style	Globe & angle	Globe & angle
Sizes	2 inch through 16 inch*	DN 50 through DN 400
Pressure Classes	ASME 900, 1500, 2500	PN 160 and PN 250
End Connections	Flanged, buttweld, RTJ flanged	Flanged, according to EN 1092-1:2008 Form B1
Face to Face	ISA 75.08.06, flanged; ISA 75.08.05, buttweld; ASME B16.10 RTJ	Globe, according to DIN EN 558:2008 GR105 (PN 160) + GR106 (PN 250) Angle, according to DIN EN 558:2008 GR105/2 (PN 160) + GR93 (PN 250)
Face Finish	Standard: 125-250	Ra 3,2 - 12,5 μm according EN 1092-1:2008 Form B1 (std. = 6,3 μm)
	Optional: 250-500	Not applicable
Bonnet	Standard, extended	Standard, heavy duty design, unbalanced standard heavy duty design, piston ring balanced
Packing Options	PTFE Vee-ring, PTFE square, Graphite, Graphite-braided, SureGuard, SureGuardXT, SafeGuard, others on request	Adjustable, graphite rings
Trim Types		
Standard	Equal percent, linear	Parabolic plug, modified characteristic Equal percent or linear ¹
Low Noise	MegaStream, Stealth, TigerTooth	Multi hole plug, modified characteristic Equal percent or linear ¹
Anti-Cavitation	CavControl, ChannelStream, TigerTooth	Radial multi step system, modified characteristic Equal percent or linear ¹
Trim Materials	400 series, 300 series stainless steels	1.4122 or 1.4922
Leakage Rates	ANSI Class IV, VI (with optional soft seat), Class V	According to IEC 60534-4:2006, Class IV; ANSI/FCI 70-2, Class V ²

* Class 2500 sizes up to 14"

¹ Optional hardened material

² Pressure balanced class III

Table 2:
ASME Mark 200: Severe Service Trim Options*






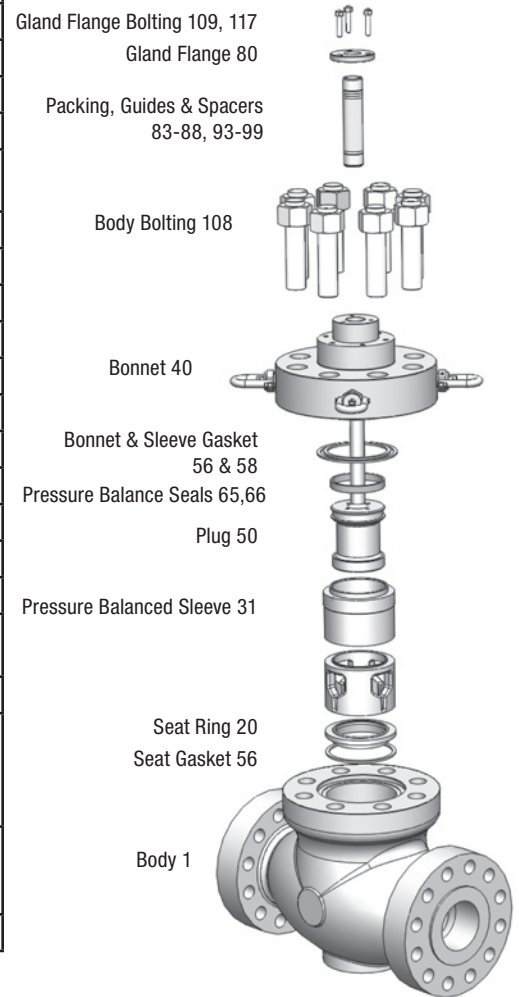
Trim	Description	
CavControl	<p>Contains the cavitating bubbles in the center of the retainer, away from the metal surfaces of the valve – a simple but very effective method of controlling cavitation in low to mild conditions.</p>	
ChannelStream	<p>Prevents cavitation from forming and minimizes hydrodynamic noise in the most severe liquid applications. This design also offers easy maintenance and product longevity, even when installed in the most difficult applications.</p>	
MegaStream	<p>Decades of proven service make this heavy-duty, drilled-hole cage one of the most common and effective solutions to control valve noise.</p>	
Stealth	<p>The most sophisticated noise attenuation design available. Effectively reduces sound pressure levels in the most demanding applications.</p>	
TigerTooth	<p>One of the most effective cavitation elimination and noise reduction trims available, especially at high-pressure drops. Reduces sound pressure levels in gas applications and prevents the formation of gas bubbles, thereby eliminating cavitation in liquid applications.</p>	

Table 3.1:

ASME Mark 200: Materials of Construction

Part	Item	Available Materials	
Body	1	Carbon Steel (WCC) , 316 SS (CF8M), CrMo (WC9, C12A), Duplex SS	
Seat Ring*	20	316 SS, 316 SS / Alloy 6, 410 SS HT, 416 SS HT, 420 SS HT	
Plug*	50	316 SS, 316 SS / Alloy 6, 416 SS HT, 420 SS HT, CrMo/Alloy 21	
Plug Stem	51	316 SS, 316 SS / Alloy 6, 416 SS HT, 17-4PH SS	
Cage	30	316 SS , 416 SS HT, CrMo/Nitrided	
Pressure Balanced Sleeve	31	316 SS, 410 SS, 410 SS HT, 420 SS HT**, 316 SS / Alloy 6, CrMo/Nitrided	
Bonnet	40	Carbon Steel, 316 SS, CrMo, Duplex SS	
Seat Gasket	55	PTFE, Spiral Graphite	
Sleeve Gasket	56	PTFE, Spiral Graphite	
Bonnet Gasket	58	PTFE, Spiral Graphite	
Seal Types	O-Ring Seal	65	Buna, Viton®, EPDM, Perfluoroelastomer
	Back-up Ring	66	Carbon-Filled PTFE, PEEK, Vespel®, Ryton®
	PTFE Seal	65	PTFE, Glass-Loaded PTFE
	Metal Multi-Seal	65	Rene 41®, Inconel® X-750
	Carbon Seal	65	Carbon (Single & Triple)
Gland Flange	80	Carbon Steel 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, Ultimet	
Upper Guide	87	316 SS / GL PTFE ^{1,2} , 316 SS / Graphite, Bronze C93200	
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, TA-Luft Double Graphite	
Body Bolting	108	B7-2H Zinc-coated ¹ , B7-2H Oxide-coated, B7M-2HM (NACE), B8-8 (304 SS) ² , B8M-8M (NACE), L7-7, L7M-7M (NACE), B16-7L, L7M-7M Uncoated (NACE)	
Packing Spacers	93-99	316 SS ^{1,2}	

Figure 3: Exploded Drawing of an ASME Mark 200, pressure balanced with cage



* The seat ring and plug have hard facing of alloy 6 or other materials on the seating and guiding surfaces

** Internal Sleeve Only

¹Standard for Carbon Steel Body Construction

²Standard for Stainless Steel Body Construction

Table 3.2:

DIN Mark 200: Materials of Construction

Part	Item	Available Materials			
Body	1.1	1.0619	1.5419	1.7357	1.7379
Bonnet Gasket	1.2	Pure Graphite on Support Plate from C-276			
Stud Bolt	1.3	1.7218 (KG)	1.7709 (GA)	1.4923 (V)	
Hex Nut	1.4	1.7218 (KG)	1.7709 (GA)	1.4923 (V)	
Extension Sleeve	1.5	1.7218 (KG)	1.7709 (GA)	1.4923 (V)	
Screwed Seat	2.1	1.4122	1.4922		
Contoured Plug	2.2	1.4122	1.4922		
Spring Pin	2.3	A2			
Stem	2.4	1.4122	1.4922		
Profil Ring	2.5	Pure Graphite			
Bonnet	3.1	1.0460	1.5415	1.7335	1.7383
Bottom Ring	3.2	1.4922			
Packing Box	3.3	Pure Graphite Rings			
Gland Flange	3.4	1.4922			
Stud Bolt	3.5	1.4923 (V)			
Hex Nut	3.6	1.4923 (V)			
Yoke Rod	5.1	1.4122			
Flange	5.2	1.0460			
Hex Nut	5.3	A2 - 70			
Stroke indicator scale	5.4	Aluminium			
Hex Bolt	5.5	A2 - 70			
Washer	5.6	A2			
Hex Nut	5.7	A2 - 50			
Stroke indicator Disk	5.9	1.0038			
Threaded Ring	5.10	1.0460			
Set Screw	5.11	45 H			

Figure 4: Exploded Drawing of a DIN Mark 200

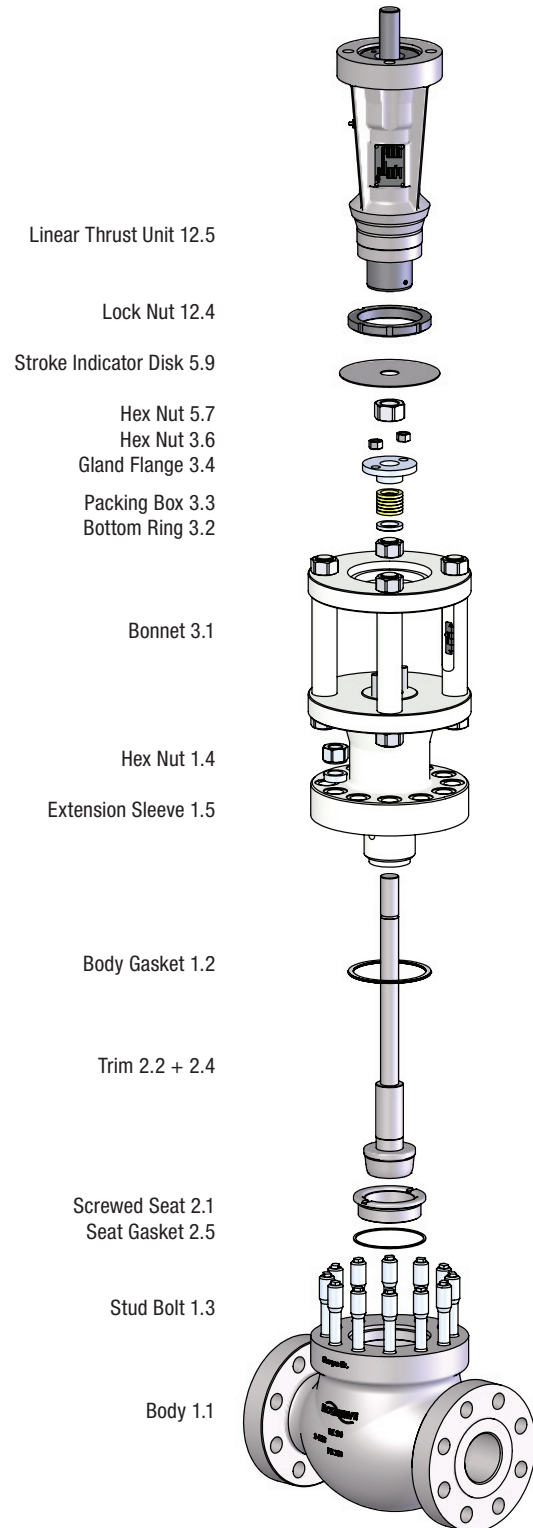


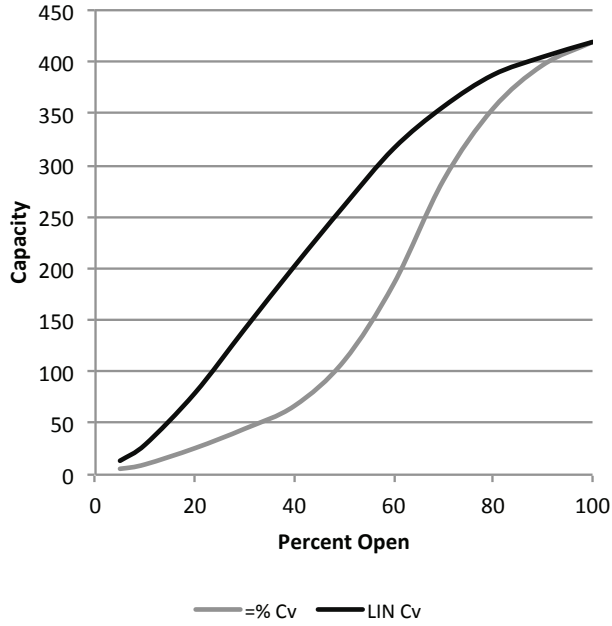
Table 4:
ASME Pressure Balanced Seal Limits (for DIN, see piston ring below)

