PROCESS INSTRUMENTATION - VALVES
Product Specifications

PSS 2A-8A1 F

MVR20 Multistage Control Valve

FEATURES

- Multistage, Axial Flow Control Valve for high pressure drop
- Progressive staged, high resistance trim
- Simple, quick change trim
- Variety of Angle or Globe Style body configurations
- Smooth, accurate control of liquids and vapor
- For use in Clean and Dirty Services - resistant to plugging and clogging
- For control of Cavitation, Erosion, Vibration, and High Noise
- Linear and Modified Equal Percentage Trims available
- Notch-Style Trim allows smooth throttling resolution even in small Cv designs
- Tight shutoff to ANSI/FCI 70.2 Class IV or V

KEY COMPONENTS OF THE QUICK CHANGE TRIM MULTISTAGE VALVES

Figure 1. MVR20 Multistage Control Valve

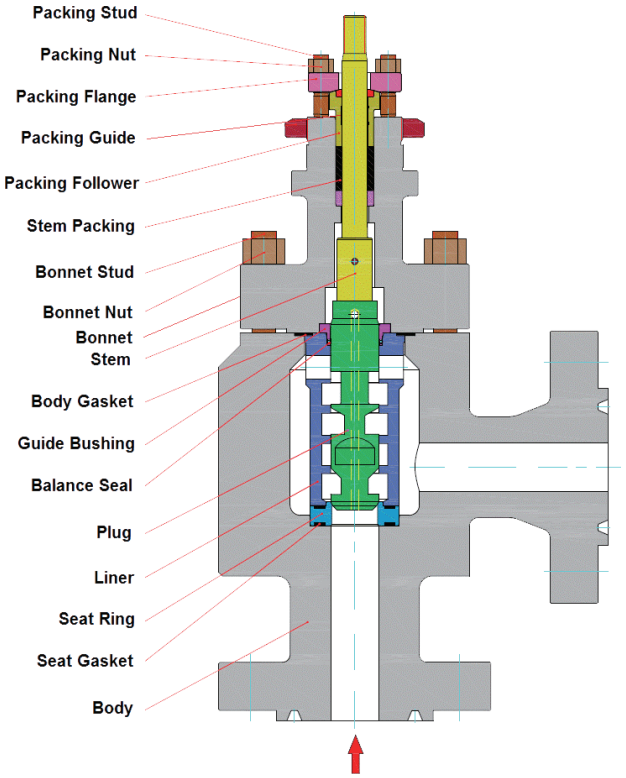


Figure 2. Axial Flow Notch Style Plug, Cage, and Seat

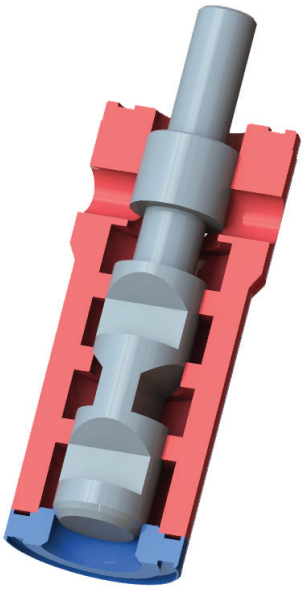


Table 1. MVR20 Key Components

Type	Multistage Axial Flow Control Valve
Body Size	1” (DN25) - 4” (DN100)
Plug Characteristics	Modified Linear and Equal Percentage
Pressure Classes	ASME Class 600-2500
Body Connections (a)	RF, RTJ, BW, SW
Face to Face Dimensions	See Catalog, Custom Design Available
Packing	Graphite/Braided TFE and Graphite
Gasket	Stainless Steel/Grafoil®

a. DIN and PN flanges are also available. Contact Global Customer Support for more information.

MATERIALS OF CONSTRUCTION

Table 2. MVR20 Valve Sizes, 1” (DN25) (a) and 1-1/2” (DN40) (b)

