Baumann™ 51000 High-Pressure, Low-Flow Control Valve

The Baumann 51000 control valve is optimally designed for demanding low-flow, high-pressure control applications often found in laboratories and pilot plants. NPS 1/4 or 1/2 valve assemblies are standard as either investment cast stainless steel or N10276 nickel alloy. Constructions with other high nickel alloys are available.

With a small footprint, less than 10 inches tall, and multiple trim capacity reductions available to meet changing process requirements, the 51000 is a perfect fit where space is at a premium and flexibility is a must. The valve is suited for demanding control of gases, chemical/dye injection and acid/caustic solutions in paper production, textiles, specialty chemicals, and many other industries.

Baumann 51000 NPS 1/2 Control Valve with TA6000 Electropneumatic Transducer (I/P)

51000 NPS 1/4 Control Valve with Baumann 16 Actuator, and Fisher™ 3660 Pneumatic Positioner

51000 NPS 1/2 Control Valve with Baumann 16 Actuator, and FIELDVUE™ DVC2000 Digital Valve Controller

Features

- Compact Size.
- Suitable for sticky fluids and corrosive atmospheres.
- Quick Trim Change Out - Matched trims not required.
- Investment cast stainless steel body in NPS 1/4 and 1/2, or barstock N10276 Nickel Alloy. Other alloys available.
- Class VI shutoff with soft seat available. Up to 207 barg (3000 psig) at 37°C (100°F).
- Rugged bolted bonnet design.
- Wide flow capacity range. Maximum rated Cv ranges from 0.00013 to 2.5 (0.00011 to 2.16 Kv).
- Available without positioner for fail-open or fail-close applications.

Figure 1. NPS 1/4 and 1/2 (6.35 and 12.7 mm) Soft Seat Cage Design for Cv = 0.00013 to 0.45 Class VI Shutoff (N10276 Nickel Alloy Construction Available)

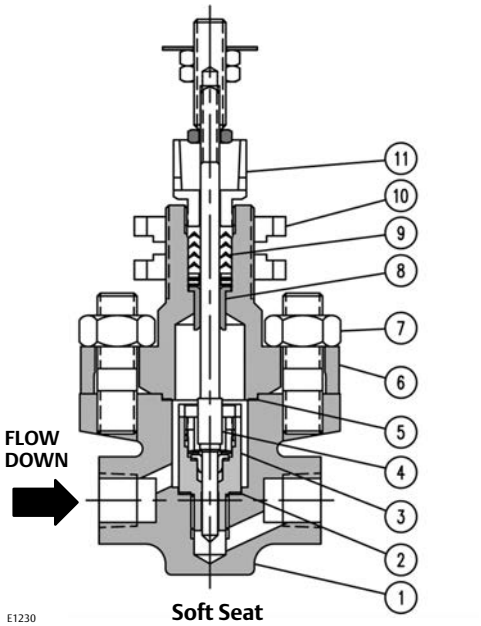


Figure 2. Soft Seat Cage Assembly

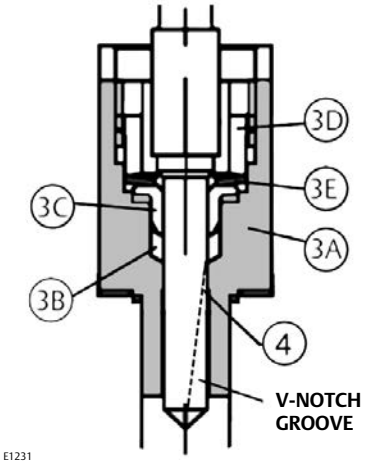
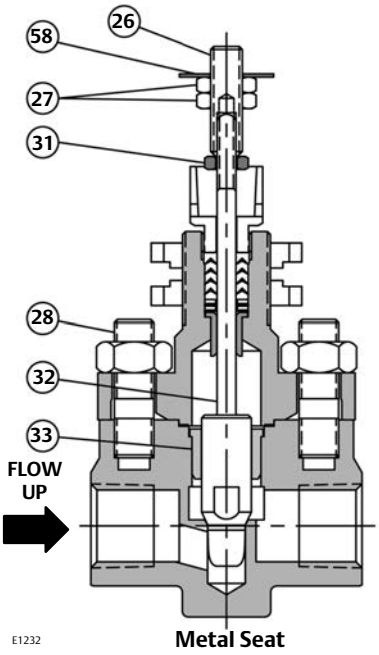