Seal Style	ASME 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
Piston Ring ¹	Class III	14	-10	842	450

* 800°F 426°C in oxidizing service

¹ DIN/TUV pressure balanced seal limits

ASME Mark 200: Equal Percent and Linear Flow Curves

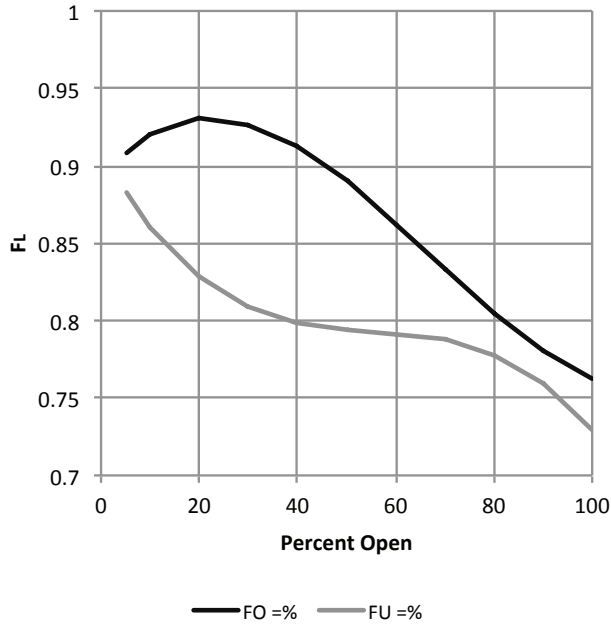


% Open	=% Cv	LIN Cv
5	5.2	13.5
10	10.0	29.2
20	25.7	79.1
30	44.5	141.0
40	66.6	201.9
50	110.3	260.5
60	184.9	316.1
70	285.3	356.6
80	354.8	387.4
90	396.9	404.8
100	419.2	419.2

Data represents a 6" Class 1500 Mark 200, equal percent trim.

Figure 5: ASME Mark 200: Equal Percent and Linear Flow Curves

ASME Mark 200: F_L Flow Curves

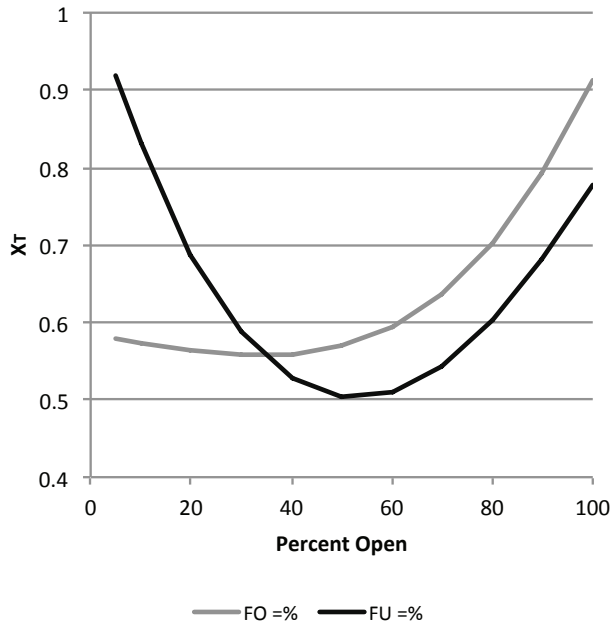


% Open	FO =%	FO LIN	FU =%	FU LIN
5	0.9084625	0.8958	0.882725	0.972771
10	0.9199	0.894	0.8607	0.89223
20	0.9304	0.8898	0.8285	0.80238
30	0.9269	0.8848	0.8091	0.77623
40	0.9124	0.879	0.7989	0.78318
50	0.8899	0.8724	0.7943	0.80055
60	0.8624	0.865	0.7917	0.81358
70	0.8329	0.8568	0.7875	0.81543
80	0.8044	0.8478	0.7781	0.80718
90	0.7799	0.838	0.7599	0.79783
100	0.7624	0.8274	0.7293	0.8043

F_L curve for a 6" Class 1500 Mark 200, equal percent trim.

Figure 6: ASME Mark 200: F_L Flow Curves

ASME Mark 200: X_T Flow Curves



% Open	FO =%	FU =%
5	0.5785995	0.920185
10	0.574013	0.83122
20	0.564672	0.68812
30	0.558257	0.58826
40	0.558548	0.5278
50	0.569325	0.5029
60	0.594368	0.50972
70	0.637457	0.54442
80	0.702372	0.60316
90	0.792893	0.6821
100	0.9128	0.7774

X_T curve for a 6" Class 1500 Mark 200, equal percent trim.

Figure 7: ASME Mark 200: X_T Flow Curves

Table 5.1:
ASME Mark 200: Globe Cv, Class 900, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	2	1.5 in. (38 mm)	=%	Flow Under	0.5	1.0	2.6	4.5	6.7	11.2	18.7	28.9	35.9	40.2	42.4
				Flow Over	0.7	1.1	2.7	4.7	6.8	12.1	22.3	31.5	37.7	41.1	42.5
			Linear	Flow Under	1.4	3.0	8.0	14.3	20.4	26.4	32.0	36.1	39.2	41.0	42.4
				Flow Over	1.5	3.1	8.1	13.5	19.6	25.9	31.7	35.8	39.1	41.1	42.5
3 in. (80 mm)	3	2 in. (50 mm)	=%	Flow Under	1.5	2.9	7.5	13.1	19.6	32.4	54.3	83.8	104.2	116.6	123.2
				Flow Over	2.3	3.9	9.4	16.6	23.8	42.3	78.0	110.3	131.8	143.8	148.6
			Linear	Flow Under	4.0	8.6	23.2	41.4	59.3	76.5	92.9	104.8	113.8	118.9	123.2
				Flow Over	5.1	11.0	28.4	47.4	68.6	90.7	110.9	125.4	136.8	143.8	148.6
4 in. (100 mm)	4	3 in. (76 mm)	=%	Flow Under	3.0	5.6	14.5	25.2	37.7	62.4	104.5	161.3	200.6	224.4	237.0
				Flow Over	4.1	6.9	16.5	29.1	41.9	74.4	137.2	194.1	232.0	253.1	261.5
			Linear	Flow Under	7.6	16.5	44.7	79.7	114.2	147.3	178.8	201.6	219.1	228.9	237.0
				Flow Over	9.0	19.3	50.0	83.4	120.8	159.6	195.2	220.7	240.7	253.0	261.5
6 in. (150 mm)	5.75	4 in. (101 mm)	=%	Flow Under	5.9	11.2	28.8	49.9	74.7	123.6	207.2	319.8	397.7	444.9	469.9
				Flow Over	7.6	12.9	31.0	54.7	78.7	139.7	257.7	364.7	435.7	475.3	491.2
			Linear	Flow Under	15.2	32.7	88.6	158.1	226.3	292.0	354.4	399.8	434.3	453.7	469.9
				Flow Over	16.9	36.3	93.9	156.7	226.8	299.8	366.6	414.5	452.1	475.2	491.2
8 in. (200 mm)	7.75	4 in. (101 mm)	=%	Flow Under	10.3	19.6	50.4	87.2	130.6	216.2	362.4	559.2	695.5	778.0	821.8
				Flow Over	14.5	24.5	58.7	103.8	149.1	264.8	488.6	691.3	826.0	901.2	931.2
			Linear	Flow Under	26.5	57.2	155.0	276.5	395.8	510.7	619.8	699.1	759.6	793.6	821.8
				Flow Over	32.0	68.9	178.0	297.0	430.0	568.3	694.9	785.8	857.1	901.0	931.2
10 in. (250 mm)	9.75	6 in. (152 mm)	=%	Flow Under	16.5	31.6	81.3	140.7	210.8	348.8	584.7	902.3	1122.1	1255.3	1325.8
				Flow Over	22.9	38.8	92.9	164.2	236.0	419.0	773.1	1094.0	1307.1	1426.0	1473.6
			Linear	Flow Under	42.8	92.2	250.1	446.1	638.6	823.9	999.9	1127.9	1225.5	1280.3	1325.8
				Flow Over	50.6	109.0	281.7	470.0	680.5	899.3	1099.7	1243.4	1356.2	1425.7	1473.6
12 in. (300 mm)	11.25	6 in. (152 mm)	=%	Flow Under	22.6	43.2	111.2	192.6	288.4	477.4	800.2	1234.7	1535.6	1717.8	1814.4
				Flow Over	28.3	48.0	114.8	202.9	291.7	517.7	955.4	1351.9	1615.2	1762.2	1821.0
			Linear	Flow Under	58.5	126.2	342.2	610.4	873.8	1127.5	1368.4	1543.5	1677.0	1752.0	1814.4
				Flow Over	62.5	134.7	348.1	580.8	840.9	1111.3	1358.9	1536.6	1676.0	1761.8	1821.0
14 in. (350 mm)	12.375	8 in. (203 mm)	=%	Flow Under	25.7	49.0	126.1	218.4	327.1	541.4	907.4	1400.2	1741.5	1948.0	2057.6
				Flow Over	34.4	58.3	139.4	246.5	354.2	628.8	1160.4	1642.0	1961.9	2140.4	2211.8
			Linear	Flow Under	66.4	143.1	388.1	692.3	991.0	1278.6	1551.8	1750.5	1901.8	1986.9	2057.6
				Flow Over	76.0	163.6	422.8	705.5	1021.4	1349.8	1650.6	1866.3	2035.7	2139.9	2211.8
16 in. (400 mm)	14.25	8 in. (203 mm)	=%	Flow Under	34.4	65.6	168.9	292.5	438.0	724.9	1215.1	1875.0	2331.9	2608.5	2755.2
				Flow Over	43.2	73.2	175.2	309.7	445.1	790.2	1458.1	2063.2	2465.2	2689.6	2779.2
			Linear	Flow Under	88.9	191.7	519.7	927.0	1327.0	1712.2	2077.9	2343.9	2546.6	2660.5	2755.2
				Flow Over	95.4	205.5	531.3	886.5	1283.4	1696.1	2074.0	2345.1	2557.9	2688.9	2779.2

