Process Interface Valves

Double Block and Bleed (DBB) Valves

Kenmac® Series Process Interface Valves and Process Monoflanges

- Stainless steel, carbon steel, and duplex stainless steel materials
  - Alloy 2507, Alloy 400, Alloy 625, Alloy 825, 6-Moly, and additional materials may be available upon request
- Pressure ratings in accordance with ASME B16.5
- Flanged connections compatible with ASME B16.5
- Ball valve bore sizes from 3/8 to 2 in. (9.5 to 50.8 mm)
- Low Emissions certification per API 641 and API 624 available
- VB05 Series meets fugitive emission requirements including Shell MESC SPE 77/300 Tightness Class B

Swagelok

Contents

Process Interface Valves

Swagelok® process interface valves enable a smooth transition from the process piping system to instrumentation in a single configuration, providing fewer potential leak points, lower installed weight, and a smaller space envelope.

Markets

- Oil and gas
- Chemical and refining
- Power generation

Applications

- Process piping isolation points
- Direct mount to instruments
- Close coupling of instruments
- Chemical injection and sampling points
- Double block and bleed isolation
- Vents and drains
- Extreme service

Oil and gas

Chemical and refining

Power generation

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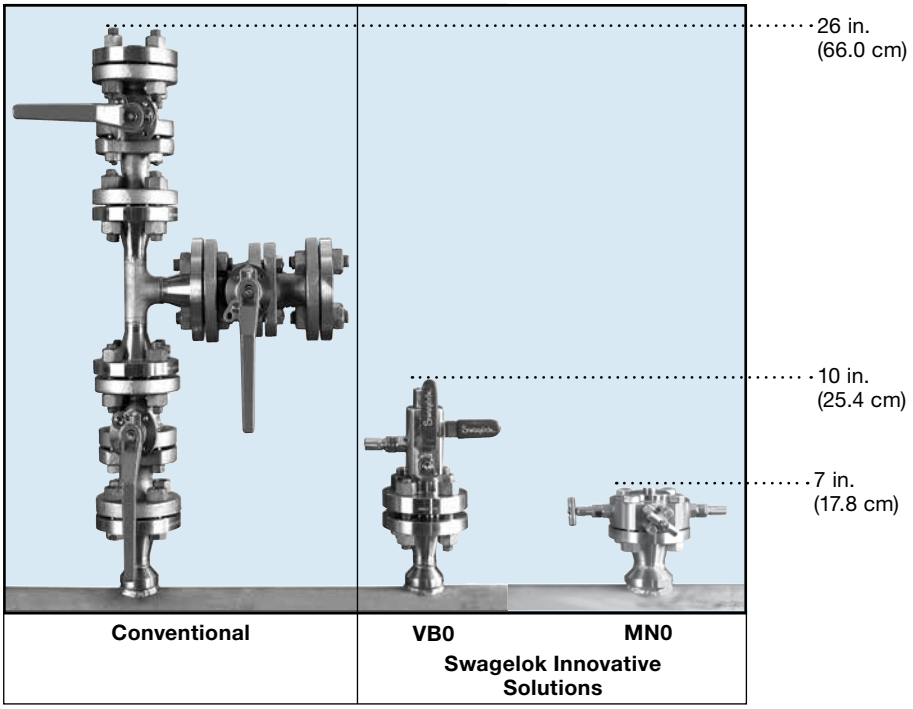
Over 100 000 double block and bleed and monoflange valves installed.

Installation Advantages

- Fewer leak points
- Smaller compact design
- Weight reduction of up to 75%
- Reduced installation time
- Reduced vibration stress
- Reduced fugitive emissions
- Low Emissions certification per API 641 and API 624 available
- Integral Swagelok tube fitting (connection options)



Low Fugitive Emissions

The American Petroleum Institute's API 641 and API 624 tests for fugitive emissions to atmosphere for quarter-turn ball valves and rising stem valves. The tests are conducted at a third party lab and certify that at no point in the test did the valve leak in excess of 100 ppm of methane. Certificates stating that the valve is certified for Low Emissions service are available. For more information, contact your authorized Swagelok sales and service representative.

Custom Configurations

Swagelok process interface valves and process monoflanges can be configured to suit a variety of special applications. In addition to double block and bleed assemblies, single block and bleed, and block combinations are available. Block and bleed globe valve module options are also available. Contact your authorized Swagelok sales and service representative for assistance with any special requirements.

"The valves are reliable and they last"

"We have made Swagelok double block and bleed's our standard and will be adding more during our next shutdown"

Swagelok

Features

Testing

Every process interface valve is factory tested hydrostatically to a requirement of no visible leakage. A shell test is performed at 1.5 times maximum rated working pressure and a seat test is performed at 1.1 times maximum rated working pressure, in accordance with BS EN 12266-1 and API 598. A low-pressure gas seat test is performed in accordance with BS EN 12266-1 and API 598.

Sour Gas Service

Process interface valves for sour gas service are available. Materials listed are selected in accordance with NACE MR0175/ISO 15156.

Sizes and Configurations

	VB03	VB04	VB0451	VB05	MN0
	3 piece	Integral	Metal Seat	Low Emissions	Monoflange
Bore Size, in (mm)					
2 (50)	✓				
1 1/2 (38)	✓				
1 (25)	✓				
3/4 (20)		✓			
1/2 (14)		✓			
3/8 (10)		✓	✓	✓	
0.16 to 0.24 (4 to 6)					✓
Valve Configuration					
Double Block Bleed	✓	✓	✓	✓	✓
Single Block Bleed	✓	✓	✓	✓	✓
Single Block	✓	✓	✓	✓	✓
End Configuration					
Flange x Flange	✓	✓	✓	✓	✓
Flange x Thread	✓	✓①	✓	✓	✓
Thread x Thread	✓	✓①	✓	✓	

① Swagelok tube fitting end connections are available as an option instead of threads.

Design and Performance Specifications

	VB03	VB04	VB0451	VB05	MN0
	3 piece	Integral	Metal Seat	Low Emissions	Monoflange
Pressure Temperature and Wall Thickness					
ASME B16.5 Flanges	✓	✓	✓	✓	✓①
ASME B1.20.1 NPT threads	✓	✓	✓	✓	✓
ASME B31.3 Process Piping	✓	✓	✓	✓	✓
Shell and Seat Testing					
BS EN 12266-1 and API 598	✓	✓	✓	✓	✓
Shell and Seat Test per API 6D	✓	✓	✓	✓	✓
Anti-Blowout Stem and Needles					
EEMUA-182	✓	✓	✓	✓	✓
Self Relieving Ball Valve Cavity					
EEMUA-182	✓	✓	✓	✓	
Fire Safe Design					
Fire Safe Design	✓	✓	✓	✓	✓②
BS6755 part 2, 3rd Party Fire Certification	✓②	✓②			✓②
Anti Static Design					
ISO 17292	✓	✓	✓	✓	✓
Low Emissions					
API 641	✓②	✓		✓	
API 624	✓②	✓②		✓	✓②
Shell MESC SPE 77/300				✓	

For additional product features, see page 34

① ASME B16.5 compatible

② Available on select configurations

Flange Connections

Pressure-Temperature Ratings

Swagelok process interface valves carry the pressure-temperature ratings of their flange end connections, which meet ASME B16.5 dimensional specifications and pressure ratings in a range of flange sizes and pressure classes.

Ratings shown below are for 316/316L dual certified stainless steel, see ASME B16.5-2009 tables 2-2.2 and F2-2.2. For valve working temperature ratings, see series specific information.

316/316L Working Pressure by Class, psig

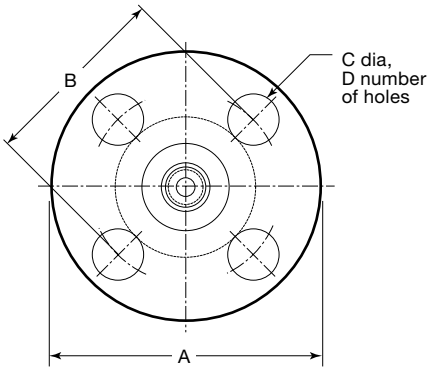
Temperature °F	ASME Class					
	150	300	600	900	1500	2500
	Working Pressure, psig					
–20 to 100	275	720	1440	2160	3600	6000
200	235	620	1240	1860	3095	5160
300	215	560	1120	1680	2795	4660
400	195	515	1025	1540	2570	4280
500	170	480	955	1435	2390	3980
600	140	450	900	1355	2255	3760
650	125	440	885	1325	2210	3680
700	110	435	870	1305	2170	3620
750	95	425	855	1280	2135	3560
800	80	420	845	1265	2110	3520
850	65	420	835	1255	2090	3480

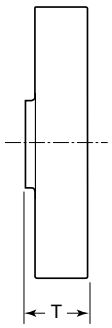
316/316L Working Pressure by Class, bar

Temperature °C	ASME Class					
	150	300	600	900	1500	2500
	Working Pressure, bar					
–29 to 38	19.0	49.6	99.3	148.9	248.2	413.7
50	18.4	48.1	96.2	144.3	240.6	400.9
100	16.2	42.2	84.4	126.6	211.0	351.6
150	14.8	38.5	77.0	115.5	192.5	320.8
200	13.7	35.7	71.3	107.0	178.3	297.2
250	12.1	33.4	66.8	100.1	166.9	278.1
300	10.2	31.6	63.2	94.9	158.1	263.5
325	9.3	30.9	61.8	92.7	154.4	257.4
350	8.4	30.3	60.7	91.0	151.6	252.7
375	7.4	29.9	59.8	89.6	149.4	249.0
400	6.5	29.4	58.9	88.3	147.2	245.3
425	5.5	29.1	58.3	87.4	145.7	242.9
450	4.6	28.8	57.7	86.5	144.2	240.4

Dimensions

Dimensions are for reference only and are subject to change.





