

# Fisher™ SS-138B Continuous Catalytic Regeneration Valve

This bulletin covers the Fisher SS-138B, an NPS 1 through NPS 8 segmented ball valve with metal flow ring construction. The segmented ball is used to control the flow of catalyst from reactor to regeneration towers in a continuous catalyst regeneration (CCR) unit.

The Fisher SS-138B is specifically designed to meet process licensor requirements. The demanding nature of the application requires a specific design which reduces crushing of the catalyst and pressure build up downstream of the valve by controlling gravity feed of the catalyst through the valve. This is achieved by shimming the Vee-Ball™ to the center of the valve body cavity to hold the flow ring a process-licensor specified distance away from the ball.

## Features

- **Flow Passages**— Specially designed flow passages eliminate solids accumulation that can hinder valve operation. This extends the life of the catalyst spheres, reduces maintenance cost, and improves regeneration efficiency.
- **Easy Installation**— Optional flanged body design of the SS-138B eliminates exposed line flange bolting, reduces alignment and installation time, and promotes secure valve installations and piping integrity.
- **Smooth Valve Operation**— Precision machined parts and pressure balanced seal designs allow smooth, precise movement of the ball.
- **Precision Engineered**— Specific clearance between the flow ring and hardened Vee-Ball trim parts prevent crushing of the catalyst spheres.
- **Quick and Easy Maintenance**— Ball seal inspection and replacement is done at the valve body inlet without removing the actuator or disassembling the valve. Valve maintenance requires no special tools.
- **Structural Integrity**— One-piece valve body improves structural integrity of the pressure boundary by eliminating leak paths that could be caused by the gaskets in two-piece, bolted valve designs.
- **Exceptional Environmental Capabilities**— The optional ENVIRO-SEAL™ packing systems are designed with very smooth shaft surfaces and live loading to provide exceptional sealing. The seal of the ENVIRO-SEAL system can restrict emissions to less than the EPA (Environmental Protection Agency) limit of 100 ppm (parts per million).



X0714

SS-138B NPS 4 with Fisher 2052 Size 2

**Specifications**

**Valve Sizes and End Connection Styles**

SS-138B: NPS ■ 1, ■ 1-1/2, ■ 2, ■ 3, ■ 4, ■ 6, and ■ 8

**Maximum Inlet Pressures<sup>(1)</sup>**

CG8M (317 Stainless Steel) Valves: Consistent with CL300 for flanged SS-138B, pressure-temperature ratings per ASME B16.34, but do not exceed the material temperature capabilities shown below or the pressure drop limitations.

Flangeless SS-138B CG8M (317 Stainless Steel) Valves: Consistent with applicable pressure-temperature ratings in table 1 per ASME B16.34, but do not exceed the material temperature capabilities shown below and the pressure drop limitations.

**Shutoff Classification<sup>(1, 3)</sup>**

Class I per ANSI/FCI 70-2 and per IEC 60534-4, (Class II and better not available). A defined initial maximum leak rate can be provided subject to review of service conditions.

**Bidirectional Flow:** 5% of valve capacity at full travel

**Construction Materials**

See table 3

**Temperature Capabilities<sup>(1,2)</sup>**

Flow Ring: -198 to 538°C (-325 to 1000°F)  
PEEK/PTFE Bearings: -198 to 260°C (-325 to 500°F)

**Packing Constructions**

PTFE V-ring: -46 to 232°C (-50 to 450°F)  
Graphite: -198 to 538°C (-325 to 1000°F)  
ENVIRO-SEAL Single PTFE V-ring: -46 to 232°C (-50 to 450°F)  
ENVIRO-SEAL Graphite: -7 to 316°C (20 to 600°F)

**Flow Characteristic**

Modified equal percentage

**Dimensions**

See figures 3 and 4 for dimensions

**Standard Flow Direction**

Forward (into the convex face of the V-notch ball)

**Flow Coefficients**

See Fisher Catalog 12

**Flow Coefficient Ratio**

See Fisher Catalog 12

**Maximum Ball Rotation**

90 degrees

**Actuator Mounting**

Standard valve construction is for right-hand mounting, as viewed from upstream end of valve. Left-hand (optional) mounting is available upon request.