Table 5.2:
ASME Mark 200: Globe Cv, Class 1500, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	1.875	1.5 in. (38 mm)	=%	Flow Under	0.5	1.0	2.6	4.5	6.7	11.2	18.7	28.9	35.9	40.2	42.4
				Flow Over	0.7	1.1	2.7	4.7	6.8	12.1	22.3	31.5	37.7	41.1	42.5
			Linear	Flow Under	1.4	3.0	8.0	14.3	20.4	26.4	32.0	36.1	39.2	41.0	42.4
				Flow Over	1.5	3.1	8.1	13.5	19.6	25.9	31.7	35.8	39.1	41.1	42.5
3 in. (80 mm)	2.75	2 in. (50 mm)	=%	Flow Under	1.5	3.0	7.6	13.2	19.7	32.7	54.8	84.5	105.1	117.6	124.2
				Flow Over	1.9	3.3	7.9	14.0	20.1	35.7	65.8	93.1	111.3	121.4	125.5
			Linear	Flow Under	4.0	8.6	23.4	41.8	59.8	77.2	93.7	105.7	114.8	119.9	124.2
				Flow Over	4.3	9.3	24.0	40.0	57.9	76.6	93.6	105.9	115.5	121.4	125.5
4 in. (100 mm)	3.625	3 in. (76 mm)	=%	Flow Under	2.7	5.1	13.1	22.7	34.1	56.4	94.5	145.8	181.3	202.8	214.2
				Flow Over	3.4	5.8	13.8	24.4	35.1	62.3	114.9	162.6	194.3	212.0	219.1
			Linear	Flow Under	6.9	14.9	40.4	72.1	103.2	133.1	161.6	182.3	198.0	206.9	214.2
				Flow Over	7.5	16.2	41.9	69.9	101.2	133.7	163.5	184.8	201.6	211.9	219.1
6 in. (150 mm)	5.375	4 in. (101 mm)	=%	Flow Under	5.2	10.0	25.7	44.5	66.6	110.3	184.9	285.3	354.8	396.9	419.2
				Flow Over	6.7	11.3	27.0	47.7	68.6	121.8	224.8	318.1	380.0	414.6	428.5
			Linear	Flow Under	13.5	29.2	79.1	141.0	201.9	260.5	316.1	356.6	387.4	404.8	419.2
				Flow Over	14.7	31.7	81.9	136.7	197.9	261.5	319.7	361.5	394.3	414.5	428.5
8 in. (200 mm)	7	4 in. (101 mm)	=%	Flow Under	9.1	17.4	44.8	77.7	116.3	192.5	322.7	498.0	619.3	692.8	731.7
				Flow Over	12.5	21.2	50.7	89.7	128.9	228.8	422.2	597.5	713.9	778.9	804.8
			Linear	Flow Under	23.6	50.9	138.0	246.2	352.4	454.7	551.9	622.5	676.3	706.6	731.7
				Flow Over	27.6	59.5	153.9	256.7	371.7	491.2	600.6	679.1	740.7	778.7	804.8
10 in. (250 mm)	8.75	6 in. (152 mm)	=%	Flow Under	14.0	26.7	68.6	118.9	178.0	294.6	493.9	762.1	947.8	1060.3	1119.9
				Flow Over	19.9	33.8	80.9	142.9	205.4	364.6	672.9	952.1	1137.6	1241.1	1282.5
			Linear	Flow Under	36.1	77.9	211.2	376.8	539.4	695.9	844.6	952.7	1035.1	1081.4	1119.9
				Flow Over	44.0	94.8	245.2	409.1	592.3	782.7	957.1	1082.2	1180.4	1240.8	1282.5
12 in. (300 mm)	10.375	6 in. (152 mm)	=%	Flow Under	19.9	37.9	97.7	169.2	253.4	419.4	702.9	1084.7	1349.0	1509.0	1593.9
				Flow Over	23.4	39.7	94.9	167.8	241.1	428.0	789.8	1117.6	1335.3	1456.8	1505.4
			Linear	Flow Under	51.4	110.9	300.6	536.3	767.7	990.5	1202.1	1356.0	1473.2	1539.1	1593.9
				Flow Over	51.7	111.3	287.8	480.2	695.2	918.7	1123.4	1270.3	1385.5	1456.5	1505.4
14 in. (350 mm)	11.375	8 in. (203 mm)	=%	Flow Under	22.7	43.2	111.3	192.7	288.6	477.6	800.6	1235.4	1536.5	1718.7	1815.4
				Flow Over	29.7	50.3	120.3	212.7	305.7	542.7	1001.5	1417.0	1693.1	1847.2	1908.8
			Linear	Flow Under	58.6	126.3	342.4	610.8	874.3	1128.1	1369.1	1544.4	1678.0	1753.0	1815.4
				Flow Over	65.6	141.2	364.9	608.8	881.5	1164.9	1424.5	1610.7	1756.8	1846.7	1908.8
16 in. (400 mm)	13	8 in. (203 mm)	=%	Flow Under	30.2	57.5	148.1	256.5	384.2	635.9	1065.8	1644.6	2045.4	2288.1	2416.7
				Flow Over	36.7	62.3	149.1	263.5	378.7	672.2	1240.4	1755.2	2097.1	2288.0	2364.3
			Linear	Flow Under	78.0	168.1	455.8	813.1	1164.0	1501.8	1822.7	2056.0	2233.8	2333.7	2416.7
				Flow Over	81.2	174.8	452.0	754.1	1091.8	1442.8	1764.4	1995.0	2176.0	2287.4	2364.3

Table 5.3:
ASME Mark 200: Globe Cv, Class 2500, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	1.5	1.5 in. (38 mm)	=%	Flow Under	0.5	0.9	2.3	4.0	5.9	9.8	16.4	25.4	31.5	35.3	37.3
				Flow Over	0.5	0.9	2.1	3.8	5.4	9.6	17.7	25.1	30.0	32.7	33.8
			Linear	Flow Under	1.2	2.6	7.0	12.5	17.9	23.2	28.1	31.7	34.4	36.0	37.3
				Flow Over	1.2	2.5	6.5	10.8	15.6	20.6	25.2	28.5	31.1	32.7	33.8
3 in. (80 mm)	2.25	2 in. (50 mm)	=%	Flow Under	1.1	2.1	5.5	9.4	14.1	23.4	39.3	60.6	75.3	84.3	89.0
				Flow Over	1.4	2.4	5.7	10.1	14.5	25.8	47.6	67.3	80.5	87.8	90.7
			Linear	Flow Under	2.9	6.2	16.8	29.9	42.9	55.3	67.1	75.7	82.3	86.0	89.0
				Flow Over	3.1	6.7	17.3	28.9	41.9	55.4	67.7	76.5	83.5	87.8	90.7
4 in. (100 mm)	2.875	3 in. (76 mm)	=%	Flow Under	1.7	3.2	8.2	14.3	21.4	35.4	59.3	91.6	113.9	127.4	134.6
				Flow Over	2.1	3.6	8.6	15.3	21.9	39.0	71.9	101.7	121.5	132.6	137.0
			Linear	Flow Under	4.3	9.4	25.4	45.3	64.8	83.6	101.5	114.5	124.4	129.9	134.6
				Flow Over	4.7	10.1	26.2	43.7	63.3	83.6	102.3	115.6	126.1	132.6	137.0
6 in. (150 mm)	4.375	4 in. (101 mm)	=%	Flow Under	3.6	6.9	17.9	31.0	46.4	76.8	128.7	198.6	247.0	276.3	291.9
				Flow Over	4.7	7.9	19.0	33.6	48.2	85.6	158.0	223.5	267.1	291.4	301.1
			Linear	Flow Under	9.4	20.3	55.0	98.2	140.6	181.4	220.1	248.3	269.8	281.8	291.9
				Flow Over	10.3	22.3	57.6	96.0	139.0	183.7	224.7	254.1	277.1	291.3	301.1
8 in. (200 mm)	5.75	4 in. (101 mm)	=%	Flow Under	6.4	12.3	31.6	54.7	81.9	135.6	227.3	350.8	436.2	488.0	515.4
				Flow Over	9.0	15.3	36.6	64.7	93.0	165.2	304.8	431.3	515.3	562.2	580.9
			Linear	Flow Under	16.6	35.9	97.2	173.4	248.2	320.3	388.7	438.5	476.4	497.7	515.4
				Flow Over	20.0	43.0	111.1	185.3	268.3	354.5	433.5	490.2	534.7	562.1	580.9
10 in. (250 mm)	7.25	6 in. (152 mm)	=%	Flow Under	10.0	19.0	48.9	84.7	126.9	210.0	351.9	543.0	675.4	755.5	798.0
				Flow Over	12.6	21.3	50.9	90.0	129.4	229.6	423.8	599.6	716.4	781.7	807.7
			Linear	Flow Under	25.7	55.5	150.5	268.5	384.3	495.9	601.8	678.9	737.6	770.6	798.0
				Flow Over	27.7	59.7	154.4	257.6	373.0	492.9	602.8	681.6	743.4	781.5	807.7
12 in. (300 mm)	8.625	6 in. (152 mm)	=%	Flow Under	14.0	26.8	68.9	119.4	178.8	296.0	496.2	765.6	952.2	1065.2	1125.0
				Flow Over	18.1	30.8	73.6	130.1	187.0	332.0	612.6	866.9	1035.7	1130.0	1167.7
			Linear	Flow Under	36.3	78.3	212.2	378.5	541.9	699.1	848.5	957.1	1039.9	1086.4	1125.0
				Flow Over	40.1	86.4	223.2	372.4	539.2	712.6	871.4	985.3	1074.7	1129.7	1167.7
14 in. (350 mm)	9.5	8 in. (203 mm)	=%	Flow Under	19.8	37.7	97.0	168.1	251.7	416.6	698.4	1077.6	1340.3	1499.3	1583.6
				Flow Over	24.0	40.6	97.2	171.8	247.0	438.4	809.1	1144.8	1367.8	1492.3	1542.1
			Linear	Flow Under	51.1	110.2	298.7	532.8	762.7	984.1	1194.3	1347.2	1463.7	1529.2	1583.6
				Flow Over	53.0	114.0	294.8	491.9	712.1	941.1	1150.8	1301.2	1419.3	1492.0	1542.1

Table 5.4:
ASME Mark 200: Angle Cv, Class 900, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	2	1.5 in. (38 mm)	=%	Flow Under	0.8	1.6	4.0	6.9	10.4	17.2	28.8	44.4	55.2	61.7	65.2
				Flow Over	1.0	1.7	4.0	7.0	10.0	17.8	32.9	46.6	55.6	60.7	62.7
			Linear	Flow Under	2.1	4.5	12.3	21.9	31.4	40.5	49.2	55.5	60.3	63.0	65.2
				Flow Over	2.2	4.6	12.0	20.0	29.0	38.3	46.8	52.9	57.7	60.7	62.7
3 in. (80 mm)	3	2 in. (50 mm)	=%	Flow Under	2.0	3.9	10.0	17.2	25.8	42.8	71.7	110.6	137.5	153.8	162.5
				Flow Over	2.5	4.2	10.0	17.6	25.3	45.0	83.0	117.5	140.4	153.2	158.3
			Linear	Flow Under	5.2	11.3	30.6	54.7	78.3	101.0	122.6	138.2	150.2	156.9	162.5
				Flow Over	5.4	11.7	30.3	50.5	73.1	96.6	118.1	133.5	145.7	153.1	158.3
4 in. (100 mm)	4	3 in. (76 mm)	=%	Flow Under	3.9	7.5	19.3	33.4	50.0	82.8	138.8	214.1	266.3	297.9	314.6
				Flow Over	4.8	8.2	19.5	34.5	49.6	88.1	162.5	230.0	274.8	299.8	309.8
			Linear	Flow Under	10.1	21.9	59.3	105.9	151.5	195.5	237.3	267.7	290.8	303.8	314.6
				Flow Over	10.6	22.9	59.2	98.8	143.1	189.0	231.2	261.4	285.1	299.7	309.8
6 in. (150 mm)	5.75	4 in. (101 mm)	=%	Flow Under	8.1	15.5	40.0	69.2	103.7	171.6	287.6	443.7	551.9	617.3	652.1
				Flow Over	9.6	16.3	38.9	68.8	98.9	175.6	324.0	458.5	547.8	597.7	617.6
			Linear	Flow Under	21.0	45.4	123.0	219.4	314.0	405.2	491.8	554.7	602.7	629.7	652.1
				Flow Over	21.2	45.7	118.1	197.0	285.2	376.9	460.9	521.1	568.4	597.5	617.6
8 in. (200 mm)	7.75	4 in. (101 mm)	=%	Flow Under	14.2	27.0	69.5	120.4	180.3	298.5	500.3	772.0	960.1	1074.0	1134.4
				Flow Over	18.4	31.3	74.8	132.3	190.1	337.5	622.7	881.2	1052.8	1148.7	1187.0
			Linear	Flow Under	36.6	78.9	214.0	381.7	546.3	704.9	855.5	965.0	1048.5	1095.4	1134.4
				Flow Over	40.8	87.8	226.9	378.6	548.1	724.4	885.8	1001.6	1092.4	1148.4	1187.0
10 in. (250 mm)	9.75	6 in. (152 mm)	=%	Flow Under	22.1	42.2	108.6	188.1	281.7	466.2	781.4	1205.8	1499.7	1677.6	1771.9
				Flow Over	26.8	45.5	108.8	192.4	276.5	490.8	905.8	1281.6	1531.3	1670.7	1726.4
			Linear	Flow Under	57.2	123.3	334.2	596.2	853.4	1101.1	1336.4	1507.4	1637.8	1711.1	1771.9
				Flow Over	59.3	127.7	330.0	550.7	797.3	1053.6	1288.3	1456.8	1588.9	1670.3	1726.4
12 in. (300 mm)	11.25	6 in. (152 mm)	=%	Flow Under	29.5	56.3	145.0	251.2	376.1	622.5	1043.5	1610.1	2002.5	2240.1	2366.0
				Flow Over	38.2	64.8	155.1	274.1	394.0	699.4	1290.5	1826.1	2181.8	2380.5	2459.8
			Linear	Flow Under	76.3	164.6	446.3	796.1	1139.5	1470.3	1784.4	2012.9	2186.9	2284.7	2366.0
				Flow Over	84.5	181.9	470.2	784.6	1135.9	1501.1	1835.7	2075.6	2263.9	2379.9	2459.8
14 in. (350 mm)	12.375	8 in. (203 mm)	=%	Flow Under	38.6	73.7	189.7	328.5	492.0	814.2	1364.8	2106.0	2619.2	2929.9	3094.7
				Flow Over	45.1	76.4	182.8	323.1	464.4	824.5	1521.4	2152.8	2572.2	2806.3	2899.8
			Linear	Flow Under	99.8	215.3	583.7	1041.2	1490.5	1923.1	2333.9	2632.7	2860.4	2988.3	3094.7
				Flow Over	99.6	214.5	554.4	924.9	1339.2	1769.7	2164.0	2446.9	2668.9	2805.6	2899.8
16 in. (400 mm)	14.25	8 in. (203 mm)	=%	Flow Under	49.3	94.1	242.2	419.5	628.2	1039.7	1742.7	2689.2	3344.5	3741.3	3951.6
				Flow Over	63.9	108.4	259.4	458.4	658.9	1169.6	2158.3	3054.0	3649.0	3981.1	4113.8
			Linear	Flow Under	127.5	274.9	745.3	1329.5	1903.2	2455.7	2980.3	3361.8	3652.5	3815.9	3951.6
				Flow Over	141.3	304.2	786.4	1312.2	1899.8	2510.5	3070.0	3471.3	3786.3	3980.1	4113.8