See each series for T dimension.

Class 150

Nominal Flange Size in.	Dimensions in. (mm)			Mounting Holes
	A	B	C	D
1/2	3.50 (88.9)	2.38 (60.5)	0.62 (15.7)	4
3/4	3.88 (98.6)	2.75 (69.8)	0.62 (15.7)	
1	4.25 (108)	3.12 (79.2)	0.62 (15.7)	
1 1/2	5.00 (127)	3.88 (98.6)	0.62 (15.7)	
2	6.00 (152)	4.75 (121)	0.75 (19.0)	
3	7.50 (190)	6.00 (152)	0.75 (19.0)	

Class 300/Class 600

Nominal Flange Size in.	Dimensions in. (mm)			Mounting Holes
	A	B	C	D
1/2	3.75 (95.2)	2.62 (66.5)	0.62 (15.7)	4
3/4	4.62 (117)	3.25 (82.6)	0.75 (19.0)	4
1	4.88 (124)	3.50 (88.9)	0.75 (19.0)	4
1 1/2	6.12 (155)	4.50 (114)	0.88 (22.4)	4
2	6.50 (165)	5.00 (127)	0.75 (19.0)	8
3	8.25 (210)	6.62 (168)	0.88 (22.4)	8

Class 900/Class 1500

Nominal Flange Size in.	Dimensions in. (mm)			Mounting Holes
	A	B	C	D
1/2	4.75 (121)	3.25 (82.6)	0.88 (22.4)	4
3/4	5.13 (130)	3.50 (88.9)	0.88 (22.4)	4
1	5.88 (149)	4.00 (102)	1.00 (25.4)	4
1 1/2	7.00 (178)	4.88 (124)	1.13 (28.7)	4
2	8.50 (216)	6.50 (165)	1.00 (25.4)	8
3 (cl 900)	9.50 (241)	7.50 (190)	1.00 (25.4)	8
3 (cl 1500)	10.5 (267)	8.00 (203)	1.25 (31.8)	8

Class 2500

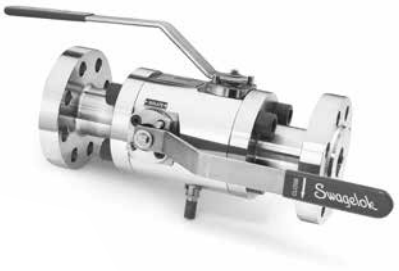
Nominal Flange Size in.	Dimensions in. (mm)			Mounting Holes
	A	B	C	D
1/2	5.25 (134)	3.50 (88.9)	0.88 (22.4)	4
3/4	5.50 (140)	3.75 (95.2)	0.88 (22.4)	4
1	6.25 (159)	4.25 (108)	1.00 (25.4)	4
1 1/2	8.00 (203)	5.75 (156)	1.25 (31.8)	4
2	9.25 (235)	6.75 (171)	1.13 (28.7)	8

Double Block and Bleed (DBB)

Swagelok process interface valves provide a smooth transition from process to instrumentation systems in a single, compact assembly. Benefits include fewer leak points and reduced size and weight compared to traditional systems.

Features

- Valves and fittings use materials selected in accordance with NACE MR0175/ISO 15156.
- Some materials offered are compliant with NORSOK M650
- Process interface in one compact ball/needle/ball valve assembly. Three-piece, bolted-body (VB03 series) or one-piece forged body (VB04 and VB05 series) construction
- Flange connections compatible with ASME B16.5, NPT connections compatible with ASME B1.20.1
- Antiblowout valve stems and needles
- Nonrotating needle vent valve
- Self relieving ball cavity
- Firesafe design
- Antistatic design
- Low Emissions certification per API 641 and API 624 available
- Hydrostatic test certificates available per ISO 15156 (3.1)
- Chemical and physical material certifications available
- Dye penetrant and magnetic particle examination available
- Every process interface valve is tested hydrostatically to a requirement in accordance with API 598 and BS EN 12266-1



VB03 Series

VB04 Series with Female NPT Outlet

VB04 Series with Flange Outlet

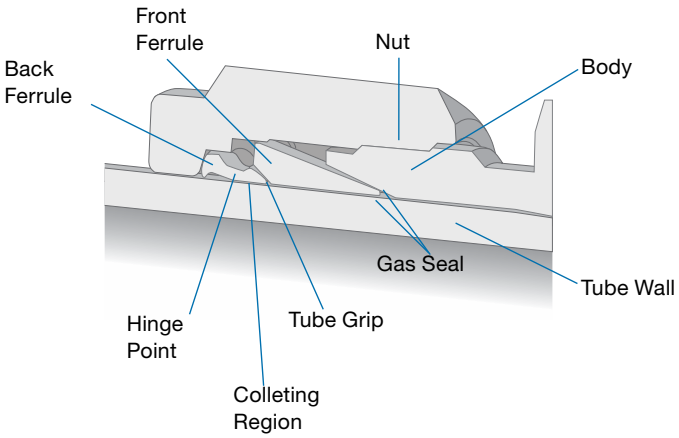
VB05 Series with Female NPT Outlet

Swagelok Tube Fittings can be Integrated Directly into Double Block and Bleed and Monoflanges

How We Outperform

Swagelok tube fittings have a grip-type design that uses a unique “hinging and colleting” action to achieve optimal performance in three key areas:

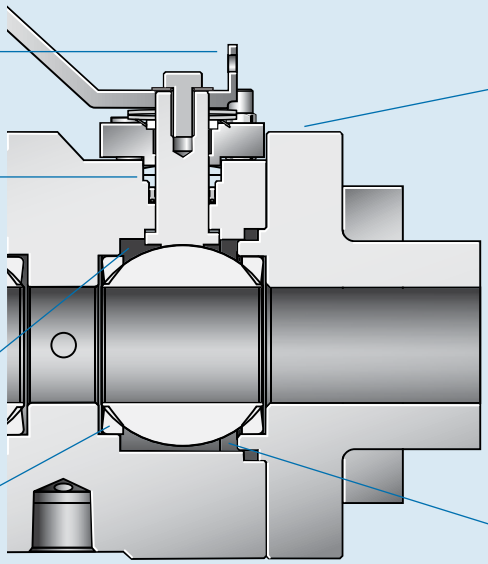
- Tube grip—hinging and colleting action provides more direct tube contact/gripping support
- Gas seal—burnishing/polishing action of the front ferrule creates concentrated zones of contact on the tube and on the body bevel for a stronger seal.
- Vibration resistance—the colleting region better isolates stress risers at the tube grip to resist bending, deflection, and vibration.



VB03 Series Advantages

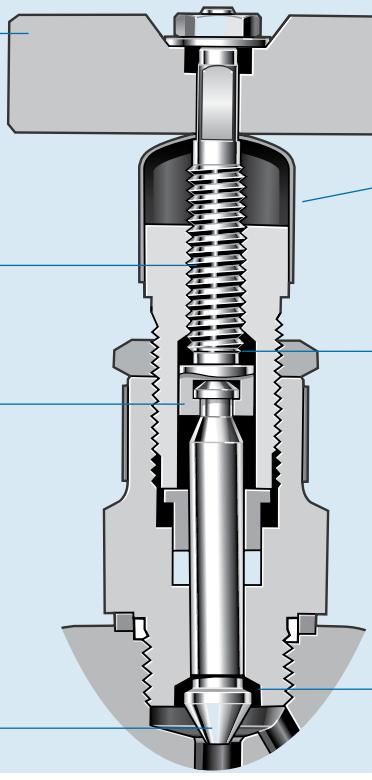
Ball Valve Module

Ball valves act as primary and secondary isolation valves in process interface assemblies.



Bleed Valve Module

Needle valves act as vent valves in the VB03 series.



VB03 Series

Materials of Construction

Component	Valve Body Materials		
	Stainless Steel	Carbon Steel	Duplex Stainless Steel
	Material Grade/ASTM Specification		
Body	*Stainless steel/ A182 F316, F316L SS*	*Carbon steel/ A350 LF2②*	*Duplex stainless steel/ A182 F51*
Balls, ball valve end connections, needle valve bonnet	*316 SS, 316L SS/ A479*		*S31803/ A479*
Ball valve stems	*316 SS/A479*		*S31803/A479*
Ball valve seats	*PEEK*		
Ball valve stem seals	*PTFE outer jacket, Elgiloy® spring*		
Needle	*S17400 SS/A564 condition H1150D①*		
Body seals, needle valve packing, needle valve bonnet seal	*Graphite③*		
Body bolts	B8M/A320	L7M/A320	PTFE-coated L7M/A320
All other components	316 SS		

Wetted components listed in *italics.*

① Alternate needle materials are available

② Carbon Steel is treated with Rust inhibtor

③ Optional Low Emissions configuration supplied with Carbon/glass-filled PTFE needle valve packing and bonnet seal.