**Valve/Actuator Action**

With diaphragm or piston rotary actuator, the valve is field-reversible between PDTTC or PDTTO:

■ push-down-to-close (extending actuator rod closes valve) and ■ push-down-to-open (extending actuator rod opens valve)

**Approximate Weight**

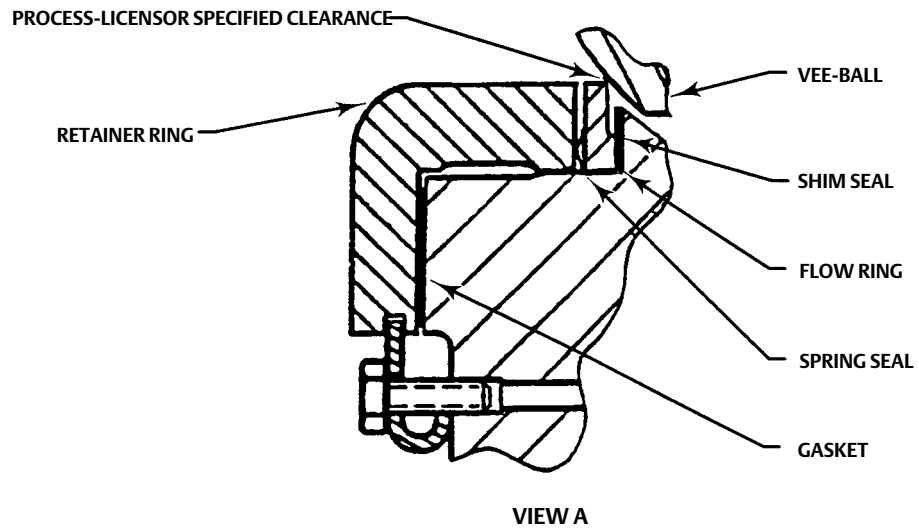
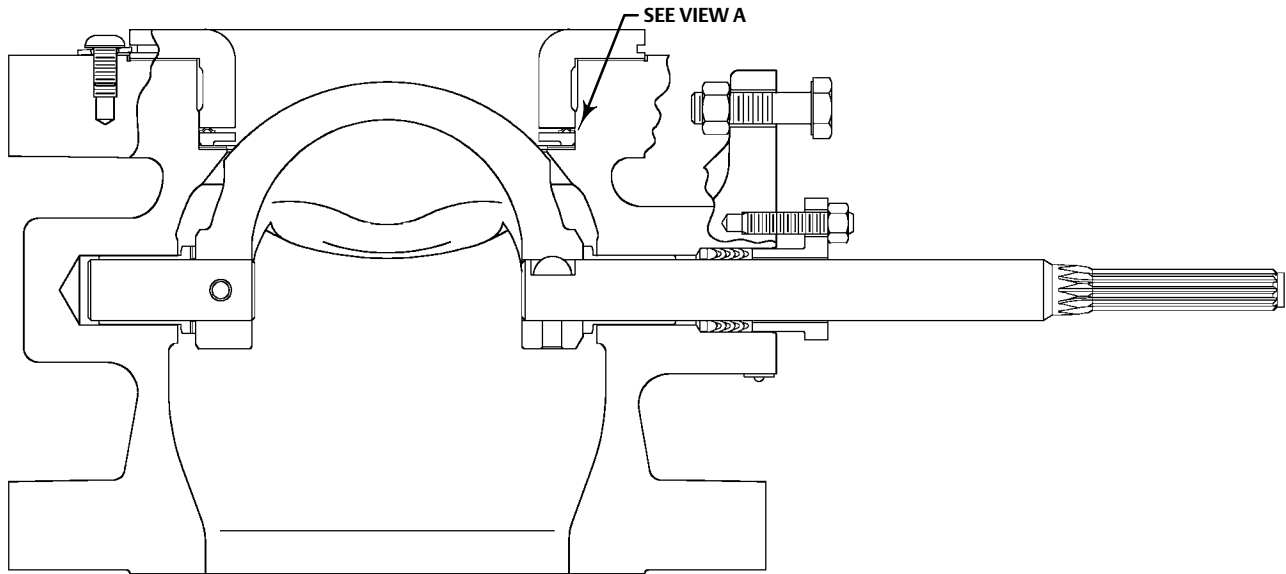
See table 2