Table 5.5:
ASME Mark 200: Angle Cv, Class 1500, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	1.875	1.5 in. (38 mm)	=%	Flow Under	0.8	1.6	4.0	6.9	10.4	17.2	28.8	44.4	55.2	61.7	65.2
				Flow Over	1.0	1.7	4.0	7.0	10.0	17.8	32.9	46.6	55.6	60.7	62.7
			Linear	Flow Under	2.1	4.5	12.3	21.9	31.4	40.5	49.2	55.5	60.3	63.0	65.2
				Flow Over	2.2	4.6	12.0	20.0	29.0	38.3	46.8	52.9	57.7	60.7	62.7
3 in. (80 mm)	2.75	2 in. (50 mm)	=%	Flow Under	1.8	3.4	8.6	14.9	22.4	37.0	62.1	95.8	119.1	133.3	140.8
				Flow Over	2.1	3.6	8.6	15.3	21.9	39.0	71.9	101.7	121.5	132.6	137.0
			Linear	Flow Under	4.5	9.8	26.5	47.4	67.8	87.5	106.2	119.7	130.1	135.9	140.8
				Flow Over	4.7	1.01	26.2	43.7	63.3	83.6	102.3	115.6	126.1	132.6	137.0
4 in. (100 mm)	3.625	3 in. (76 mm)	=%	Flow Under	3.5	6.7	17.1	29.7	44.4	73.5	123.2	190.2	236.5	264.6	279.5
				Flow Over	5.1	8.6	20.6	36.5	52.4	93.0	171.6	242.9	290.2	316.6	327.1
			Linear	Flow Under	9.0	19.4	52.7	94.0	134.6	173.7	210.8	237.7	258.3	269.9	279.5
				Flow Over	11.2	24.2	62.5	104.3	151.1	199.6	244.1	276.0	301.1	316.5	327.1
6 in. (150 mm)	5.375	4 in. (101 mm)	=%	Flow Under	6.9	13.2	34.1	59.0	88.4	146.2	245.1	378.2	470.4	526.2	555.8
				Flow Over	7.6	13.0	31.0	54.8	78.8	139.9	258.2	365.4	436.5	476.3	492.2
			Linear	Flow Under	17.9	38.7	104.8	187.0	267.7	345.4	419.2	472.8	513.7	536.7	555.8
				Flow Over	16.9	36.4	94.1	157.0	227.3	300.3	367.3	415.3	453.0	476.2	492.2
8 in. (200 mm)	7	4 in. (101 mm)	=%	Flow Under	12.8	24.4	62.9	108.9	163.1	269.9	452.3	698.0	868.1	971.1	1025.7
				Flow Over	17.3	29.3	70.2	124.0	178.2	316.3	583.8	826.0	986.9	1076.8	1112.6
			Linear	Flow Under	33.1	71.4	193.5	345.1	494.0	637.4	773.6	872.6	948.0	990.5	1025.7
				Flow Over	38.2	82.3	212.7	354.9	513.8	679.0	830.3	938.9	1024.1	1076.5	1112.6
10 in. (250 mm)	8.75	6 in. (152 mm)	=%	Flow Under	19.2	36.7	94.5	163.7	245.2	405.8	680.1	1049.5	1305.2	1460.1	1542.2
				Flow Over	22.9	38.8	92.8	164.0	235.7	418.4	772.1	1092.5	1305.3	1424.2	1471.6
			Linear	Flow Under	49.7	107.3	290.9	518.9	742.7	958.3	1163.1	1312.0	1425.4	1489.2	1542.2
				Flow Over	50.5	108.8	281.3	469.4	679.6	898.1	1098.2	1241.8	1354.5	1423.8	1471.6
12 in. (300 mm)	10.375	6 in. (152 mm)	=%	Flow Under	26.2	50.0	128.8	223.0	334.0	552.8	926.6	1429.8	1778.3	1989.2	2101.1
				Flow Over	31.8	53.9	129.0	228.0	327.7	581.7	1073.3	1518.8	1814.6	1979.8	2045.8
			Linear	Flow Under	67.8	146.2	396.3	706.9	1011.9	1305.7	1584.6	1787.4	1942.0	2028.9	2101.1
				Flow Over	70.3	151.3	391.1	652.5	944.8	1248.5	1526.7	1726.3	1882.9	1979.3	2045.8
14 in. (350 mm)	11.375	8 in. (203 mm)	=%	Flow Under	32.2	61.5	158.3	274.1	410.5	679.4	1138.9	1757.3	2185.6	2444.9	2582.3
				Flow Over	36.2	61.4	146.9	259.7	373.3	662.6	1222.7	1730.1	2067.1	2255.3	2330.5
			Linear	Flow Under	83.3	179.6	487.1	868.8	1243.7	1604.7	1947.5	2196.9	2386.8	2493.6	2582.3
				Flow Over	80.0	172.3	445.5	743.3	1076.2	1422.2	1739.2	1966.5	2144.9	2254.7	2330.5
16 in. (400 mm)	13	8 in. (203 mm)	=%	Flow Under	39.7	75.7	194.9	337.5	505.4	836.6	1402.2	2163.7	2691.0	3010.3	3179.5
				Flow Over	48.9	83.0	198.5	350.8	504.2	895.0	1651.5	2336.9	2792.1	3046.3	3147.8
			Linear	Flow Under	102.6	221.2	599.7	1069.8	1531.3	1975.9	2397.9	2704.9	2938.8	3070.3	3179.5
				Flow Over	108.1	232.8	601.8	1004.1	1453.7	1921.0	2349.1	2656.2	2897.2	3045.5	3147.8

Table 5.6:
ASME Mark 200: Angle Cv, Class 2500, Standard Retainer

Valve Size	Trim No.	Stroke	Characteristic	Flow Direction	Cv at Percent Open										
					5	10	20	30	40	50	60	70	80	90	100
2 in. (50 mm)	1.5	1.5 in. (38 mm)	=%	Flow Under	0.6	1.1	2.9	5.1	7.6	12.5	21.0	32.4	40.3	45.1	47.6
				Flow Over	0.7	1.1	2.7	4.7	6.8	12.1	22.3	31.5	37.7	41.1	42.5
			Linear	Flow Under	1.5	3.3	9.0	16.0	22.9	29.6	35.9	40.5	44.0	46.0	47.6
				Flow Over	1.5	3.1	8.1	13.5	19.6	25.9	31.7	35.8	39.1	41.1	42.5
3 in. (80 mm)	2.25	2 in. (50 mm)	=%	Flow Under	1.3	2.4	6.2	10.8	16.1	26.7	44.7	69.0	85.8	96.0	101.4
				Flow Over	1.6	2.8	6.7	11.8	17.0	30.2	55.7	78.8	94.2	102.7	106.2
			Linear	Flow Under	3.3	7.1	19.1	34.1	48.9	63.0	76.5	86.3	93.8	97.9	101.4
				Flow Over	3.6	7.9	20.3	33.9	49.0	64.8	79.2	89.6	97.7	102.7	106.2
4 in. (100 mm)	2.875	3 in. (76 mm)	=%	Flow Under	2.3	4.3	11.1	19.2	28.8	47.7	79.9	123.3	153.3	171.5	181.1
				Flow Over	3.1	5.2	12.5	22.0	31.7	56.2	103.8	146.9	175.5	191.4	197.8
			Linear	Flow Under	5.8	12.6	34.2	60.9	87.2	112.6	136.6	154.1	167.4	174.9	181.1
				Flow Over	6.8	14.6	37.8	63.1	91.4	120.7	147.6	166.9	182.1	191.4	197.8
6 in. (150 mm)	4.375	4 in. (101 mm)	=%	Flow Under	4.6	8.7	22.5	38.9	58.2	96.4	161.6	249.3	310.1	346.9	366.4
				Flow Over	6.4	10.8	25.9	45.7	65.7	116.6	215.2	304.5	363.8	396.9	410.1
			Linear	Flow Under	11.8	25.5	69.1	123.3	176.5	227.7	276.3	311.7	338.7	353.8	366.4
				Flow Over	14.1	30.3	78.4	130.8	189.4	250.3	306.1	346.1	377.5	396.8	410.1
8 in. (200 mm)	5.75	4 in. (101 mm)	=%	Flow Under	8.3	15.8	40.8	70.6	105.8	175.1	293.5	452.9	563.3	630.1	665.5
				Flow Over	12.1	20.6	49.2	87.0	125.0	222.0	409.6	579.6	692.5	755.5	780.7
			Linear	Flow Under	21.5	46.3	125.5	223.9	320.5	413.6	501.9	566.2	615.1	642.6	665.5
				Flow Over	26.8	57.7	149.2	249.0	360.5	476.4	582.6	658.8	718.5	755.3	780.7
10 in. (250 mm)	7.25	6 in. (152 mm)	=%	Flow Under	12.1	23.2	59.6	103.3	154.7	256.0	429.1	662.1	823.4	921.1	972.9
				Flow Over	15.5	26.2	62.7	110.9	159.3	282.9	522.0	738.6	882.5	962.8	994.9
			Linear	Flow Under	31.4	67.7	183.5	327.3	468.6	604.6	733.7	827.7	899.2	939.5	972.9
				Flow Over	34.2	73.6	190.2	317.3	459.5	607.2	742.5	839.5	915.7	962.6	994.9
12 in. (300 mm)	8.625	6 in. (152 mm)	=%	Flow Under	19.7	37.6	96.7	167.5	250.9	415.3	696.1	1074.1	1335.9	1494.4	1578.4
				Flow Over	25.1	42.5	101.8	179.9	258.6	459.0	847.0	1198.5	1432.0	1562.4	1614.4
			Linear	Flow Under	50.9	109.8	297.7	531.1	760.2	980.9	1190.4	1342.8	1458.9	1524.2	1578.4
				Flow Over	55.4	119.4	308.6	515.0	745.6	985.2	1204.8	1362.3	1485.9	1562.0	1614.4
14 in. (350 mm)	9.5	8 in. (203 mm)	=%	Flow Under	24.0	45.9	118.0	204.5	306.2	506.8	849.5	1310.8	1630.2	1823.6	1926.1
				Flow Over	31.5	53.4	127.6	225.6	324.3	575.6	1062.2	1503.0	1795.8	1959.3	2024.6
			Linear	Flow Under	62.1	134.0	363.3	648.1	927.7	1197.0	1452.7	1638.6	1780.3	1860.0	1926.1
				Flow Over	69.5	149.7	387.0	645.8	935.0	1235.5	1510.9	1708.4	1863.4	1958.8	2024.6