Temperature -20°F to 500°F (-29°C to 260°C)			
Description	NACE, MR0175, ISO15156	NACE, MR0103	Power Plant Materials
Body	ASTM A105	ASTM A105	ASTM A105
Body Seat/Gasket	300 SS/Graphite	300 SS/Graphite	300 SS/Graphite
Seat Ring	XM19 50, Integral with Liner	XM19, Integral with Liner	17-4 H900, Integral with Liner
Liner	XM19	XM19	17-4 H900
Plug/Stem	Inconel 718	17-4 H1150M	410 SS HT
Balance Seal	Filled TFE, Spring Energized	Filled TFE, Spring Energized	Filled TFE, Spring Energized
Guide Bushing	316 SS	316 SS	316 SS
Bonnet Stud	A193-B7	A193-B7	A193-B7
Bonnet Nut	A194-2H	A194-2H	A194-2H
Stem Packing	Graphite/TFE Rope, Carbon Spacer	Graphite/TFE Rope, Carbon Spacer	Graphite/TFE Rope, Carbon Spacer
Packing Follower	316 SS	316 SS	316 SS
Packing Guide	Metoplast™	Metoplast™	Metoplast™
Packing Flange	ASTM A105	ASTM A105	ASTM A105
Packing Stud	A193-B7	A193-B7	A193-B7
Packing Nut	A194-2H	A194-2H	A194-2H

a. 1” (DN25) size MVR20 is unbalanced trim.

b. Optional materials are available. Contact Global Customer Support.

Table 3. MVR20 Valve Sizes, 2” (DN50) and 4” (DN100) (a)

Temperature -20°F to 500°F (-29°C to 260°C)			
Description	NACE, MR0175, ISO15156	NACE, MR0103	Power Plant Materials
Body	ASTM A105	ASTM A105	ASTM A105
Body Seat/Gasket	300 SS/Grafoil®	300 SS/Grafoil®	300 SS/Grafoil®
Seat Ring	316 SS/Hardfaced	316 SS/Hardfaced	316 SS/Hardfaced
Liner	XM19	XM19	17-4 H900
Plug/Stem	Inconel 718	17-4 H1150M	410 SS HT
Balance Seal	Filled TFE, Spring Energized	Filled TFE, Spring Energized	Filled TFE, Spring Energized
Guide Bushing	316 SS	316 SS	316 SS
Stem	Inconel 718	17-4 H1150M	17-4 H1150M
Bonnet Stud	A193-B7	A193-B7	A193-B7
Bonnet Nut	A194-2H	A194-2H	A194-2H
Stem Packing	Graphite/TFE Rope, Graphite	Graphite/TFE Rope, Graphite	Graphite/TFE Rope, Graphite
Packing Follower	316 SS	316 SS	316 SS
Packing Guide	Metoplast™	Metoplast™	Metoplast™
Packing Flange	ASTM A105	ASTM A105	ASTM A105
Packing Stud	A193-B7	A193-B7	A193-B7
Packing Nut	A194-2H	A194-2H	A194-2H

a. Optional materials are available. Contact Global Customer Support.

VALVE SIZES, RATED CV, CRITICAL FLOW FACTORS

Factor F_L, Valve Stroke, Cv vs Stroke

Table 4. Valve Sizes, Cv, and F_L

Cv and Stages															
Valve Size		Trim Size		3 Stage Cv Mod %			4 Stage Cv, Mod Lin.			5 Stage Cv, Mod %			6 Stage Cv, Mod Lin.		
DN	inch	mm	inch	A	B	C	A	B	C	A	B	C	A	B	C
25	1”	18	0.71”	1.3	1.9	2.0	1.0	1.4	1.7	0.8	1.3	1.5	0.8	1.0	1.4
40	1.5”	25	1”	2.5	3.2	3.8	1.9	2.5	3.2	1.6	2.1	2.8	1.4	1.8	2.5
50	2”	38	1.5”	6.0	7.5	9.0	4.5	6.0	7.5	3.8	5.0	6.6	3.5	4.5	6.0
80	3”	58	2.3”	13.0	16.5	20.0	10.0	13.0	16.5	8.0	11.0	14.0	7.5	9.5	13.0
100	4”	73	2.87”	22.0	28.0	34.0	16.5	22.0	28.0	13.0	18.0	24.0	12.0	16.0	22.0
Valve F_L															
Valve Size		Trim Size		3 Stage Cv Mod %			4 Stage Cv, Mod Lin.			5 Stage Cv, Mod %			6 Stage Cv, Mod Lin.		
DN	inch	mm	inch	A	B	C	A	B	C	A	B	C	A	B	C
25	1”	18	0.71”	0.994	0.991	0.980	0.996	0.994	0.991	0.997	0.995	0.992	0.998	0.997	0.994
40	1.5”	25	1”	0.994	0.991	0.980	0.996	0.994	0.991	0.997	0.995	0.992	0.998	0.997	0.994
50	2”	38	1.5”	0.994	0.991	0.980	0.996	0.994	0.991	0.997	0.995	0.992	0.998	0.997	0.994
80	3”	58	2.3”	0.994	0.991	0.980	0.996	0.994	0.991	0.997	0.995	0.992	0.998	0.997	0.994
100	4”	73	2.87”	0.994	0.991	0.980	0.996	0.994	0.991	0.997	0.995	0.992	0.998	0.997	0.994