**Options**

■ Pipe plug at end of follower shaft for all sizes,  
■ Line flange bolting, ■ ENVIRO-SEAL packing system: See figure 2 and [Bulletin 59.3:041, ENVIRO-SEAL Packing Systems for Fisher Rotary Valves \(D101638X012\)](#) for more information,  
■ S31254/CK3MCuN trim material

1. The pressure/temperature limits in this bulletin, and any applicable code or standard limitation, should not be exceeded.  
2. Additional limits are shown in tables 4 and 5.  
3. Shutoff classification Class I as required by process licensor.

Figure 1. Fisher SS-138B Construction Features (Flanged SS-138B Shown)



**Table 1. Valve Body Materials, End Connections, and Ratings**

VALVE DESIGN	VALVE BODY MATERIAL	SIZE	RATINGS
		NPS	
Flangeless SS-138B <sup>(1)</sup>	CG8M	1, 1-1/2, 2, 3, 4	CL300/600 raised-face
		6, 8	CL300 or CL600 raised-face
Flanged SS-138B	CG8M	1, 1-1/2, 2, 3, 4, 6, 8	CL300

1. Flangeless SS-138B is a dual-rated valve body in sizes NPS 1 to 4.

**Table 2. Valve Weights, Approximate**

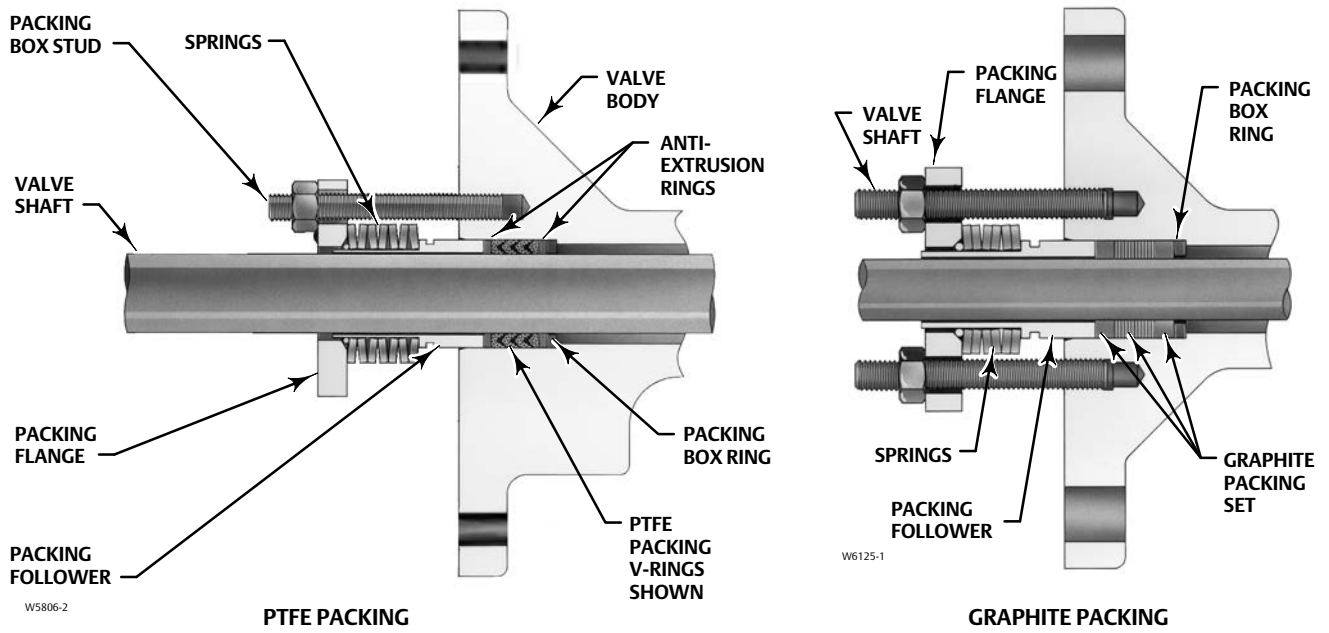
VALVE SIZE, NPS	FLANGELESS SS-138B		FLANGED SS-138B	
	kg	lbs	kg	lbs
1	4.5	10	8	17
1-1/2	6.4	14	12	27
2	10	23	17	38
3	15	34	28	61
4	22	48	37	81
6	36	80	60	133
8	62	136	103	226