DIN Mark 200: Globe Size 150, Modified Equal Percent and Linear Characteristic Flow Curves, Full Area

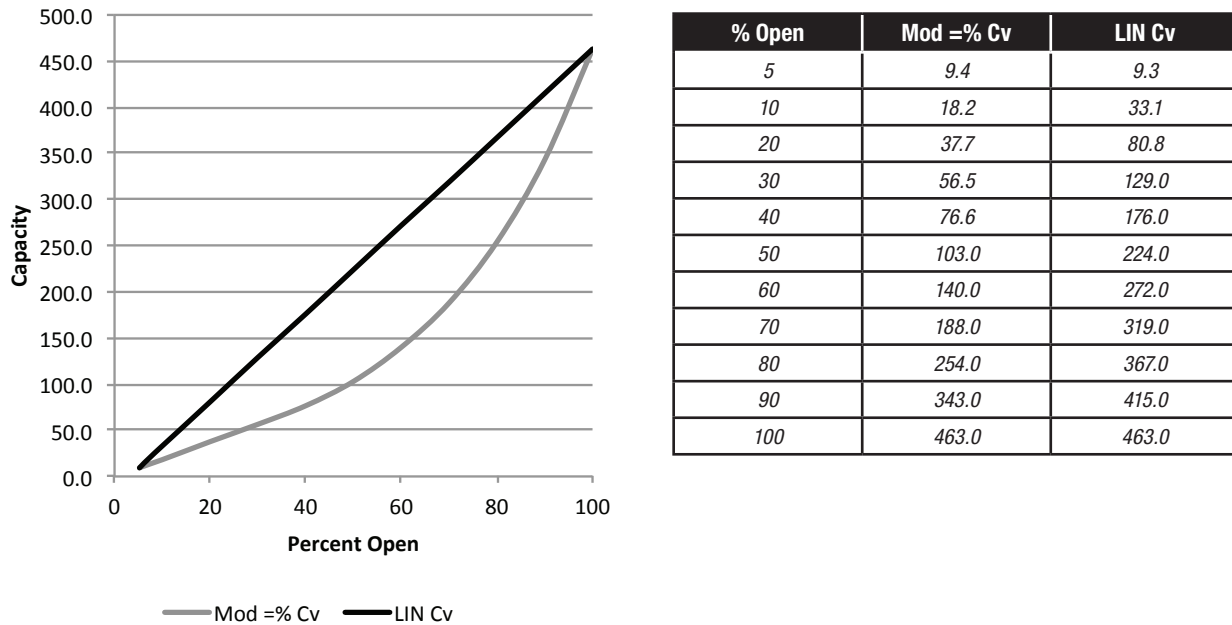


Figure 8: DIN Mark 200: Globe Size 150, Modified Equal Percent and Linear Characteristic Flow Curves, Full Area

DIN Mark 200: Globe Size 150, X_T and F_L Flow Curves, Full Area

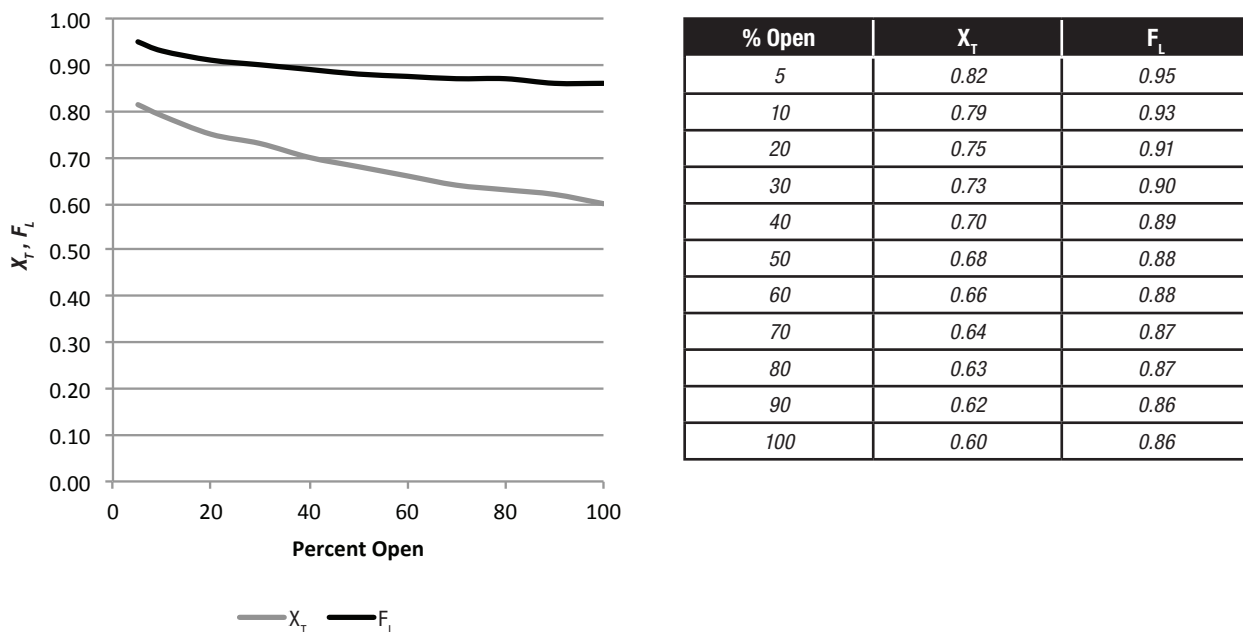


Figure 9: DIN Mark 200: Globe Size 150, X_T and F_L Flow Curves, Full Area

Table 6.1:

DIN Mark 200: Globe Cv Flow Rate, Modified Equal Percent, Parabolic Plug

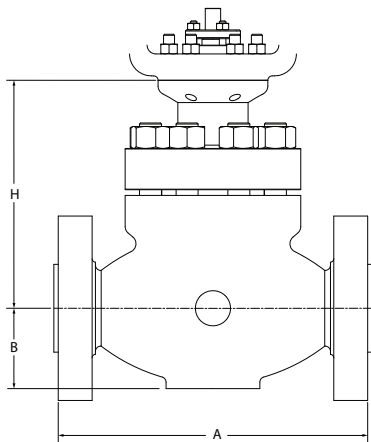
Valve Size (mm)	Trim No.	Stroke (mm)	Kvs	Cv at Percent Open										
				5	10	20	30	40	50	60	70	80	90	100
50	0.875	25	12.5	0.3	0.6	1.2	1.8	2.4	3.2	4.4	5.9	7.9	10.7	14.45
	1.25	25	22.4	0.5	1.1	2.1	3.2	4.3	5.8	7.8	10.5	14.2	19.2	25.9
	2	25	40	0.9	1.9	3.8	5.7	7.7	10.3	14.0	18.8	25.4	34.3	46.3
80	1.5	50	35.5	0.8	1.7	3.3	5.0	6.8	9.2	12.4	16.7	22.5	30.4	41.0
	2	50	63	1.5	3.0	5.9	8.9	12.1	16.3	22.0	29.7	40.0	54.0	72.8
	3.125	50	112	2.6	5.3	10.6	15.8	21.5	29.0	39.1	52.7	71.1	96.0	130
100	2	50	50	1.2	2.4	4.7	7.1	9.6	12.9	17.4	23.5	31.8	42.8	57.8
	2.625	50	90	2.1	4.2	8.5	12.7	17.2	23.3	31.4	42.4	57.2	77.1	104
	3.875	50	160	3.8	7.5	15.1	22.6	30.7	41.4	55.8	75.3	102	137	185
150	3.125	100	125	2.9	5.9	11.8	17.7	23.9	32.3	43.6	58.8	79.4	107	145
	4	100	224	5.3	10.6	21.1	31.7	42.9	57.9	78.1	105	142	192	259
	5.875	100	400	9.4	18.8	37.7	56.5	76.6	103	140	188	254	343	463
200	3.5	100	200	4.7	9.4	18.8	28.3	38.3	51.7	69.8	94.1	127	171	231
	5	100	355	8.4	16.7	33.5	50.2	68.0	91.8	124	167	225	304	410
	7.75	100	630	14.8	29.7	59.4	89.1	121	163	220	297	400	540	728
250	5	150	355	8.4	16.7	33.5	50.2	68.0	91.8	124	167	225	304	410
	7	150	630	14.8	29.7	59.4	89.1	121	163	220	297	400	540	728
	9.75	150	1120	26.4	52.8	106	158	215	290	391	527	711	960	1295
300	5.875	150	450	10.6	21.2	42.4	63.6	86.2	116	157	212	286	386	520
	8	150	800	18.8	37.7	75.4	113	153	207	279	377	508	686	925
	11.625	150	1400	33.0	66.0	132	198	268	362	488	659	889	1200	1619
400	8	200	800	18.8	37.7	75.4	113	153	207	279	377	508	686	925
	11.625	200	1400	33.0	66.0	132	198	268	362	488	659	889	1200	1619
	15.75	200	2500	58.9	118	236	353	479	646	872	1177	1588	2142	2891

Table 6.2:
DIN Mark 200: Globe Cv Flow Rate, Linear, Parabolic Plug

Valve Size (mm)	Trim No.	Stroke (mm)	Kvs	Cv at Percent Open										
				5	10	20	30	40	50	60	70	80	90	100
50	0.875	25	12.5	0.3	1.0	2.5	4.0	5.5	7.0	8.5	10.0	11.5	13.0	14.5
	1.25	25	22.4	0.5	1.9	4.5	7.2	9.9	12.5	15.2	17.9	20.6	23.2	25.9
	2	25	40	0.9	3.3	8.1	12.9	17.6	22.4	27.2	31.9	36.7	41.5	46.3
80	1.5	50	35.5	0.8	2.9	7.2	11.4	15.6	19.9	24.1	28.3	32.6	36.8	41.1
	2	50	63	1.5	5.2	12.7	20.2	27.8	35.3	42.8	50.3	57.8	65.3	72.9
	3.125	50	112	2.6	9.3	22.6	36.0	49.4	62.7	76.1	89.4	103	116	130
100	2	50	50	1.2	4.1	10.1	16.1	22.0	28.0	34.0	39.9	45.9	51.9	57.8
	2.625	50	90	2.1	7.5	18.2	28.9	39.7	50.4	61.1	71.9	82.6	93.3	104
	3.875	50	160	3.7	13.2	32.3	51.4	70.5	89.6	109	128	147	166	185
150	3.125	100	125	2.9	10.3	25.3	40.2	55.1	70.0	84.9	100	115	130	145
	4	100	224	5.2	18.5	45.3	72.0	99	125	152	179	206	232	259
	5.875	100	400	9.3	33.1	80.8	129	176	224	272	319	367	415	463
200	3.5	100	200	4.6	16.6	40.4	64.3	88.1	112	136	160	184	207	231
	5	100	355	8.2	29.4	71.7	114	156	199	241	283	326	368	411
	7.75	100	630	14.6	52.2	127	202	278	353	428	503	578	653	729
250	5	150	355	8.2	29.4	71.7	114	156	199	241	283	326	368	411
	7	150	630	14.6	52.2	127	202	278	353	428	503	578	653	729
	9.75	150	1120	25.9	92.7	226	360	494	627	761	894	1028	1162	1295
300	5.875	150	450	10.4	37.3	90.9	145	198	252	306	359	413	467	520
	8	150	800	18.5	66.2	162	257	353	448	543	639	734	830	925
	11.625	150	1400	32.4	116	283	450	617	784	951	1118	1285	1452	1619
400	8	200	800	18.5	66.2	162	257	353	448	543	639	734	830	925
	11.625	200	1400	32.4	116	283	450	617	784	951	1118	1285	1452	1619
	15.75	200	2500	57.9	207	505	803	1102	1400	1698	1996	2295	2593	2891