Table 5. Valve Strokes

Valve Travel							
Valve Size		Trim Size		3/5 Stage Travel Modified % Trim		4/6 Stage Travel, Modified Linear Trim	
DN	inch	mm	inch	mm	inch	mm	inch
25	1”	18	0.71”	10.0	0.39”	6.0	0.24”
40	1.5”	25	1”	10.0	0.39”	6.0	0.24”
50	2”	38	1.5”	15.0	0.59”	10.0	0.39”
80	3”	58	2.3”	20.0	0.79”	15.0	0.59”
100	4”	73	2.87”	25.0	0.98”	20.0	0.79”

Notes:
1. Pipe nipples and reducers can be provided.
2. Other flange ratings and end connections are available.
3. Larger valve sizes are available, consult the factory.
4. Rangeability exceeds 50:1 on most valve sizes.

FLOW PATHS AND STAGING

Axial Flow Notch Trim Stages

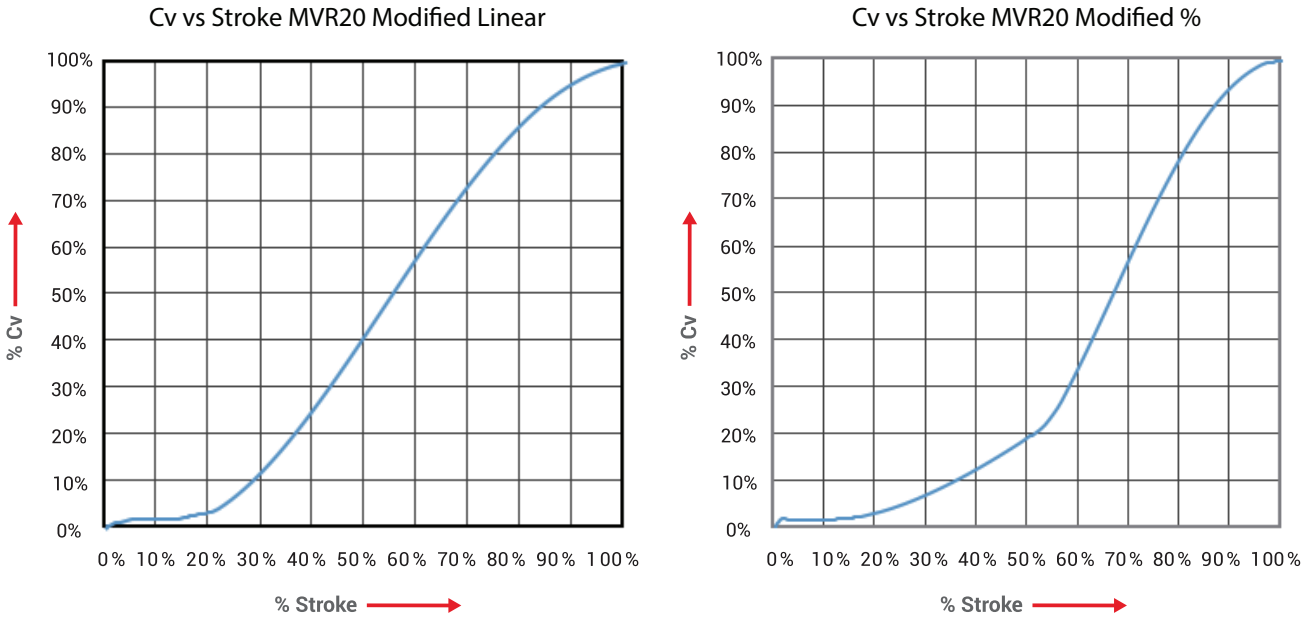
MVR20 Trim Flow Path

- The axial flow notch style trim defines a stage for each layer of notches and discharge holes (4 stage trim shown).
- Each stage combines right angle turns with entry and exit losses.
- Flow testing shows that the axial flow stage has the same resistance as 3 to 4 right angle turns.
- Axial flow distributes the pressure drop along the entire length of the plug as compared to radial flow which concentrates the pressure drop at the leading edge of the plug.