⚠ A packing adjustment may be required periodically to increase service life and to prevent leakage.

⚠ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

⚠ To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.

Pressure-Temperature Ratings

Class 150 to class 2500 in accordance with ASME B16.5; see page 5.

1 in. (25 mm) Bore 100 ft·lbs (135 N·m) Maximum Actuation Torque			
ASME Class	Minimum Temperature		Maximum Temperature
	316 SS and Duplex	Carbon Steel	
150	–58°F (–50°C)	–50°F (–46°C)	350°F (176°C)
300			
600			
900			
1500			
2500	–20°F (–28°C)①	–20°F (–28°C)②	

1 1/2 in. (38 mm) Bore 120 ft·lbs (160 N·m) Maximum Actuation Torque			
ASME Class	Minimum Temperature		Maximum Temperature
	316 SS and Duplex	Carbon Steel	
150	–20°F (–28°C)①	–20°F (–28°C)②	350°F (176°C)
300			
600			
900			
1500			
2500			

2 in. (50 mm) Bore 245 ft·lbs (330 N·m) Maximum Actuation Torque			
ASME Class	Minimum Temperature		Maximum Temperature
	316 SS and Duplex	Carbon Steel	
150	–58°F (–50°C)	–50°F (–46°C)	400°F (204°C)
300			
600			
900			
1500	–20°F (–28°C)①	–20°F (–28°C)②	350°F (176°C)

Note: At temperatures below –20°F (–28°C), the torque required to actuate the valve may exceed the maximum allowable actuation torque. Applying torque above this limit may cause damage to the valve.

① Limited actuation to –58°F (–50°C)

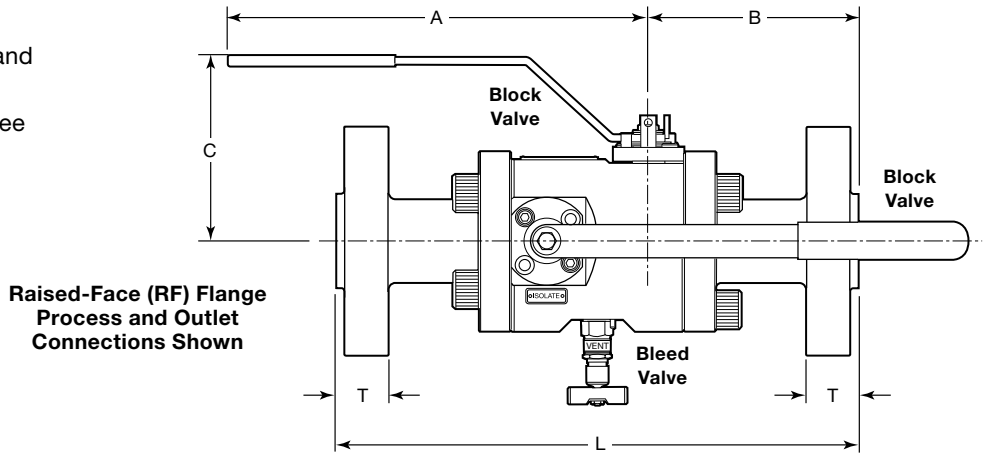
② Limited actuation to –50°F (–46°C)

VB03 Series

Dimensions

Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.



Full-Bore

Flange Size in.	Bore in. (mm)	ASME Class	Dimensions, in. (mm)							Weight lb (kg)
			A	B①	C	RF Flanges L	RF Flanges T	RTJ Flanges L	RTJ Flanges T	
1 (DN 25)	1 (25.4)	150	9.0 (229)	4.09 (104)	5.20 (132)	10.7 (272)	0.64 (16.2)	11.2 (285)	0.89 (22.6)	33.1 (15.0)
		300		4.21 (107)		11.0 (279)	0.77 (19.5)	—	—	36.8 (16.7)
		600		4.49 (114)		11.5 (292)	1.02 (25.9)	11.5 (292)	1.02 (25.9)	38.6 (17.5)
		900/1500		5.87 (149)		14.3 (364)	1.45 (36.8)	14.3 (364)	1.45 (36.8)	46.7 (21.2)
		2500		6.14 (156)		14.8 (377)	1.71 (43.5)	14.8 (377)	1.71 (43.5)	53.4 (24.2)
1 1/2 (DN 40)	1 1/2 (38.1)	150	12.8 (325)	5.55 (141)	5.79 (147)	14.2 (361)	0.77 (19.5)	14.7 (374)	1.02 (25.9)	54.5 (24.7)
		300		5.67 (144)		14.4 (367)	0.89 (22.6)	—	—	59.7 (27.1)
		600		5.98 (152)		15.1 (384)	1.21 (30.8)	15.1 (384)	1.21 (30.8)	61.5 (27.9)
		900/1500		6.38 (162)		15.8 (402)	1.58 (40.2)	15.8 (402)	1.58 (40.2)	77.4 (35.1)
		2500		7.56 (192)		18.2 (463)	2.08 (52.9)	18.3 (466)	2.14 (54.4)	100 (45.5)
2 (DN 50)	2 (50.8)	150	17.8 (452)	5.87 (149)	6.69 (170)	15.4 (390)	0.83 (21.1)	15.8 (403)	1.08 (27.5)	106 (48.2)
		300		6.02 (153)		15.7 (398)	0.98 (24.9)	—	—	111 (50.3)
		600		6.38 (162)		16.4 (416)	1.33 (33.8)	16.5 (419)	1.39 (35.3)	113 (51.1)
		900/1500		7.64 (194)		18.9 (481)	1.83 (46.5)	19.1 (484)	1.89 (48.0)	147 (66.8)

① Based on RF Flanges.

Reduced-Bore

Flange Size in.	Bore in. (mm)	ASME Class	Dimensions, in. (mm)							Weight lb (kg)
			A	B①	C	RF Flanges L	RF Flanges T	RTJ Flanges L	RTJ Flanges T	
1 1/2 (DN 40)	1 (25.4)	150	9.0 (229)	4.21 (107)	5.20 (132)	11.0 (279)	0.77 (19.5)	11.5 (292)	1.02 (25.9)	36.1 (16.4)
		300		4.33 (110)		11.2 (285)	0.89 (22.6)	—	—	44.5 (20.2)
		600		4.65 (118)		11.9 (301)	1.21 (30.8)	11.9 (301)	1.21 (30.8)	46.3 (21.0)
		900/1500		6.02 (153)		14.6 (370)	1.58 (40.2)	14.6 (370)	1.58 (40.2)	57.8 (26.2)
		2500		6.50 (165)		15.6 (396)	2.08 (52.9)	15.7 (399)	2.14 (54.4)	80.7 (36.6)
2 (DN 50)	1 1/2 (38.1)	150	12.8 (325)	5.63 (143)	5.79 (147)	14.3 (364)	0.83 (21.1)	14.8 (377)	1.08 (27.5)	56.7 (25.7)
		300		5.75 (146)		14.6 (372)	0.98 (27.9)	—	—	65.7 (29.8)
		600		6.10 (155)		15.4 (390)	1.33 (33.8)	15.5 (393)	1.39 (35.3)	68.8 (31.2)
		900/1500		6.61 (168)		16.3 (415)	1.83 (46.5)	16.5 (418)	1.89 (48.0)	96.6 (43.8)
		2500		7.80 (198)		18.7 (475)	2.33 (59.2)	18.8 (478)	2.39 (60.7)	127 (57.5)
3 (DN 80)	2 (50.8)	150	17.8 (452)	6.06 (154)	6.69 (170)	15.7 (400)	1.02 (25.9)	16.3 (413)	1.27 (32.3)	116 (52.7)
		300		6.26 (159)		16.1 (410)	1.22 (30.9)	—	—	125 (56.7)
		600		6.61 (168)		16.9 (428)	1.58 (40.2)	17.0 (431)	1.64 (41.7)	129 (58.7)
		900		6.85 (174)		17.4 (441)	1.83 (46.5)	17.5 (444)	1.89 (48.0)	152 (68.9)
		1500		8.03 (204)		19.7 (500)	2.21 (56.2)	19.8 (503)	1.03 (57.7)	187 (84.7)

① Based on RF Flanges.

VB03 Series

Ordering Information

Build a process interface valve ordering number by combining the designators as shown below.