Table 7.1:
ASME Mark 200: Dimensions Table for Globe Body

Valve Size	Pressure Class	Integral Flange Face-to-Face (per ISA S75.08.06)		Buttweld Face-to-Face (per ISA S75.08.05)		RTJ Flange Face-to-Face (per B16.10)		Match to Center		Center to Base	
		A		A		A		H		B	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
2 in. (50 mm)	900	14.75	375	14.75	375	14.88	378	11.30	287	4.25	108
	1500	14.75	375	14.75	375	14.88	378	11.55	293	4.25	108
	2500	16.25	413	15.75	400	16.38	416	11.06	281	4.63	117
3 in. (80 mm)	900	17.38	441	18.12	460	17.50	445	12.51	318	4.75	121
	1500	18.12	460	18.12	460	18.25	464	12.98	330	5.25	133
	2500	26.00	660	19.62	498	26.25	667	15.51	394	6.00	152
4 in. (100 mm)	900	20.12	511	20.88	530	20.25	514	14.97	380	5.75	146
	1500	20.88	530	20.88	530	21.00	533	15.98	406	6.13	156
	2500	29.00	737	22.62	575	29.38	746	18.39	467	7.00	178
6 in. (150 mm)	900	28.12	714	30.25	768	28.25	718	18.31	465	7.69	195
	1500	30.25	768	30.25	768	30.50	775	18.63	473	7.75	197
	2500	34.00	864	32.25	819	34.50	876	21.00	533	9.50	241
8 in. (200 mm)	900	36.00	914	32.75	832	36.12	917	20.78	528	9.98	253
	1500	38.25	972	32.75	832	38.62	981	21.20	538	10.19	259
	2500	40.25	1022	40.25	1022	40.88	1038	23.45	596	10.88	276
10 in. (250 mm)	900	39.00	991	39.00	991	39.12	994	24.03	610	11.92	303
	1500	42.00	1067	39.00	991	42.38	1076	26.83	681	12.81	325
	2500	54.00	1372	50.00	1270	54.88	1394	32.10	815	13.47	342
12 in. (300 mm)	900	44.50	1130	44.50	1130	44.62	1133	24.88	632	13.64	346
	1500	48.00	1219	44.50	1130	48.62	1235	27.78	706	14.66	372
	2500	62.00	1575	56.00	1422	62.88	1597	32.84	834	15.00	381
14 in. (350 mm)	900	49.50	1257	49.50	1257	49.88	1267	30.98	787	14.51	369
	1500	49.50	1257	49.50	1257	50.25	1276	31.33	796	15.06	383
	2500	—	—	71.00	1803	—	—	38.54	979	16.8	427
16 in. (400 mm)	900	56.00	1422	56.00	1422	56.38	1432	31.33	796	17.61	447
	1500	56.00	1422	56.00	1422	56.88	1445	35.75	908	17.15	436


Figure 10: Dimensions for ASME Globe Body

Note: For some sizes the Center to mounting base dimension (B) is taken from half of the dimension of Flg O.D. This is due to the height of mounting base being less than the Flg O.D.

Table 7.2:
ASME Mark 200: Dimensions Table for Angle Body

Valve Size	Pressure Class	Integral Flange Face-to-Face (per ISA S75.08.06)		Buttweld Face-to-Face (per ISA S75.08.05)		RTJ Flange Face-to-Face (per B16.10)		Match to Center	
		A		A		A		H	
		in.	mm	in.	mm	in.	mm	in.	mm
2 in. (50 mm)	900	7.38	187	7.38	187	7.44	189	9.94	252
	1500	7.38	187	7.38	187	7.44	189	10.19	259
	2500	8.13	206	7.88	200	8.19	208	9.88	251
3 in. (80 mm)	900	8.69	221	9.06	230	8.75	222	10.63	270
	1500	9.06	230	9.06	230	9.13	232	10.98	279
	2500	13.00	330	9.81	249	13.13	333	13.63	346
4 in. (100 mm)	900	10.06	256	10.44	265	10.13	257	12.64	321
	1500	10.44	265	10.44	265	10.50	267	13.52	343
	2500	14.50	368	11.31	287	14.69	373	16.07	408
6 in. (150 mm)	900	14.06	357	15.13	384	14.13	359	14.69	373
	1500	15.13	384	15.13	384	15.25	387	15.01	381
	2500	17.00	432	16.13	410	17.25	438	17.82	453
8 in. (200 mm)	900	18.00	457	16.38	416	18.06	459	16.18	411
	1500	19.13	486	16.38	416	19.31	490	16.54	420
	2500	20.13	511	20.13	511	20.44	519	19.26	489
10 in. (250 mm)	900	19.50	495	19.50	495	19.56	497	18.67	474
	1500	21.00	533	19.50	495	21.19	538	21.52	547
	2500	27.00	686	25.00	635	27.44	697	26.57	675
12 in. (300 mm)	900	22.25	565	22.25	565	22.31	567	18.17	462
	1500	24.00	610	22.25	565	24.31	617	20.92	531
	2500	31.00	787	28.00	711	31.44	799	26.53	674
14 in. (350 mm)	900	24.75	629	24.75	629	24.94	633	24.05	611
	1500	24.75	629	24.75	629	25.13	638	24.5	622
	2500	—	—	35.50	902	—	—	31.13	791
16 in. (400 mm)	900	28.00	711	28.00	711	28.19	716	23.18	589
	1500	28.00	711	28.00	711	28.44	722	27.31	694

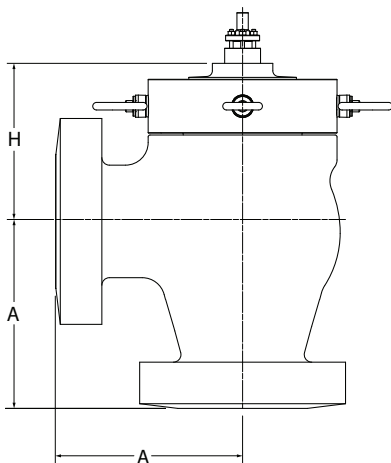

Figure 11: Dimensions for ASME Angle Body

Table 8.1:
ASME Mark 200: Shipping Weights & Crate Dimensions for Globe body

Valve Size	Pressure Class	Typical Actuator Size	Weight*		Minimum Shipping Crate Dimensions					
					Width		Length		Height	
			lbs	Kg	in.	m	in.	m	in.	m
2 in. (50 mm)	900	50	207	94	16	0.40	38	0.96	10	0.26
	1500		219	99	16	0.40	38	0.96	10	0.26
	2500		288	131	17	0.44	38	0.96	10	0.26
3 in. (80 mm)	900	100	410	186	19	0.47	45	1.15	14	0.34
	1500		477	216	19	0.49	46	1.17	14	0.34
	2500		734	333	27	0.69	49	1.25	14	0.34
4 in. (100 mm)	900	100	568	258	21	0.54	48	1.21	14	0.34
	1500		678	308	22	0.56	50	1.27	14	0.34
	2500		995	451	30	0.77	53	1.35	15	0.38
6 in. (150 mm)	900	100	1133	514	29	0.74	54	1.37	19	0.49
	1500		1517	688	32	0.80	54	1.38	24	0.61
	2500		2173	986	36	0.90	58	1.48	21	0.53
8 in. (200 mm)	900	100	1791	812	37	0.94	59	1.49	29	0.72
	1500		2408	1092	40	1.01	59	1.51	26	0.67
	2500		3371	1529	42	1.06	62	1.58	24	0.60
10 in. (250 mm)	900	200	2910	1320	40	1.02	69	1.75	29	0.73
	1500		4109	1864	43	1.10	73	1.84	30	0.75
	2500		7078	3211	56	1.42	78	1.99	43	1.08
12 in. (300 mm)	900	200	3793	1720	46	1.16	71	1.81	28	0.71
	1500		6050	2744	50	1.26	75	1.91	36	0.92
	2500		10045	4556	64	1.62	81	2.05	45	1.14
14 in. (350 mm)	900	200	4766	2162	51	1.29	78	1.99	30	0.75
	1500		7209	3270	51	1.30	79	2.01	43	1.09
	2500		13360	6060	72	1.83	88	2.24	57	1.44
16 in. (400 mm)	900	200	7030	3189	57	1.46	82	2.08	36	0.91
	1500		11753	5331	58	1.47	86	2.18	40	1.02

* Approximate combined body and standard actuator weight.
 Weight for packing material and box thickness not included.
 Actuator weight does not include accessories.

Table 8.2:

ASME Mark 200: Shipping Weights & Crate Dimensions for Angle Body

Valve Size (mm)	Pressure Class	Typical Actuator Size	Weight*		Minimum Shipping Crate Dimensions					
					Width		Length		Height	
			lbs	Kg	in.	m	in.	m	in.	m
2 in. (50 mm)	900	50	203	92	13	0.33	39	1.00	10	0.26
	1500		215	98	13	0.33	40	1.01	10	0.26
	2500		274	124	14	0.35	40	1.02	10	0.26
3 in. (80 mm)	900	100	387	176	16	0.40	47	1.20	14	0.34
	1500		444	201	16	0.41	48	1.22	14	0.34
	2500		693	314	20	0.52	55	1.39	14	0.34
4 in. (100 mm)	900	100	559	254	17	0.44	51	1.29	14	0.34
	1500		619	281	18	0.45	52	1.32	14	0.34
	2500		935	424	23	0.57	59	1.49	15	0.38
6 in. (150 mm)	900	100	1032	468	24	0.62	57	1.44	19	0.49
	1500		1349	612	26	0.66	58	1.48	21	0.52
	2500		1996	905	28	0.71	63	1.60	21	0.53
8 in. (200 mm)	900	100	1585	719	33	0.83	62	1.58	29	0.72
	1500		2085	946	33	0.84	64	1.62	27	0.68
	2500		2943	1335	32	0.82	67	1.71	24	0.60
10 in. (250 mm)	900	200	2644	1199	36	0.92	71	1.80	33	0.83
	1500		3358	1523	36	0.92	75	1.92	30	0.75
	2500		6289	2853	48	1.22	86	2.19	43	1.08
12 in. (300 mm)	900	200	3375	1531	36	0.92	73	1.86	27	0.70
	1500		4867	2208	46	1.16	79	1.99	41	1.03
	2500		8699	3946	54	1.37	90	2.30	45	1.14
14 in. (350 mm)	900	200	4144	1880	39	1.00	82	2.08	28	0.72
	1500		6157	2793	47	1.19	82	2.09	43	1.09
	2500		11340	5144	64	1.63	100	2.53	57	1.44
16 in. (400 mm)	900	200	5818	2639	45	1.14	84	2.13	33	0.83
	1500		10330	4686	49	1.23	88	2.24	40	1.02

* Approximate combined body and standard actuator weight.
 Weight for packing material and box thickness not included.
 Actuator weight does not include accessories.