Figure 3. NPS 1/2 (12.7 mm) Integral (Metal) Seating for Cv = 1.0, 1.5, and 2.5 Class IV Shutoff



The PTFE ring (key 3B) surrounds the valve plug (key 4) to help eliminate clearance flow typical of lapped-in metal-to-metal close clearance micro trims. Flow is directed over the valve plug and forced through a single V-notch path as the plug moves above the PTFE ring, providing precise and predictable control over its entire travel range. When the V-notch moves below the PTFE ring, Class VI primary shutoff is achieved.

A live-loaded metal seat collar (key 3C) fully retains the PTFE ring (key 3B). The valve plug (key 4) seats against the metal collar providing Class IV secondary shutoff. In addition, the fluid process pressure combines with the actuator seating force to form a hydraulic seal within the fully retained PTFE ring (key 3B). Therefore, the higher the process pressure the tighter the shutoff.

Table 1. Baumann 51000 Soft Seat Cage Assembly

Key Number	Parts	Material
3A	Cage	ASTM A276 S31600 Condition A or ASTM B574 N10276, 35 HRC Max
3B	Ring	PTFE (Polytetrafluoroethylene)
3C	Collar	ASTM A276 S31600 Condition A or ASTM B574 N10276, 35 HRC Max
3D	Retainer	
3E	Spring	

Figure 4. V-Ring Packing Kit

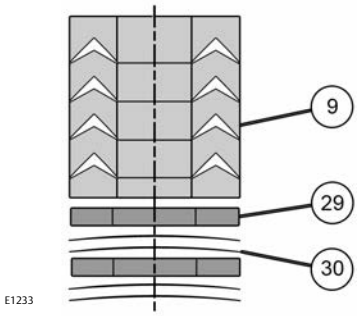


Table 2. Baumann 51000 V-Ring Packing Kit 51607

Key Number	Quantity	Description
9	1	Packing Set
29	2	Flat Washer
3	4	Disc Spring

Table 3. Materials of Construction

Key Number	Parts	Material
1	Valve Body, NPS 1/4 and NPS 1/2	ASTM A351 CF8M or ASTM B575 N10276, 35 HRC Max
2	Seat Cage Gasket	Reinforced Graphite
3	Figure 1 ONLY! Soft Seat Cage Assy, (Cv's 0.00013 to 0.45), (Kv's 0.00011 to 0.39)	See figure 2, table 1
	Seat, Body (Integral Seat) (Cv's 1.0, 1.5, 2.5); (Kv's 0.86, 1.29, 2.16)	ASTM A351 CF8M or ASTM B575 N10276, 35 HRC Max
4	Plug/Stem (Cv's 0.00013 - 0.45); (Kv's 0.00011 to 0.39)	ASTM A479 S21800 Annealed or ASTM B574 N10276, 35 HRC Max
5	Bonnet Gasket	Flexible Graphite and Polymer Composite
6	Bonnet	ASTM A351 CF8M or ASTM B574 N10276, 35 HRC Max
7	Hex Nuts	18-8 Stainless Steel
8	Stem Guide	ASTM A582 S30300 Condition A or Carbon Fiber-Filled Thermoplastic Fluoropolymer
9	V-Ring Packing Kit	PTFE (Polytetrafluoroethylene) & S30400 & S30100
10	Clamp Nut	ASTM A240 S30400
11	Packing Follower Nut	ASTM A582 S30300 Condition A or ASTM B574 N10276, 35 HRC Max
26	Stem Adapter, Baumann 16 Actuator	18-8 Stainless Steel
27	Hex Jam Nut, Baumann 16 Actuator	18-8 Stainless Steel
28	Body Studs	S30400 ASTM A193, B8 Class 1
31	Stem Adapter Nut	18-8 Stainless Steel
32	Plug and Stem S/A (for metal seated plugs) Integral Seat, Cv's 1.0, 1.5, & 2.5; (Kv's 0.86, 1.29, 2.16)	ASTM A276 S31600 Condition A or ASTM B574 N10276, 35 HRC Max
33	Plug Guide	ASTM A479 S21800 Annealed or Carbon Fiber-Filled Thermoplastic Fluoropolymer
34	Flange, Bonnet	ASTM A743 CF8
35	Travel Indicator Disc, Baumann 16 Actuator	18-8 Stainless Steel