**Table 3. Standard Construction Materials for NPS 1 through 8 Valves**

PART	MATERIAL
Seal Protector Ring	CG8M (317 SST)
V-Notch Ball	CG8M chrome plated with CoCr-A V-notch, chromium coated CG8M with CoCr-A V-notch
Seal	Flow ring (S31600/Alloy 6)
Bearings	R30006 (Alloy 6)
Seal Retainer Gasket	Graphite
Packing	PTFE V-ring with one carbon-filled PTFE ring <sup>(1)</sup> , PTFE V-ring, or graphite ribbon. Packing is available with or without live loading.
Shafts	S17400 H900/chrome plated, N07750 chrome coated
Groove Pin	S31600 or N10276
Taper Key	R30006 <sup>(2)</sup> , S20910, or N10276
Taper Pin (NPS 1, 1-1/2, and 2 only)	S20910 or N10276
Seal Retainer Screws and Washers	Stainless steel
Packing Follower and Packing Box Ring	CF8M (316 stainless steel), N10276, S31254, or N10276 with separate S31600 packing box flange
Actuator Mounting Bolts and Nuts	Grade 5 steel or strain-hardened B8M stainless steel
Spacer and Bushing	S31700, N10276, or S31603
Packing Follower Bolting and Optional Line Bolting	SA-193-B7, SA-193-B7M, or strain-hardened SA-193-B8M

1. The carbon-filled PTFE ring is used for grounding.  
2. Standard material offered in North America.

Figure 2. Typical ENVIRO-SEAL Packing Arrangements



## Pressure Drops

Pressure drop limits of any given valve are based on valve body, and trim material limits. To find the appropriate pressure drop limitation, choose the desired valve size and temperature range. Then search

table 4 for body limitations and table 5 for trim limitations. The lowest number from the tables is the appropriate limit. The tables for both trim and body limits must be consulted.

**Table 4. Maximum Allowable Shutoff Pressure Drops (Body Ratings) based on Stainless Steel Valve Body Types. (The tables for both trim and body limits must be consulted.)**

TEMPERATURE RANGE	PRESSURE CLASS	
	317 SST CL300	317 SST CL600
°C	Bar	
-46 to -29	49.6	99.3
-29 to 38	49.6	99.3
93	42.7	85.5
149	38.6	77.2
204	35.5	70.6
232	34.5	68.6
260	33.1	65.8
316	32.1	64.1
343	31.0	62.4
371	30.7	60.0
399	29.3	58.9
427	29.0	58.3
454	58.8	57.6
482	58.6	57.1
510	27.1	54.2
538	25.2	50.0
°F	Psi	
-50 to -20	720	1440
-20 to 100	720	1440
200	620	1240
300	560	1120
400	515	1025
450	500	995
500	480	955
550	465	930
600	450	905
650	445	890
700	430	870
750	425	855
800	420	845
850	420	835
900	415	830
950	385	775
1000	365	725

**Table 5. Maximum Allowable Shutoff Pressure Drops based on Trim (Bearing and Seal).**  
(Note: Do not exceed the ASME pressure/temperature rating of the valve or mating flanges.)