	A	B	C	D	E	F	G	H	J	K
VB03	01	SA	D	1	C	1	3	C	A	LE

A Configuration
- **01** = Full-bore ball/needle/ball
- **02** = Reduced-bore ball/needle/ball

B Materials

Standard
- **SA** = 316 SS
- **CA** = Carbon steel
- **DA** = Duplex SS

Available
- **DB** = Super Duplex SS
- **DE** = Super Duplex SS (NORSOK)
- **DD** = Duplex SS (NORSOK)
- **DG** = Duplex SS, with Duplex bolts
- **DL** = Duplex SS, with Duplex needles
- **NA** = Alloy 400
- **NB** = Alloy 625
- **NC** = Alloy 825
- **SB** = Alloy 6 Moly

C Seats, Stem Seals, Body Seals
- **D** = PEEK, PTFE, Graphite

D ASME Class
- **1** = 150
- **2** = 300
- **3** = 600
- **4** = 900 (3 in. flange size **F** only)
- **5** = 900/1500 (1, 1 1/2, or 2 in. flange size **C, D,** or **E**)
- **5** = 1500 (3 in. flange size **F** only)
- **6** = 2500 (configuration **01,** flange size **C** or **D** only; configuration **02,** flange size **D** or **E**)

E Process Connection Flange Size
- **C** = 1 in. (DN 25) (full bore only; select configuration **01**)
- **D** = 1 1/2 in. (DN 40)
- **E** = 2 in. (DN 50)
- **F** = 3 in. (DN 80) (reduced bore only; select configuration **02**)

F Process Connection Flange Type
- **1** = RF smooth (3.2 to 6.3 µm)
- **2** = RF serrated (6.3 to 12.5 µm)
- **3** = RTJ
- **4** = FF serrated (6.3 to 12.5 µm)
- **5** = FF smooth (3.2 to 6.3 µm)

G Outlet Connection
- **3** = Flange (same as process)

H Bleed Connection
- **C** = 1/2 in. female NPT
- **E** = 1/2 in. female NPT with 316 SS bleed valve
- **F** = 1/2 in. female NPT with Duplex SS bleed valve
- **H** = 1/4 in. female Swagelok①
- **J** = 1/2 in. female NPT with 316 SS plug
- **K** = 1/2 in. female NPT with Duplex SS plug
- **V** = 10 mm female Swagelok①

① Not available in Duplex valve configurations.

J Handle Options
- **A** = Block, nonlockable levers; bleed, antitamper①
- **B** = Block, lockable levers; bleed, antitamper①
- **C** = Block, nonlockable levers; bleed, bar
- **D** = Block, lockable levers; bleed, bar

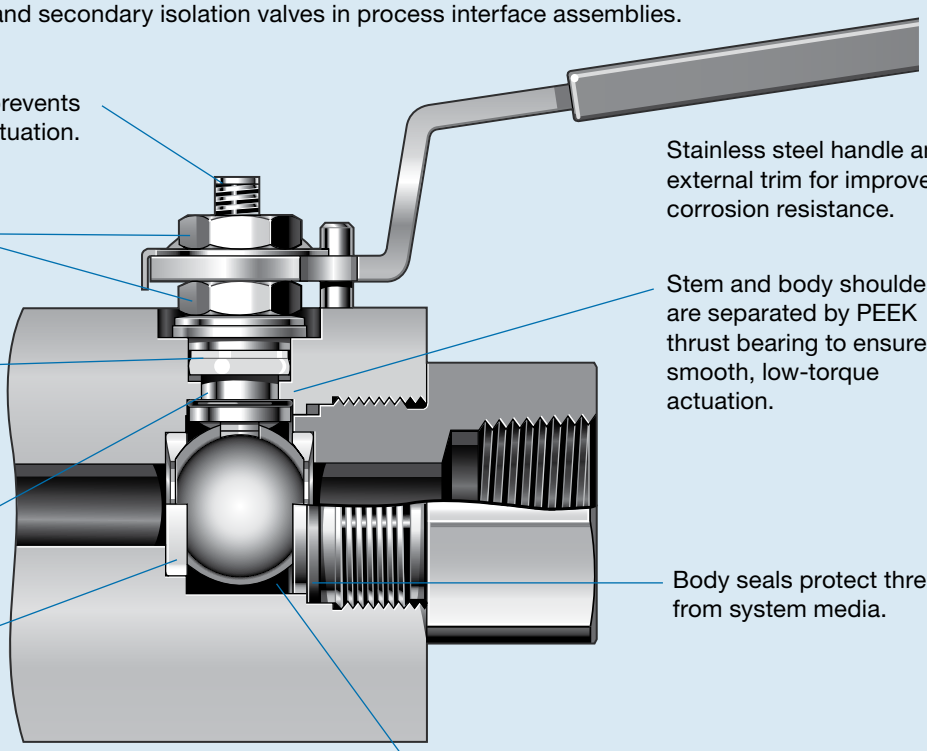
① Antitamper key sold separately. See page 35.

K Low Emissions Options
- **LE** = Low Emissions certification per API 641 and API 624 available for 1 in. and 1 1/2 in. bore sizes only.

VB04 Series Advantages

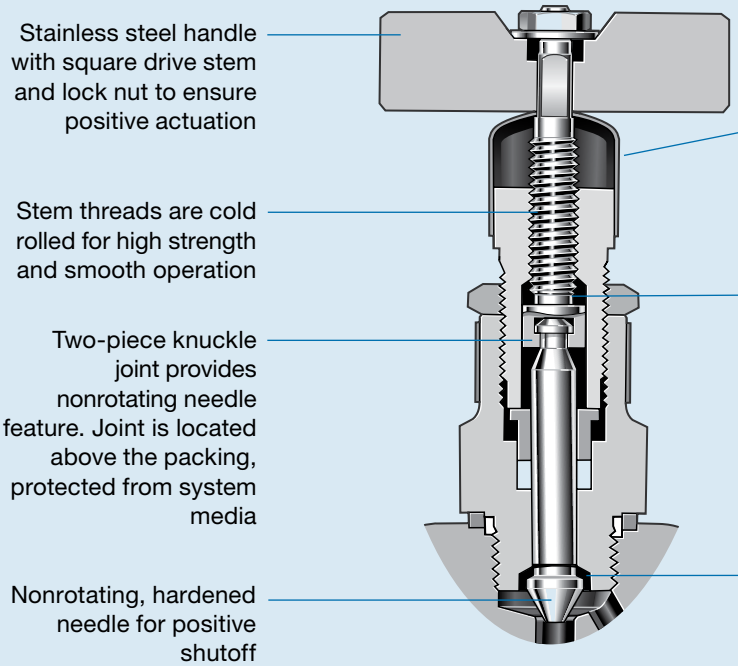
Ball Valve Module

Ball valves act as primary and secondary isolation valves in process interface assemblies.

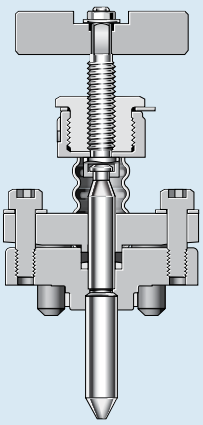


Bleed Valve Module

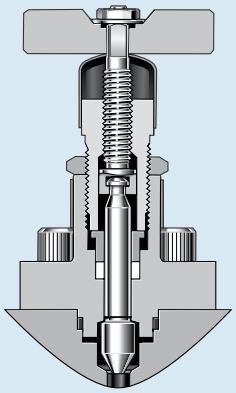
Needle valves act as vent valves in the VB04 series.



Screwed Bonnet



Bolted OS&Y Bonnet



Bolted Bonnet

VB04 Series

Materials of Construction

Component	Valve Body Materials		
	Stainless Steel	**Carbon Steel**	**Duplex Stainless Steel**
	Material Grade/ASTM Specification		
Body	*Stainless steel/ A182 F316, F316L SS*	*Carbon steel/ A350 LF2③*	*Duplex stainless steel/ A182 F51*
Balls, ball valve end connections, needle valve bonnet	*316 SS, 316L SS/ A479*		*S31803/ A479④*
Ball valve stems	*316 SS/A479①*		*S31803/A479*
Ball valve seats	*PEEK*		
Ball valve stem seals	*PTFE outer jacket, Elgiloy® spring*		
Needle	*S17400 SS/A564 condition H1150D②*		
Body seals, needle valve packing, needle valve bonnet seal	*Graphite⑤*		
All other components	316 SS		

Wetted components listed in *italics.*

① VB04 valves with 3/4 in. (20 mm) bore—*S17400 SS/A564 condition H1150D.*

② Alternate needle material are available.

③ Carbon Steel is treated with Rust inhibtor.

④ Optional Swagelok end connections are only offered in Super Duplex.

⑤ Optional Low Emissions configuration supplied with Carbon/glass-filled PTFE needle valve packing and bonnet seal.

Pressure-Temperature Ratings

Class 150 to class 2500 in accordance with ASME B16.5; see page 5.