MVR20 Trim Staging

- The last two stages are constant in all designs.
- Varying the number or the size of notches on the initial stages, additional staging can be achieved for cavitation control:
  - "C" trim, (full area) is defined as 1-1-1-2 area ratios, where the last stage has 2 times the areas of the notches.
  - "A" trim (reduced area) is defined as 1-1-2-4 area ratio trim, there would be only one notch on the first 2 stages and the last stages would be unchanged.
  - "B" trim (reduced area) is defined as 1-1-1-5 area ratio trim, where the initial two stages have reduced area notches.
- 3, 4, 5, and 6 stage trim use similar design philosophy.

Figure 3. Cv vs Stroke



Notes:
1)The Cv vs Stoke characteristics may vary based on valve size.
2) Certain industry applications are better served by a specific valve characteristic, consult the factory.

DIMENSIONS & WEIGHTS

1" (DN25) to 4" (DN100) Size Valves

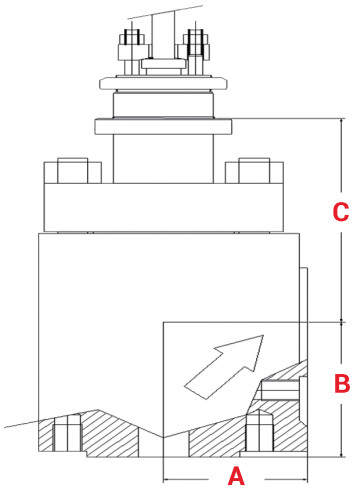
Table 6. Valve Dimensions and Weights (see Figure 4)

Valve Size inch DN mm	ANSI Class	End Connection	MVR20 3/4 and 5/6 Stage Forged Angle				
			Stages	A mm (inch)	B mm (inch)	C mm (inch)	Valve Weight kg (lbs)
1 DN25	600-2500	Flange	3/4	114 (4.5)	70 (2.75)	165 (6.5)	39 (85)
			5/6		95 (3.75)		43 (95)
	600-2500	SW	3/4	73 (2.88)	64 (2.5)		27 (60)
			5/6		99 (3.88)		32 (70)
1.5 DN40	600-2500	Flange	3/4	140 (5.5)	83 (3.25)	196 (7.7)	59 (130)
			5/6		102 (4.00)		66 (145)
	600-2500	SW	3/4	78 (3.06)	70 (2.75)		34 (75)
			5/6		105 (4.12)		41 (90)
2 DN50	600-1500	Flange	3/4	149 (5.88)	99 (3.88)	231 (9.1)	91 (200)
			5/6			279 (11)	109 (240)
	600-2500	SW	3/4	102 (4)	111 (4.38)	234 (9.2)	80 (175)
			5/6		165 (6.00)	241 (9.5)	91 (200)
	2500	Flange	3/4	162 (6.38)	105 (4.12)	236 (9.3)	114 (250)
			5/6			284 (11.2)	136 (300)
3 DN80	600-1500	Flange	3/4	141 (5.56)	197 (7.75)	302 (11.9)	205 (450)
			5/6		279 (11.00)		250 (550)
	600-1500	BW	3/4	138 (5.42)	197 (7.75)	315 (12.4)	182 (400)
			5/6		279 (11.00)		200 (440)
	2500	Flange	3/4	159 (6.25)	210 (8.25)	318 (12.5)	284 (625)
			5/6			368 (14.5)	318 (700)
	2500	BW	3/4	156 (6.16)	197 (7.75)	325 (12.8)	250 (550)
			5/6			396 (15.6)	273 (600)
4 DN100	600-1500	Flange	3/4	184 (7.25)	222 (8.75)	318 (12.5)	252 (775)
			5/6		313 (12.31)	409 (16.1)	409 (900)
	600-1500	BW	3/4	166 (6.53)	248 (9.75)	320 (12.6)	330 (725)
			5/6			411 (16.2)	364 (800)
	2500	Flange	3/4	209 (8.22)	241 (9.50)	333 (13.1)	477 (1050)
			5/6		332 (13.06)		568 (1250)
	2500	BW	3/4	181 (7.12)	241 (9.50)	343 (13.5)	398 (875)
			5/6			434 (17.1)	432 (950)

Notes:

1. Flange ends use drilled and tapped holes in the valve body.
2. Forged globe body options are available, contact Global Customer Support.
3. Custom end connections and centerline to face dimensions are available, contact Global Customer Support.
4. Standard flow direction is under the plug. Flow to close options are available, contact Global Customer Support.

Figure 4. Dimensions



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