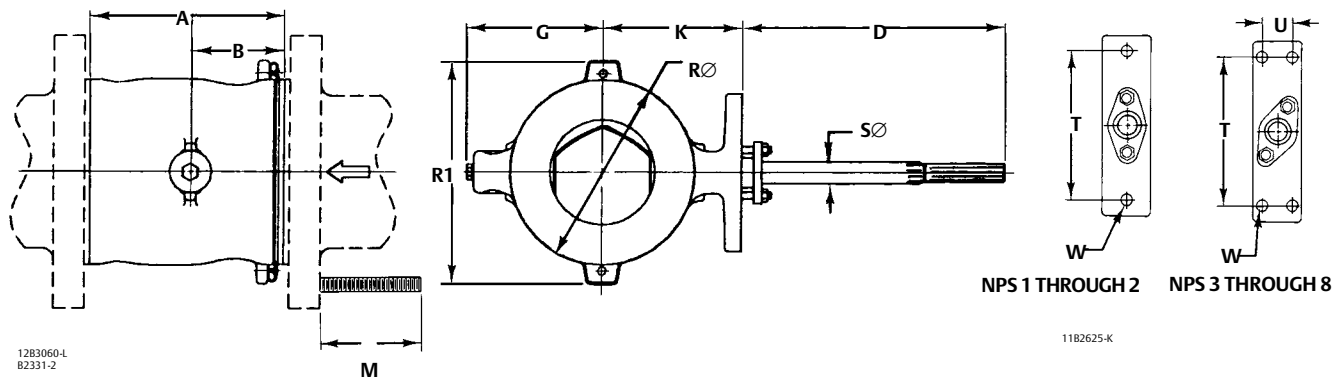
BEARING MATERIAL	BALL SEAL	BALL MATERIAL	SHAFT	TEMPERATURE RANGE, °C	VALVE SIZE, NPS						
					1	1-1/2	2	3	4	6	8
					Bar						
R30006	Flow Ring	CG8M CRPL CoCr-A V-notch	S17400 H900 CRPL	316	74.5	49.6	26.8	18.8	10.9	11.2	11.1
		CG8M CRCT CoCr-A V-notch	N07750/CoCr-A CRCT	538	74.5	49.6	26.8	18.8	10.9	11.2	11.1
BEARING MATERIAL	BALL SEAL	BALL MATERIAL	SHAFT	TEMPERATURE RANGE, °F	Psi						
R30006	Flow Ring	CG8M CRPL CoCr-A V-notch	S17400 H900 CRPL	600	1080	720	388	273	158	163	161
		CG8M CRCT CoCr-A V-notch	N07750/CoCr-A CRCT	1000	1080	720	388	273	158	163	161

**Table 6. Fisher Flangeless SS-138B Dimensions**

VALVE SIZE, NPS	FLANGELESS SS-138B DIMENSIONS (ISA S75.04)													ASME B16.5 RF FLANGES
	A	B	D	G	K	M		R	R1	S	T	U	W	
						CL300	CL600							
mm														
1	102	56		81	95	202	202	51	102	12.7				
1-1/2	114	62	188	89	121	224	224	73	119	15.7 and 15.7 x 12.7	117	---	14.2	CL300 and 600
2	124	67		106	127	236	236	92	137	15.7 and 15.7 x 12.7				
3	165	79	214	117	130	279	286	127	167	19.1	152	32	14.2	
4	194	101	214	133	141	305	343	157	197	19.1	152	32	14.2	
6	229	109	214	159	164 <sup>(1)</sup>	362	413	216	260	25.4	152	32	14.2	
8	243	124	208	195	232	387	426	270	314	31.8	235	46	17.5	
Inch														
1	4.00	2.21		3.19	3.75	7.94	7.94	2	4.00	1/2				
1-1/2	4.50	2.46	7.38	3.50	4.75	8.81	8.81	2.88	4.68	5/8 and 5/8 x 1/2	4.62	---	0.56	CL300
2	4.88	2.63		4.19	5.00	9.31	9.31	3.63	5.38	5/8 and 5/8 x 1/2				
3	6.50	3.10	8.44	4.62	5.12	11.00	11.25	5.00	6.56	3/4	6.00	1.25	0.56	
4	7.62	3.99	8.44	5.25	5.56	12.00	13.50	6.19	7.76	3/4	6.00	1.25	0.56	
6	9.00	4.29	8.44	6.25	6.44 <sup>(1)</sup>	14.25	16.25	8.50	10.24	1	6.00	1.25	0.56	
8	9.56	4.88	8.19	7.69	9.12	15.25	16.75	10.63	12.38	1-1/4	9.25	1.81	0.69	

1. 179 mm (7.06 inches) for NPS 6, CL600 valves only.