Valve Working Temperatures

- –58 to 400°F (–50 to 204°C) for stainless steel and duplex valve assemblies
- –50 to 400°F (–46 to 204°C) for carbon steel valve assemblies

⚠ **A packing adjustment may be required periodically to increase service life and to prevent leakage.**

⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**

⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

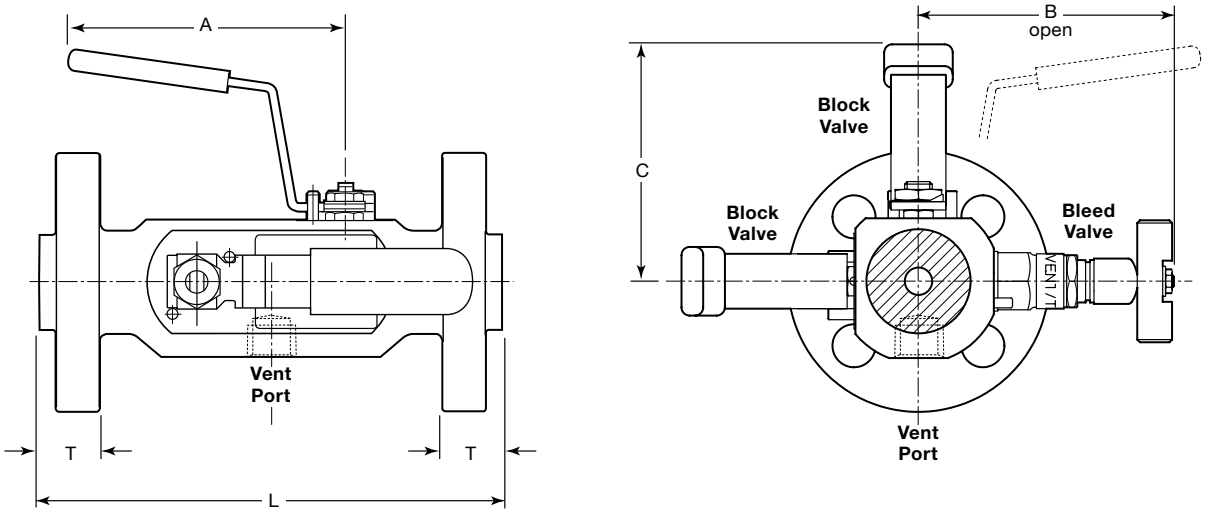
VB04 Series

Dimensions

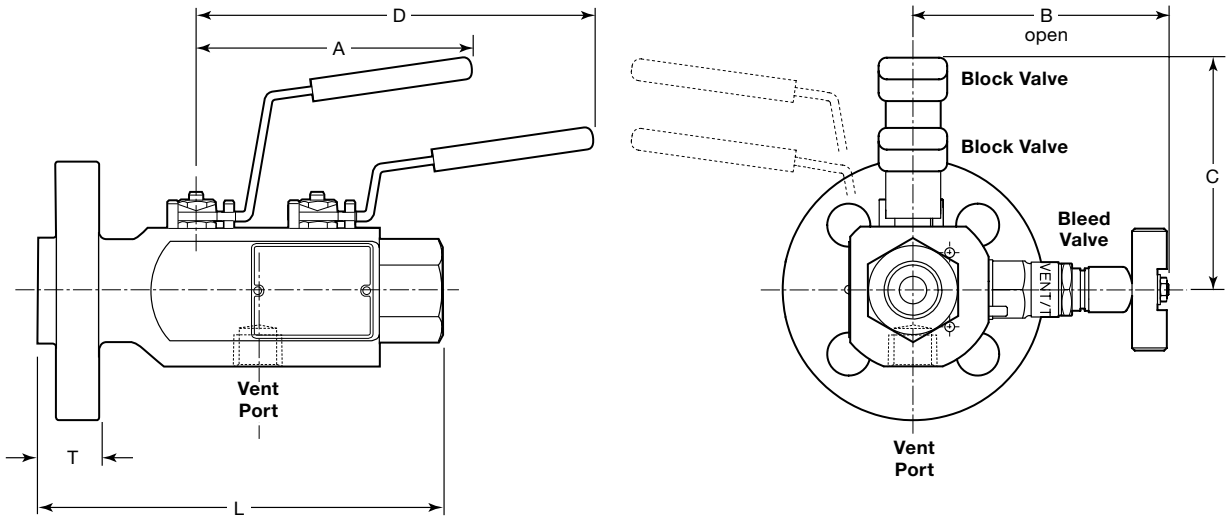
Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.

Raised-Face (RF) Flange
Process and Outlet Connections
All Bore Sizes



Raised-Face (RF) Flange Process Connection,
1/2 in. Female NPT Outlet Connection
3/8 and 1/2 in. (9.5 and 14 mm) Bore Sizes



VB04 Series

Dimensions

3/8 in. (9.5 mm) Bore

Flange Size in.	ASME Class	Dimensions, in. (mm)									Weight lb (kg)	
		A	B	C	D	L			T			
						RF Flanges	RTJ Flanges	Flange/NPT	RF Flange	RTJ Flange	Flanges	Flange/NPT
1/2 (DN 15)	150	4.02 (102)	3.78 (96.0)	3.41 (86.5)	5.79 (147)	6.41 (163)	6.41 (163)	5.91 (150)	0.52 (13.2)	—	9.3 (4.2)	7.3 (3.3)
	300/600					6.81 (173)	6.81 (173)		0.89 (22.6)	0.89 (22.6)	10.1 (4.6)	7.5 (3.4)
	900/1500					7.99 (203)	7.99 (203)	6.69 (170)	1.21 (30.8)	1.21 (30.8)	15.4 (7.0)	10.4 (4.7)
	2500								1.52 (38.6)	1.52 (38.6)	20.1 (9.1)	12.8 (5.8)
3/4 (DN 20)	150					6.41 (163)	6.41 (163)	5.91 (150)	0.58 (14.7)	—	9.9 (4.5)	7.7 (3.5)
	300/600					6.81 (173)	6.81 (173)		0.95 (24.1)	0.95 (24.1)	12.6 (5.7)	8.6 (3.9)
	900/1500					7.99 (203)	7.99 (203)	6.69 (170)	1.33 (33.8)	1.33 (33.8)	17.9 (8.1)	11.7 (5.3)
	2500								1.58 (40.2)	1.58 (40.2)	22.3 (10.1)	13.9 (6.3)
1 (DN 25)	150					6.41 (163)	6.61 (168)	5.91 (150)	0.63 (16.2)	0.89 (22.6)	11.0 (5.0)	8.2 (3.7)
	300/600					7.01 (178)	7.01 (178)		1.02 (25.9)	1.02 (25.9)	14.1 (6.4)	9.5 (4.3)
	900/1500					10.3 (261)	10.3 (261)	7.00 (178)	1.45 (36.8)	1.45 (36.8)	25.4 (11.5)	14.6 (6.6)
	2500					10.7 (273)	10.7 (273)		1.71 (43.5)	1.71 (43.5)	31.5 (14.3)	17.4 (7.9)
1 1/2 (DN 40)	150					8.90 (226)	9.49 (241)	7.00 (178)	0.77 (19.5)	1.02 (25.9)	16.3 (7.4)	10.8 (4.9)
	300/600					9.89 (251)	9.89 (251)		1.21 (30.8)	1.21 (30.8)	24.3 (11.0)	14.1 (6.4)
	900/1500					11.5 (291)	11.5 (291)	7.64 (194)	1.58 (40.2)	1.58 (40.2)	36.4 (16.5)	20.1 (9.1)
	2500					12.4 (316)	12.4 (316)		2.08 (52.9)	2.14 (54.4)	56.9 (25.8)	29.8 (13.5)
2 (DN 50)	150					9.09 (231)	9.49 (241)	7.00 (178)	0.83 (21.1)	1.08 (27.5)	20.7 (9.4)	12.8 (5.8)
	300/600					10.1 (256)	10.3 (261)		1.33 (33.8)	1.39 (35.3)	28.2 (12.8)	16.1 (7.3)
	900/1500					12.0 (306)	12.0 (306)	7.64 (194)	1.83 (46.5)	1.89 (48.0)	56.0 (25.4)	29.5 (13.4)
	2500					13.6 (346)	13.6 (346)	8.03 (204)	2.33 (59.2)	2.39 (60.7)	80.7 (36.6)	41.4 (18.8)

1/2 in. (14 mm) Bore

Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)	
		A	B	C	D	L		T			
						Flanges	Flange/NPT	RF Flange	RTJ Flange	Flanges	Flange/NPT
1 (DN 25)	150	4.80 (122)	3.98 (101)	3.88 (98.5)	6.79 (177)	9.10 (231)	7.76 (197)	0.63 (16.2)	0.89 (22.6)	17.0 (7.7)	8.2 (3.7)
	300/600					9.49 (241)		1.02 (25.9)	1.02 (25.9)	19.4 (8.8)	9.5 (4.3)
	900/1500					10.3 (261)		1.45 (36.8)	1.45 (36.8)	28.0 (12.7)	14.6 (6.6)
	2500					10.7 (273)		1.71 (43.5)	1.71 (43.5)	34.2 (16.5)	17.4 (7.9)
1 1/2 (DN 40)	150					9.49 (241)	8.15 (207)	0.77 (19.5)	1.02 (25.9)	20.1 (9.1)	10.8 (4.9)
	300/600					9.88 (251)		1.21 (30.8)	1.21 (30.8)	27.1 (12.3)	14.1 (6.4)
	900/1500					11.5 (291)	8.35 (212)	1.58 (40.2)	1.58 (40.2)	39.0 (17.7)	20.1 (9.1)
	2500					12.4 (316)		2.08 (52.9)	2.14 (54.4)	59.5 (27.0)	29.8 (13.5)
2 (DN 50)	150					9.49 (241)	8.15 (207)	0.83 (21.1)	1.08 (27.5)	24.1 (10.9)	12.8 (5.8)
	300/600					10.3 (261)		1.33 (33.8)	1.39 (35.3)	31.1 (14.1)	16.1 (7.3)
	900/1500					12.0 (306)	8.35 (212)	1.83 (46.5)	1.89 (48.0)	58.6 (26.6)	29.5 (13.4)
	2500					13.6 (346)	8.74 (222)	2.33 (59.2)	2.39 (60.7)	83.3 (37.8)	41.4 (18.8)