Table 4. Valve Body S/A Pressure-Temperature Ratings

WORKING PRESSURE (barg)			WORKING PRESSURE (psig)		
Temperature (°C)	ASTM A351 CF8M	ASTM B575 N10276, 35 HRC Max	Temperature (°F)	ASTM A351 CF8M	ASTM B575 N10276, 35 HRC Max
-195 to 37.8	207	207	-320 to 100	3000	3000
93.3	178	207	200	2580	3000
149	161	200	300	2330	2910
176	154	196	350	2235	2850

Table 5. Dimensions and Weights, Valve Body Subassembly

VALVE SIZE		A		MATERIAL	APPROXIMATE WEIGHTS	
mm	NPS	mm	inch		kgs	lbs
6.35	1/4	55.9	2.20	Stainless Steel	0.64	1.4
				N10276 Nickel Alloy	1.0	2.2
12.7	1/2	68.6	2.70	Stainless Steel	0.82	1.8
				N10276 Nickel Alloy	1.18	2.6

Table 6. Rated Cv Comparison Chart

VALVE SIZE		ORIFICE DIAMETER		PLUG TRAVEL		TRIM NUMBER	CV AT VALVE OPENING- PERCENT OF PLUG TRAVEL
mm	NPS	mm	inch	mm	inch		100
6.35 12.7	1/4 1/2	3.97	0.156	12.7	0.5	16	0.00013
						15	0.00025
						14	0.0005
						13	0.001
						12	0.002
						11	0.004
						10	0.008
						09	0.015
						08	0.03
						07	0.06
						06	0.10
						05	0.20
						04	0.45
12.7	1/2	9.53	0.375	12.7	0.5	03	1.0
						02	1.5
						01	2.5

Table 7. Model Numbering System

51												
51000	Valve Size			Trim No.	Cv	Kv	Instrument		Valve Body Material		Fail Option	
		mm	NPS									
51000	1	6.35	1/4	01	2.5(1)	2.16(1)	0(2)	None	S	CF8M	O	Open
	2	12.7	1/2	02	1.5(1)	1.29(1)	1(3)	Pneumatic (3-15 psi)	C	N10276	C	Closed
				03	1.0(1)	0.86(1)	2(4)	I/P Positioner (4-20 mA)				
				04	0.45	0.39	3(5)	I/X Transducer (4-20 mA)				
				05	0.20	0.17						
				06	0.10	0.09						
				07	0.060	0.05						
				08	0.030	0.026						
				09	0.015	0.013						
				10	0.008	0.0069						
				11	0.004	0.0035						
				12	0.002	0.0018						
				13	0.001	0.0009						
				14	0.0005	0.00043						
				15	0.00025	0.00022						
				16	0.00013	0.00011						

1. Available in NPS 1/2 valve only.
2. Baumann 16 actuator.
3. 16 with 3660.
4. 16 with 3661.
5. 16 with TA6000.

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