**Figure 3. Fisher Flangeless SS-138B Dimensions (also see table 6)**

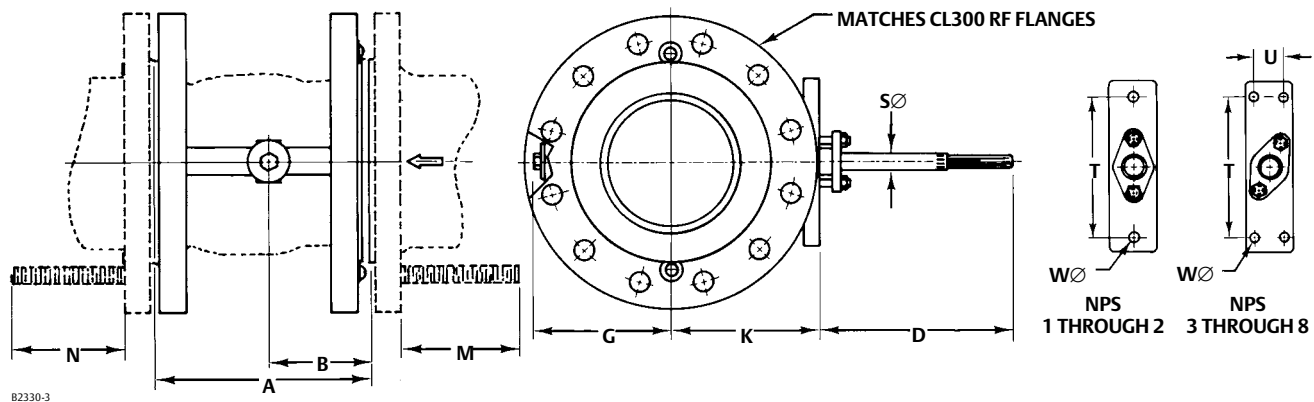


**Table 7. Fisher Flanged SS-138B Dimensions**

VALVE SIZE, NPS	FLANGED SS-138B DIMENSIONS (ISA S75.04)											
	A	B	D	G	K	M <sup>(1)</sup>	N <sup>(1)</sup>	S Diameter	T	U	W	
mm												
1	102	56		81	95	100	94	12.7				
1-1/2	114	62	188	89	121	114	108	15.7 and 15.7 X 12.7	117	---	14.2	
2	124	67		106	127	106	100	15.7 and 15.7 X 12.7				
3	165	79	214	117	130	133	121	19.1	152	32	14.2	
4	194	101	214	133	141	140	127	19.1	152	32	14.2	
6	229	109	214	159	164 <sup>(2)</sup>	152	140	25.4	152	32	14.2	
8	243	124	208	195	232	165	152	31.8	235	46	17.5	
Inch												
1	4.00	2.21		3.19	3.75	3.94	3.69	1/2				
1-1/2	4.50	2.46	7.38	3.50	4.75	4.50	4.25	5/8 and 5/8 X 1/2	4.62	---	0.56	
2	4.88	2.63		4.19	5.00	4.19	3.94	5/8 and 5/8 X 1/2				
3	6.50	3.10	8.44	4.62	5.12	5.25	4.75	3/4	6.00	1.25	0.56	
4	7.62	3.99	8.44	5.25	5.56	5.50	5.00	3/4	6.00	1.25	0.56	
6	9.00	4.29	8.44	6.25	6.44 <sup>(2)</sup>	6.00	5.50	1	6.00	1.25	0.56	
8	9.56	4.88	8.19	7.69	9.12	6.50	6.00	1-1/4	9.25	1.81	0.69	

1. Clearance necessary to remove flange bolts.  
2. 179 mm (7.06 inches) for NPS 6, CL600 valves only.

**Figure 4. Fisher Flanged SS-138B Dimensions (also see table 7)**



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