3/4 in. (20 mm) Bore

Flange Size in.	ASME Class	Dimensions, in. (mm)						Weight lb (kg)
		A	B	C	L	T		
						RF Flange	RTJ Flange	
1 1/2 (DN 40)	150	7.12 (181)	4.25 (108)	5.55 (141)	10.7 (273)	0.77 (19.5)	1.02 (25.9)	29.5 (13.4)
	300/600					1.21 (30.8)	1.21 (30.8)	35.1 (15.9)
	900/1500				11.7 (298)	1.58 (40.2)	1.58 (40.2)	46.1 (20.9)
	2500				12.7 (323)	2.08 (52.9)	2.14 (54.4)	66.1 (30.0)
2 (DN 50)	150				10.7 (273)	0.83 (21.1)	1.08 (27.5)	33.5 (15.2)
	300/600					1.33 (33.8)	1.39 (35.3)	38.4 (17.4)
	900/1500				12.5 (318)	1.83 (46.5)	1.89 (48.0)	65.9 (29.9)
	2500				14.7 (373)	2.33 (59.2)	2.39 (60.7)	91.7 (41.6)

VB04 Series

Ordering Information for Flange by Flange and Flange by Thread, Including Swagelok Tube Fittings

Build a process interface valve ordering number by combining the designators as shown below.

A	B	C	D	E	F	G	H	J	K	L	M
VB04	01	SA	D	1	D	1	C	C	A	S	450	LE

A Configuration

(ball/needle/ball)

01 = 3/8 in. (9.5 mm) bore
02 = 1/2 in. (14 mm) bore (select process connection size; **C, D,** or **E**)
03 = 3/4 in. (20 mm) bore (select process connection size; **D** or **E**)
13 = 3/8 in. (9.5 mm) bore dual outlets

(ball/needle [block/bleed])

04 = 3/8 in. (9.5 mm) bore
05 = 1/2 in. (14 mm) bore (select process connection size; **C, D,** or **E**)

(ball/ball [block/block])

31 = 3/8 in. (9.5 mm) bore
32 = 1/2 in. (14 mm) bore (select process connection size; **C, D,** or **E**)

Integral check valve (ball/needle/ball/check)

07 = 3/8 in. (9.5 mm) bore
08 = 1/2 in. (14 mm) bore (select process connection size; **C, D,** or **E**)

B Materials

Standard

SA = 316 SS
CA = Carbon steel
DA = Duplex SS

Available

DB = Super Duplex SS
DE = Super Duplex SS (NORSOK)
DD = Duplex SS (NORSOK)
DL = Duplex SS, with Duplex needles
NA = Alloy 400
NB = Alloy 625
NC = Alloy 825
SB = Alloy 6 Moly

C Seats, Stem Seals, Body Seals

D = PEEK, PTFE, Graphite

D ASME Flange Class

1 = 150
3 = 300/600
5 = 900/1500
6 = 2500

API Flange Class

B = 5K -PSL1 (select process connection size **2** and process connection type **3**)

E Process Connection Size

A = 1/2 in. (DN 15)
B = 3/4 in. (DN 20)
C = 1 in. (DN 25)
D = 1 1/2 in. (DN 40)
E = 2 in. (DN 50)
2 = 2 1/16 in. API

F Process Connection Type

1 = Flange, RF smooth (3.2 to 6.3 µm)
2 = Flange, RF serrated (6.3 to 12.5 µm)
3 = Flange, RTJ
4 = Flange, FF serrated (6.3 to 12.5 µm)
5 = Flange, FF smooth (3.2 to 6.3 µm)

G Outlet Connection

3 = Flange
A = 1/4 in. female NPT
B = 3/8 in. female NPT
C = 1/2 in. female NPT
D = 3/4 in. female NPT
E = 1 in. female NPT①
F = G1/4②
G = G1/2②
H = 1/4 in. female Swagelok⑤
I = 1/2 in female Swagelok⑤
J = 10 mm female Swagelok⑤
K = 12 mm female Swagelok⑤
L = 1/4 in. male NPT
M = 1/2 in. male NPT
N = 3/4 in. male NPT
P = 1/4 in. Swagelok⑤
Q = 3/8 in. Swagelok⑤
R = 1/2 in. Swagelok⑤
S = 3/4 in. Swagelok③⑤
T = 1 in. Swagelok①③⑤
U = 6 mm Swagelok⑤
V = 10 mm Swagelok⑤
W = 12 mm Swagelok⑤
Y = 20 mm Swagelok③④
Z = 25 mm Swagelok①③④

① Available on 14 mm and 20 mm bore only.
② Compatible with Swagelok RS and RP fittings.
③ Pressure rating may be limited by end connection. Refer to Swagelok *Tubing Data* catalog, MS-01-107, for additional information.
④ Not available in Duplex or Super Duplex valve configurations.
⑤ Not available in Duplex valve configurations.

H Bleed Connection

C = 1/2 in. female NPT
E = 1/2 in. female NPT with 316 SS bleed valve
F = 1/2 in. female NPT with duplex SS bleed valve
H = 1/4 in. female Swagelok①
J = 1/2 in. female NPT with 316 SS plug
K = 1/2 in. female NPT with duplex SS plug
V = 10 mm female Swagelok①

① Not available in Duplex valve configurations.

J Handle Options

A = Block, nonlockable levers; bleed, antitamper①
B = Block, lockable levers; bleed, antitamper①
C = Block, nonlockable levers; bleed, bar
D = Block, lockable levers; bleed, bar

① Antitamper key sold separately. See page 35.

K Injection and Sampling Probe Options

Probes are available on VB04 series valves with 3/8 and 1/2 in. (9.5 and 14 mm) bores and process connection sizes 1 1/2 in. (DN40) and larger.

Omit designator if no probe is required.

S = Probe, 45° end preparation
R = Probe, 90° end preparation

L Injection and Sampling Probe Length

Insert probe length in millimeters, in whole numbers, up to a maximum of three characters.

Minimum length may apply,
Maximum length = 600 mm

Omit designator if no probe is required.

M Low Emissions Options

LE = Low Emissions certification per API 641 and API 624 available

VB04 Series

Ordering Information Thread by Thread, Including Swagelok Tube Fittings

Build a process interface valve ordering number by combining the designators as shown below.

	A	B	C	D	E	F	G	H	J	K
VB04	01	SA	D	6	S	S	S	H	A	LE

A Configuration

(ball/needle/ball)

01 = 3/8 in. (9.5 mm) bore
02 = 1/2 in. (14 mm) bore
03 = 3/4 in. (20 mm) bore

(ball/needle [block/bleed])

04 = 3/8 in. (9.5 mm) bore
05 = 1/2 in. (14 mm) bore

(ball/ball [block/block])

31 = 3/8 in. (9.5 mm) bore
32 = 1/2 in. (14 mm) bore

Integral check valve (ball/needle/ball/check)

07 = 3/8 in. (9.5 mm) bore
08 = 1/2 in. (14 mm) bore

B Materials

Standard

SA = 316 SS
CA = Carbon steel
DA = Duplex SS

Available

DB = Super Duplex SS
DE = Super Duplex SS (NORSOK)
DD = Duplex SS (NORSOK)
DL = Duplex SS, with Duplex needles
NA = Alloy 400
NB = Alloy 625
NC = Alloy 825
SB = Alloy 6 Moly

C Seats, Stem Seals, Body Seals

D = PEEK, PTFE, Graphite

D Pressure Class

6 = 2500

E End Configuration

S = Thread by thread connection

F Inlet Connection

A = 1/4 in. female NPT
B = 3/8 in. female NPT
C = 1/2 in. female NPT
D = 3/4 in. female NPT
E = 1 in. female NPT①
F = G1/4②
G = G1/2②
H = 1/4 in. female Swagelok⑤
I = 1/2 in female Swagelok⑤
J = 10 mm female Swagelok⑤
K = 12 mm female Swagelok⑤
L = 1/4 in. male NPT
M = 1/2 in. male NPT
N = 3/4 in. male NPT
P = 1/4 in. Swagelok⑤
Q = 3/8 in. Swagelok⑤
R = 1/2 in. Swagelok⑤
S = 3/4 in. Swagelok③⑤
T = 1 in. Swagelok①③⑤
U = 6 mm Swagelok⑤
V = 10 mm Swagelok⑤
W = 12 mm Swagelok⑤
Y = 20 mm Swagelok③④
Z = 25 mm Swagelok①③④

① Available on 14 mm and 20 mm bore only.
② Compatible with Swagelok RS and RP fittings.
③ Pressure rating may be limited by end connection. Refer to Swagelok *Tubing Data* catalog, MS-01-107, for additional information.
④ Not available in Duplex or Super Duplex valve configurations.
⑤ Not available in Duplex valve configurations.