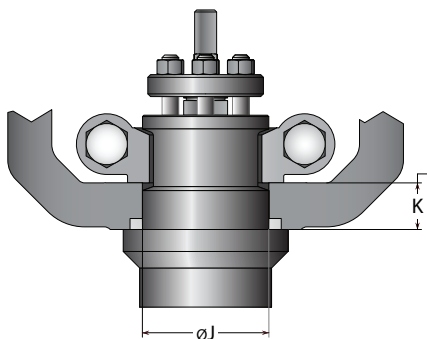
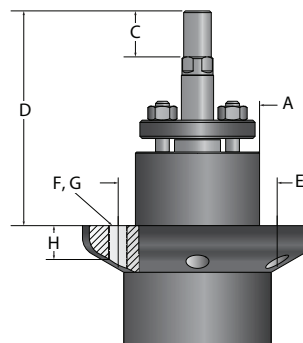
Table 8.3:
ASME Mark 200: Valve Sub Assembly Shipping Weights for Globe & Angle Body

Valve Size	Pressure Class	Act Weight (lbs)	Globe body sub assy weight (lbs)	Angle body sub assy weight (lbs)	Act Weight (Kg)	Globe body sub assy weight (Kg)	Angle body sub assy weight (Kg)
2 in. (50 mm)	900	56	151	147	25	68	66
	1500	56	163	159	25	73	72
	2500	56	232	218	25	105	98
3 in. (80 mm)	900	150	260	237	68	117	107
	1500	150	327	294	68	148	133
	2500	150	584	543	68	264	246
4 in. (100 mm)	900	150	418	409	68	189	185
	1500	150	528	469	68	239	212
	2500	150	845	785	68	383	356
6 in. (150 mm)	900	150	983	882	68	445	400
	1500	150	1367	1199	68	620	543
	2500	150	2023	1846	68	917	837
8 in. (200 mm)	900	150	1641	1435	68	744	650
	1500	150	2258	1935	68	1024	877
	2500	150	3221	2793	68	1461	1253
10 in. (250 mm)	900	285	2625	2359	129	1190	1070
	1500	285	3824	3073	129	1734	1393
	2500	285	6793	6004	129	3081	2723
12 in. (300 mm)	900	285	3508	3090	129	1591	1401
	1500	285	5765	4582	129	2614	2078
	2500	285	9760	8414	129	4427	3816
14 in. (350 mm)	900	285	4481	3859	129	2032	1750
	1500	285	6924	5872	129	3140	2663
	2500	285	13075	11055	129	5930	5014
16 in. (400 mm)	900	285	6745	5533	129	3059	2509
	1500	285	11468	10045	129	5201	4556

* Approximate weight for separate actuator and body

Table 9:
ASME Mark 200: Actuator Mounting Data
(continues on next page)

Valve Size (mm)	Pressure Class	Spud Size		Plug Thread	Plug Thread Depth		Plug Height	
		A			B	C		D
		in	mm	in		mm	in	mm
2 in. (50 mm)	900	2.88	73.15	.50-20	1.00	25.40	4.97	126.19
	1500	2.88	73.15	.50-20	1.00	25.40	4.97	126.19
	2500	2.88	73.15	.50-20	1.00	25.40	4.97	126.19
3 in. (80 mm)	900	3.38	85.85	0.75-16	1.25	31.75	5.82	147.78
	1500	3.38	85.85	0.75-16	1.25	31.75	5.82	147.78
	2500	3.38	85.85	0.75-16	1.25	31.75	5.82	147.78
4 in. (100 mm)	900	4.00	101.60	1.00-12	1.62	41.15	6.07	154.13
	1500	4.00	101.60	1.00-12	1.62	41.15	6.07	154.13
	2500	4.00	101.60	1.00-12	1.62	41.15	6.07	154.13
6 in. (150 mm)	900	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
	1500	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
	2500	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
8 in. (200 mm)	900	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
	1500	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
	2500	4.75	120.65	1.5-12	2.12	53.85	6.69	169.98
10 in. (250 mm)	900	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
	1500	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
	2500	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
12 in. (300 mm)	900	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
	1500	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
	2500	4.75	120.65	1.5-12	2.25	57.15	6.69	169.98
14 in. (350 mm)	900	6.00	152.40	1.5-12	2.25	57.15	7.81	198.37
	1500	6.00	152.40	1.5-12	2.25	57.15	7.86	199.64
	2500	6.00	152.40	1.5-12	2.25	57.15	7.82	198.63
16 in. (400 mm)	900	6.00	152.40	1.5-12	2.25	57.15	7.84	199.14
	1500	6.00	152.40	1.5-12	2.25	57.15	7.83	198.88


Figure 12: ASME Mark 200 Mounting Clamped-On (Size 2" only)

Figure 13: ASME Mark 200 Mounting Bolt-On

ASME Mark 200: Actuator Mounting Data (continued)

Bonnet to Yoke Connection style										Stroke Length	
Bolt On					Clamp On						
Bolt Circle Diameter		No. of Bolts	Bolt thread	Bolt Depth		Bonnet outside Diameter		Yoke thickness			
E		F	G	H		J		K			
in	mm			in	mm	in	mm	in	mm		
—	—	—	—	—	—	2.87	72.90	1.13	28.6	1.5	38.10
—	—	—	—	—	—	2.87	72.90	1.13	28.6		
—	—	—	—	—	—	2.87	72.90	1.13	28.6		
5.00	127.00	6	5/8-11	1.25	31.75	—	—	—	—	2	50.80
5.00	127.00	6	5/8-11	1.25	31.75	—	—	—	—		
5.00	127.00	6	5/8-11	1.25	31.75	—	—	—	—		
5.75	146.05	6	5/8-11	2.75	69.85	—	—	—	—	3	76.20
5.75	146.05	6	5/8-11	3	76.20	—	—	—	—		
5.75	146.05	6	5/8-11	3	76.20	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—	4	101.60
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—	4	101.60
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	1.25	31.75	—	—	—	—	6	152.40
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—	6	152.40
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
6.50	165.10	6	5/8-11	0.75	19.05	—	—	—	—		
7.75	196.85	8	¾-10	0.88	22.35	—	—	—	—	8	203.20
7.75	196.85	8	¾-10	0.88	22.35	—	—	—	—		
7.75	196.85	8	¾-10	0.88	22.35	—	—	—	—		
7.75	196.85	8	¾-10	0.88	22.35	—	—	—	—	8	203.20
7.75	196.85	8	¾-10	0.88	22.35	—	—	—	—		

Table 10:
ASME Mark 200: Standard Actuator Sizing Data

Valve 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
2 in. (50 mm)	900	1.88	2.76	1781	2.000	51	3.14	2027	0.13	85	0.562	14.3	0.25	160	1.5	38
	1500	1.88	2.76	1781	2.000	51	3.14	2027	0.13	85	0.562	14.3	0.25	160		
	2500	1.50	1.77	1140	1.626	41	2.08	1340	0.06	40	0.562	14.3	0.25	160		
3 in. (80 mm)	900	3.00	7.07	4560	3.188	81	7.98	5150	0.31	202	0.875	22.2	0.60	388	2	51
	1500	2.75	5.94	3832	2.938	75	6.78	4374	0.24	154	0.875	22.2	0.60	388		
	2500	2.25	3.98	2565	2.438	62	4.67	3012	0.09	59	0.875	22.2	0.60	388		
4 in. (100 mm)	900	4.00	12.57	8107	4.250	108	14.19	9152	0.63	404	1.125	28.6	0.99	641	3	76
	1500	3.63	10.32	6658	3.875	98	11.79	7609	0.48	309	1.125	28.6	0.99	641		
	2500	2.88	6.49	4188	3.125	79	7.67	4948	0.18	119	1.125	28.6	0.99	641		
6 in. (150 mm)	900	5.75	25.97	16753	6.000	152	28.27	18241	0.54	348	1.500	38.1	1.77	1140	4	102
	1500	5.38	22.69	14639	5.689	145	25.42	16399	0.96	620	1.500	38.1	1.77	1140		
	2500	4.38	15.03	9699	4.688	119	17.26	11136	0.46	297	1.500	38.1	1.77	1140		
8 in. (200 mm)	900	7.75	47.17	30434	8.000	203	50.27	32429	1.33	855	1.500	38.1	1.77	1140	4	102
	1500	7.00	38.48	24829	7.313	186	42.00	27099	1.75	1130	1.500	38.1	1.77	1140		
	2500	5.75	25.97	16753	6.000	152	28.27	18241	0.54	348	1.500	38.1	1.77	1140		
10 in. (250 mm)	900	9.75	74.66	48169	10.125	257	80.52	51945	2.71	1750	2.000	50.8	3.14	2027	6	152
	1500	8.75	60.13	38795	9.188	233	66.30	42776	3.03	1954	2.000	50.8	3.14	2027		
	2500	7.25	41.28	26634	7.625	194	45.66	29460	1.24	800	2.000	50.8	3.14	2027		
12 in. (300 mm)	900	11.25	99.40	64130	11.600	295	105.68	68183	3.14	2026	2.000	50.8	3.14	2027	6	152
	1500	10.38	84.54	54542	10.751	273	90.78	58567	3.10	1998	2.000	50.8	3.14	2027		
	2500	8.63	58.43	37694	9.001	229	63.63	41052	2.06	1331	2.000	50.8	3.14	2027		
14 in. (350 mm)	900	12.38	120.28	77598	12.813	325	128.94	83188	3.76	2423	2.500	63.5	4.91	3167	8	203
	1500	11.38	101.62	65563	11.875	302	110.75	71454	4.22	2724	2.500	63.5	4.91	3167		
	2500	9.50	70.88	45730	9.938	252	77.57	50044	1.78	1147	2.500	63.5	4.91	3167		
16 in. (400 mm)	900	14.25	159.48	102893	14.625	371	167.99	108380	3.60	2320	2.500	63.5	4.91	3167	8	203
	1500	13.00	132.73	85634	13.438	341	141.83	91501	4.19	2701	2.500	63.5	4.91	3167		

Table 11:

ASME Mark 200: Actuator Selection Options

Valve Size	Rating Class	Aluminum Actuators							Carbon Steel Actuators						
		50	100	200	300	400	500	600	50	100	150	200	300	400	
2 in. (50 mm)	900/2500	Std*	Opt*	—	—	—	—	—	—	Std*	Opt*	—	—	—	—
3 in. (80 mm)	900/2500	—	Std*	Opt*	—	—	—	—	—	—	Std*	Opt*	Opt*	—	—
4 in. (100 mm)	900/2500	—	Std	Opt*	Opt*	—	—	—	—	—	Std	Opt*	Opt*	Opt*	—
6 in. (150 mm)	900/2500	—	Std	Opt	Opt	Opt*	Opt*	Opt*	—	—	Std	Opt	Opt	Opt	Opt*
8 in. (200 mm)	900/2500	—	Std	Opt	Opt	Opt*	Opt*	Opt*	—	—	Std	Opt	Opt	Opt	Opt*
10 in. (250 mm)	900/2500	—	Opt	Std	Opt	Opt*	Opt*	Opt*	—	—	Opt	Std	Std	Opt	Opt*
12 in. (300 mm)	900/2500	—	Opt	Std	Opt	Opt*	Opt*	Opt*	—	—	Opt	Std	Std	Opt	Opt*
14 in. (350 mm)	900/2500	—	Opt	Std	Opt	Opt*	Opt*	Opt*	—	—	Opt	Std	Std	Opt	Opt*
16 in. (400 mm)	900/1500	—	—	Std	Opt	Opt*	Opt*	Opt*	—	—	Opt	Std	Std	Opt	Opt*

Actuator selections bases on 316 SS plug stems.