K Low Emissions Options

LE = Low Emissions certification per API 641 and API 624 available

G Outlet Connection

A = 1/4 in. female NPT
B = 3/8 in. female NPT
C = 1/2 in. female NPT
D = 3/4 in. female NPT
E = 1 in. female NPT①
F = G1/4②
G = G1/2②
H = 1/4 in. female Swagelok⑤
I = 1/2 in female Swagelok⑤
J = 10 mm Female Swagelok⑤
K = 12 mm female Swagelok⑤
L = 1/4 in. male NPT
M = 1/2 in. male NPT
N = 3/4 in. male NPT
P = 1/4 in. Swagelok⑤
Q = 3/8 in. Swagelok⑤
R = 1/2 in. Swagelok⑤
S = 3/4 in. Swagelok③⑤
T = 1 in. Swagelok①③⑤
U = 6 mm Swagelok⑤
V = 10 mm Swagelok⑤
W = 12 mm Swagelok⑤
Y = 20 mm Swagelok③④
Z = 25 mm Swagelok①③④

① Available on 14 mm and 20 mm bore only.
② Compatible with Swagelok RS and RP fittings.
③ Pressure rating may be limited by end connection. Refer to Swagelok *Tubing Data* catalog, MS-01-107, for additional information.
④ Not available in Duplex or Super Duplex valve configurations.
⑤ Not available in Duplex valve configurations.

H Bleed Connection

C = 1/2 in. female NPT
E = 1/2 in. female NPT with 316 SS bleed valve
F = 1/2 in. female NPT with duplex SS bleed valve
H = 1/4 in. female Swagelok①
J = 1/2 in. female NPT with 316 SS plug
K = 1/2 in. female NPT with duplex SS plug
V = 10 mm female Swagelok①

① Not available in Duplex valve configurations.

J Handle Options

A = Block, nonlockable levers; bleed, antitamper①
B = Block, lockable levers; bleed, antitamper①
C = Block, nonlockable levers; bleed, bar
D = Block, lockable levers; bleed, bar

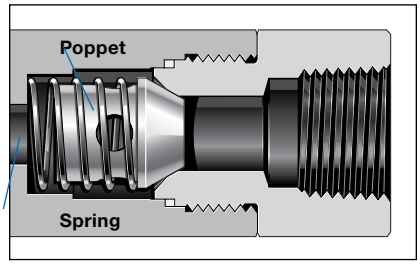
① Antitamper key sold separately, see page 35.

VB04 Series

Options

Integral Check Valves

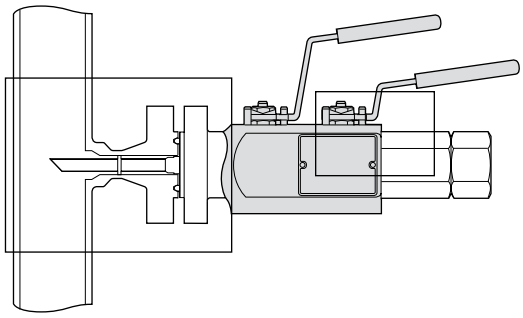
Integral check valves are available on both flange and NPT connections. The metal-seated check valve is ideal for chemical injection applications in oil and gas production.



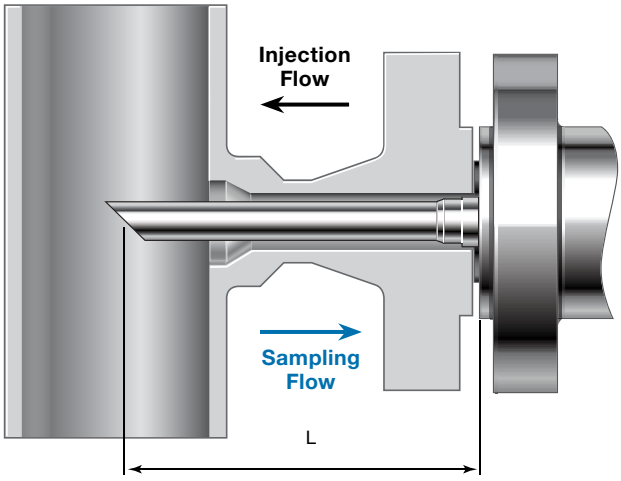
NPT Connection with Integral Check Valve

Chemical Injection and Process Sampling Options

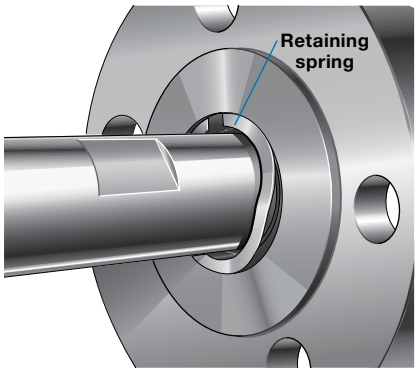
Select process interface valves may be ordered in optional injection or sampling valve configurations, providing double block and bleed protection for specialized applications.



Injection Valve with Integral Check Valve and NPT Connection



Injection Valve Flow Compared with Sampling Valve Flow



Retaining Spring Stabilizes Probe in Valve Body
(shown partially inserted for demonstration purposes)

A process interface valve fitted with an injection probe and a check valve allows fluids to be dispersed into the process stream while providing protection against back flow of process fluids.

The sampling valve probe draws process fluid from the flow stream.

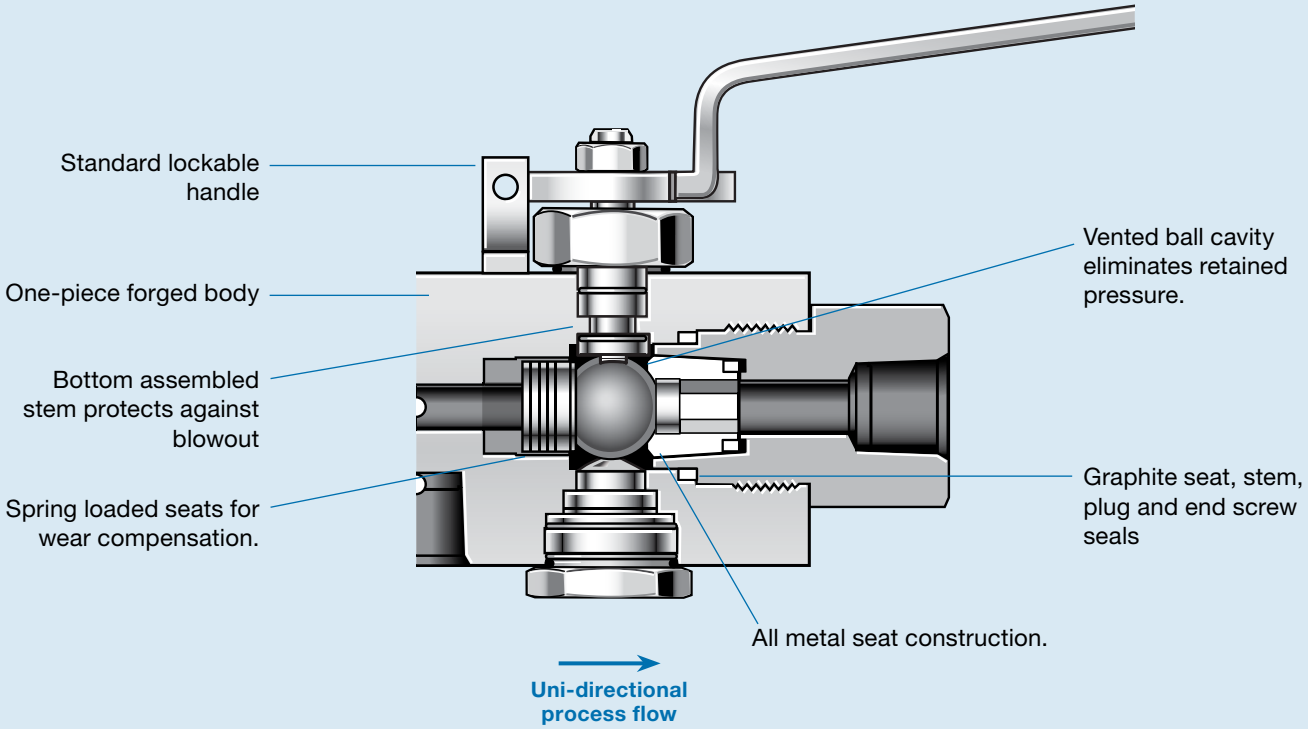
Standard injection and sampling probes of 1/2 in. schedule 40 pipe are available on VB04 series valves with 3/8 and 1/2 in. (9.5 and 14 mm) bores. They are limited to process connection sizes 1 1/2 in. (DN40) and larger. End preparations of 45° and 90° are available.