*Reduced pressures and/ or plug material change required

Table 12.1:
DIN Mark 200: Dimensions Table for Globe Body

Valve Size (mm)	Nominal Pressure PN	Integral Flange Face-to Face (per DIN EN 558:2008 FTF)		Match to Center when mounted with S36 or S75		Match to Center when mounted with S36 or S75 or S120		Match to Center when mounted with S200		Match to Center when mounted with S121 or S300	
		A		H		H		H		H	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
50	160	14.75	375	31.3	795	—	—	—	—	—	—
	250	14.75	375	31.3	795	—	—	—	—	—	—
80	160	17.38	441	—	—	36.6	930	39.0	990	—	—
	250	18.12	460	—	—	36.6	930	39.0	990	—	—
100	160	20.12	511	—	—	38.6	980	40.9	1040	46.7	1185
	250	20.88	530	—	—	38.8	985	41.1	1045	46.7	1185
150	160	28.12	714	—	—	46.5	1180	48.8	1240	54.7	1390
	250	30.25	768	—	—	46.9	1190	49.2	1250	54.7	1390
200	160	36.00	914	—	—	47.2	1200	—	—	55.3	1405
	250	38.25	972	—	—	—	1245	51.4	1305	56.9	1445
250	160	39.00	991	—	—	—	—	—	—	63.6	1615
	250	42.00	1067	—	—	—	—	—	—	64.0	1625
300	160	44.50	1130	—	—	—	—	—	—	65.0	1650
	250	48.00	1219	—	—	—	—	—	—	65.4	1660
400	160	56.00	1422	—	—	—	—	—	—	73.4	1865
	250	56.00	1422	—	—	—	—	—	—	73.6	1870

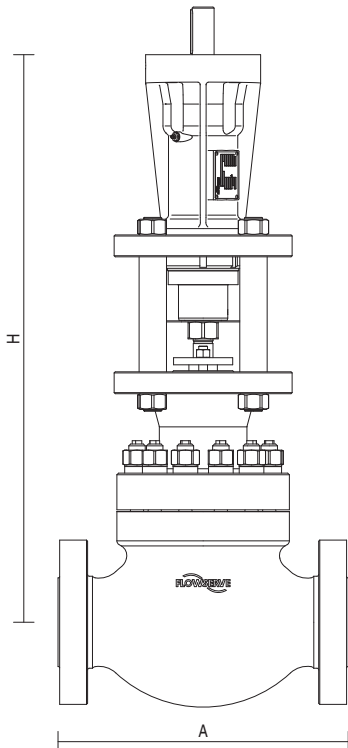

Figure 14: DIN Mark 200 Globe Body

Table 12.2:

DIN Mark 200: Dimensions Table for Angle Body

Valve Size (mm)	Nominal Pressure PN	Integral Flange Face-to Face (per DIN EN 558:2008 CTF)		Match to Center when mounted with S36 or S75		Match to Center when mounted with S36 or S75 or S120		Match to Center when mounted with S200		Match to Center when mounted with S121 or S300	
		A		H		H		H		H	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
50	160	7.38	187	29.9	760	—	—	—	—	—	—
	250	6.89	175	29.9	760	—	—	—	—	—	—
80	160	8.69	221	—	—	34.4	875	36.8	935	—	—
	250	8.86	225	—	—	34.6	880	37.0	940	—	—
100	160	10.06	256	—	—	36.0	915	38.4	975	44.1	1120
	250	10.24	260	—	—	36.4	925	38.78	985	44.3	1125
150	160	14.06	357	—	—	42.5	1080	44.9	1140	50.6	1285
	250	13.78	350	—	—	43.3	1100	45.7	1160	51.2	1300
200	160	18	457	—	—	43.1	1095	45.5	1155	51.2	1300
	250	15.75	400	—	—	44.1	1120	46.5	1180	52.0	1320
250	160	19.5	495	—	—	—	—	—	—	58.7	1490
	250	21	534	—	—	—	—	—	—	57.5	1460
300	160	22.25	565	—	—	—	—	—	—	60.0	1525
	250	24	610	—	—	—	—	—	—	59.4	1510
400	160	28	711	—	—	—	—	—	—	66.7	1695
	250	28	711	—	—	—	—	—	—	67.1	1705

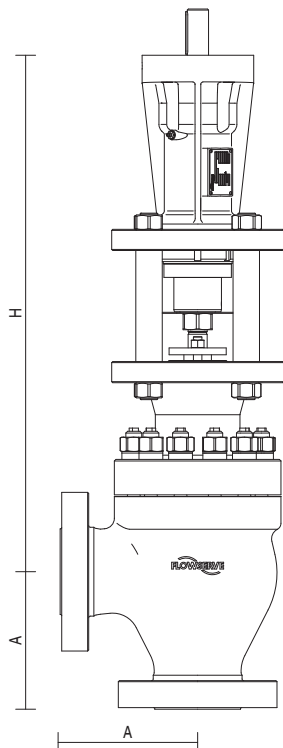


Figure 15: DIN Mark 200 Angle Body

Table 13:
DIN Mark 200: Flange Connection Data

Nominal Size	Flanged Connecting Dimensions according to DIN EN 1092-2:2008-09 Typ 21									
	Nominal pressure PN160					Nominal pressure PN250				
	D	K	n	L	Gw	D	K	n	L	Gw
50	195	145	4	26	M24	200	150	8	26	M24
80	230	180	8	26	M24	255	200	8	30	M27
100	265	210	8	30	M27	300	235	8	33	M30
150	355	290	12	33	M30	390	320	12	36	M33
200	430	360	12	36	M33	485	400	12	42	M39
250	515	430	12	42	M39	585	490	16	48	M45
300	585	500	16	42	M39	690	590	16	52	M48
400	750	650	20	48	M45	855	725	16	70	M64

Table 14.1:
DIN Mark 200: Shipping Weights & Crate Dimensions for Globe body

Valve Size (mm)	Nominal Pressure PN	Minimum Shipping Crate Dimensions with max. usable linear thrust unit						Weight* when mounted with S36 or S75		Weight* when mounted with S36 or S75 or S120		Weight* when mounted with S200		Weight* when mounted with S121 or S300	
		Width		Length		Height		lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg
		in.	m	in.	m	in.	m								
50	160	12	0.3	16	0.4	35	0.9	227	103	—	—	—	—	—	—
	250	12	0.3	16	0.4	35	0.9	240	109	—	—	—	—	—	—
80	160	12	0.3	20	0.5	43	1.1	—	—	423	192	478	217	—	—
	250	12	0.3	20	0.5	43	1.1	—	—	500	227	558	253	—	—
100	160	20	0.5	24	0.6	51	1.3	—	—	602	273	657	298	769	349
	250	16	0.4	24	0.6	51	1.3	—	—	730	331	787	357	899	408
150	150	20	0.5	31	0.8	63	1.6	—	—	1047	475	1102	500	1215	551
	250	20	0.5	31	0.8	63	1.6	—	—	1440	653	1497	679	1607	729
200	160	20	0.5	39	1.0	67	1.7	—	—	1731	785	1786	810	1898	861
	250	20	0.5	39	1.0	67	1.7	—	—	2654	1204	2712	1230	2822	1280
250	160	28	0.7	39	1.0	75	1.9	—	—	—	—	—	—	3064	1390
	250	28	0.7	43	1.1	75	1.9	—	—	—	—	—	—	4486	2035
300	160	28	0.7	47	1.2	79	2.0	—	—	—	—	—	—	4299	1950
	250	28	0.7	51	1.3	79	2.0	—	—	—	—	—	—	6371	2890
400	160	35	0.9	59	1.5	91	2.3	—	—	—	—	—	—	8223	3730
	250	35	0.9	59	1.5	91	2.3	—	—	—	—	—	—	10748	4875

* Approximate combined body and electric actuator. Weight for packing material and box thickness not included.

Table 14.2:
DIN Mark 200: Shipping Weights & Crate Dimensions for Angle body

Valve Size (mm)	Nominal Pressure PN	Minimum Shipping Crate Dimensions						Weight* when mounted with S36 or S75		Weight* when mounted with S36 or S75 or S120		Weight* when mounted with S200		Weight* when mounted with S121 or S300	
		Width		Length		Height		lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg
		in.	m	in.	m	in.	m								
50	160	12	0.3	12	0.3	35	0.9	218	99	—	—	—	—	—	—
	250	12	0.3	12	0.3	35	0.9	227	103	—	—	—	—	—	—
80	160	12	0.3	16	0.4	47	1.2	—	—	406	184	461	209	—	—
	250	12	0.3	16	0.4	47	1.2	—	—	465	211	522	237	—	—
100	160	20	0.5	20	0.5	55	1.4	—	—	589	267	644	292	756	343
	250	16	0.4	20	0.5	55	1.4	—	—	672	305	730	331	842	382
150	160	20	0.5	24	0.6	67	1.7	—	—	972	441	1027	466	1140	517
	250	20	0.5	24	0.6	67	1.7	—	—	1254	569	1312	595	1424	646
200	160	20	0.5	28	0.7	71	1.8	—	—	1581	717	1636	742	1748	793
	250	20	0.5	28	0.7	71	1.8	—	—	1980	898	2037	924	2147	974
250	160	28	0.7	35	0.9	79	2.0	—	—	—	—	—	—	2800	1270
	250	28	0.7	35	0.9	79	2.0	—	—	—	—	—	—	3880	1760
300	160	28	0.7	39	1.0	83	2.1	—	—	—	—	—	—	3913	1775
	250	28	0.7	39	1.0	83	2.1	—	—	—	—	—	—	5633	2555
400	160	35	0.9	47	1.2	94	2.4	—	—	—	—	—	—	7110	3225
	250	35	0.9	47	1.2	94	2.4	—	—	—	—	—	—	9535	4325

* Approximate combined body and electric actuator. Weight for packing material and box thickness not included.

Table 15:
DIN Mark 200: Electric Actuator Selection Options

Valve Size	Nominal Pressure	Linear thrust Unit							
		S36	S75	S36	S75	S120	S200	S121	S300
50	160/250	Std	Std	—	—	—	—	—	—
80	160/250	—	—	Std	Std	Std	Std	—	—
100	160/250	—	—	Std	Std	Std	Std	Std	Std
150	160/250	—	—	Std	Std	Std	Std	Std	Std
200	160/250	—	—	Std	Std	Std	Std	Std	Std
250	160/250	—	—	—	—	—	—	Std	Std
300	160/250	—	—	—	—	—	—	Std	Std
400	160/250	—	—	—	—	—	—	Std	Std

Note: The max. allowable actuator force depends on the seat size, operation pressure, temperature and selected material

1. First, determine the maximum necessary Force and Torque based on the Valve/Seat Size, Pressure, Temperature and Materials.
2. Second, select the linear thrust unit in accordance with the possible mountable valve/thrust unit size. (shown in tables 12 & 14, the weight, dimension tables)
3. Third, select the maximum thrust/torque and standardized size (table 16 and figure 14) from the electric actuator selection. (shown in the linear thrust unit data)
4. Fourth, virtually any electric multi-turn actuator can be selected by using the following variables:
 - Actuator/linear thrust unit connecting flange (according to EN ISO 5210)
 - maximum allowable thrust (kN)
 - maximum allowable torque (Nm)

Table 16:
DIN Mark 200: Multi-turn Electric Actuator Thrust Data*

Linear thrust unit	Thrust max. kN	Torque max. Nm	Stroke max. mm	Multi-turn Valve Actuator Attachments According to EN ISO 5210 From B3									
				Size	ø d	l3	ø d1	h1	ø d2	ø d3	ø d4	Screw	n
S 36	35	100	100	F10	20	47	175	5	70	102	11	M10x16	4
S 75	77	250		F14	30	68	175	6	100	140	18	M16x40	4
S 120	121	500		F14	30	68	175	6	100	140	18	M16x40	4
S 200	181	1000		F16	40	87	210	7	130	165	22	M20x75	4
S 121	121	500	200	F14	30	68	300	6	100	140	18	M16x25	4
S 300	288	1700		F25	50	115	300	7	200	254	18	M16x45	8

* all dimensions in mm

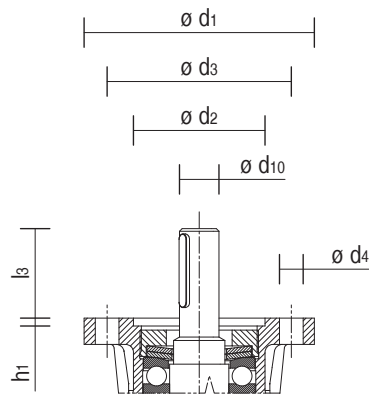


Figure 16: DIN Mark 200 Actuator Mounting



Pages available for technician's notes.



Pages available for technician's notes.



Pages available for technician's notes.



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