For additional features, such as support collars, and for probes on VB03 series valves, contact your authorized Swagelok representative.

VB0451 Series Advantages

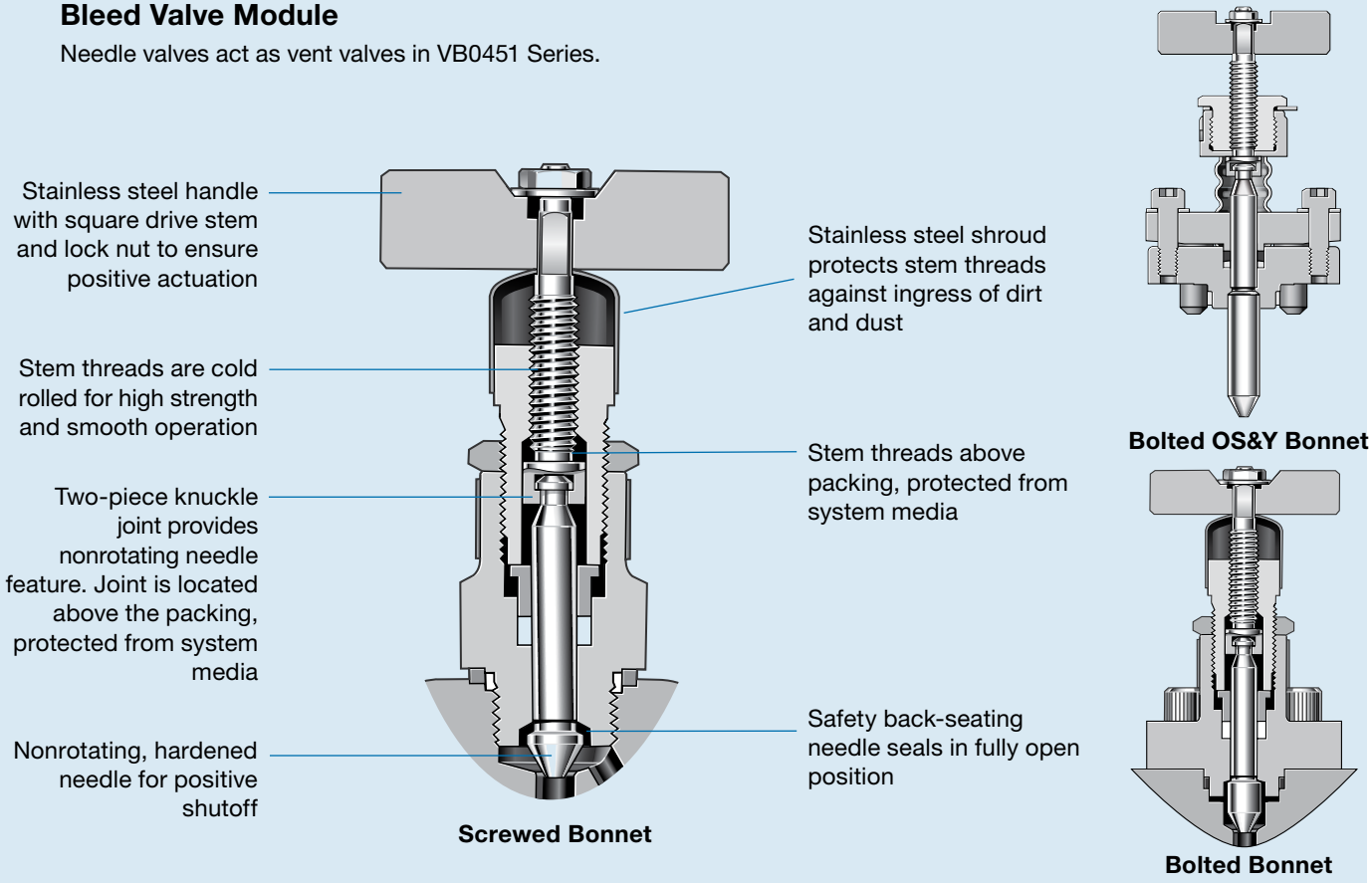
Ball Valve Module

Ball valves act as primary and secondary isolation valves in process interface assemblies.



Bleed Valve Module

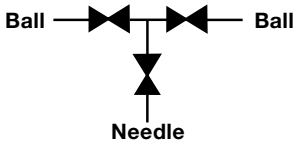
Needle valves act as vent valves in VB0451 Series.



VB0451 Series

For Slurries and Liquids Containing Abrasive Particles

Swagelok metal-seated process interface valves provide a unidirectional transition from process to instrumentation systems. These valves offer an extended temperature range and greater resistance to particulate-containing liquids.



Features

- Double block-and-bleed design—compact ball/needle/ball configuration
- One-piece forged body
- 3/8 in. (9.5 mm) bore size
- All-metal seat seal construction
- Antiblowout valve stems and needle
- Nonrotating needle vent valve
- Standard lockable handle
- Flange connections (1/2 to 2 in.) in accordance with ASME B16.5 RF and RTJ. Studded flange design is required for 1/2 in. class 150, 300, and 600 flanges and for 3/4 in. class 150 flanges.
- Hydrostatic test certificates available.
- Chemical and physical material certifications available per ISO 15156 (3.1).

Pressure-Temperature Ratings

Class 150 to class 2500, up to working temperatures listed below, in accordance with ASME B16.5; see page 5.

Valve Working Temperatures

- –58 to 590°F (–50 to 310°C) for stainless valve assemblies
- –50 to 590°F (–46 to 310°C) for carbon steel valve assemblies
- –58 to 536°F (–50 to 280°C) for duplex valve assemblies

Materials of Construction

Component	Valve Body Materials		
	Stainless Steel	Carbon Steel	Duplex Stainless Steel
	Material Grade/ASTM Specification		
Body	*Stainless steel/ A182 F316, F316L SS*	*Carbon steel/ A350 LF2*	*Duplex stainless steel/ A182 GR F51*
Ball and valve stem	*N06625/B446*		
Stem seal, needle valve packing, and needle valve bonnet seal	*Graphite*		
Body and seat seal	*Stainless steel-capped graphite*		
End fittings, bottom plug, valve spring carrier	*S31600/A479*		*S31803/A479*
Valve seats	*S31600/A479*		*N08367/ A479, B691*
Valve springs and stem washers	*N07718 AMS 5596/ASTM B670*		
Stem bearings	*N07750 AMS 5542, Type X-750*		
Standard vent valve needle	*S17400 SS/ A564 condition H1150D*		*S31803/A479*
Bolted bonnet	S31600/A479		
Bonnet bolts	B8M S31600/A193		
All other components	316 SS		

Wetted components listed in *italics*.

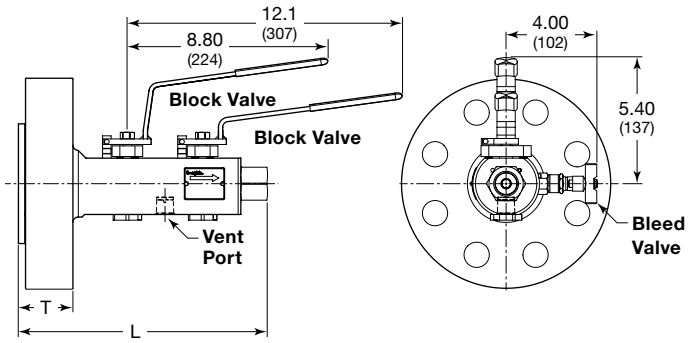
VB0451 Series

Dimensions

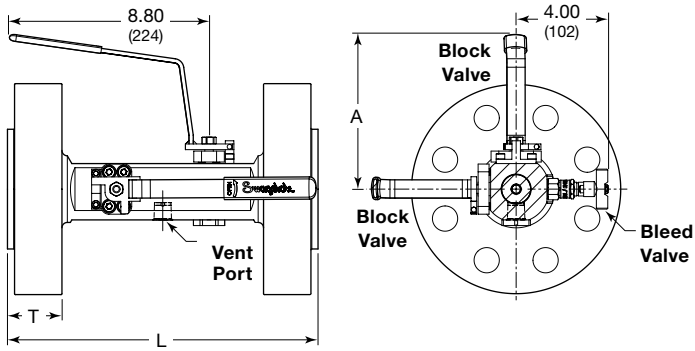
Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.

Raised-Face (RF) Flange Process Connection, 1/2 in. Female NPT Outlet Connection



Raised-Face (RF) Flange Process and Outlet Connections



Flange size in.	ASME Class	Dimensions, in. (mm)						Weight lb (kg)	
		A	L			T			
			RF Flanges	RTJ Flanges	Flange / NPT	RF Flange	RTJ Flange	Flanges	Flange / NPT
1/2 (DN15)	150①	4.00 (102)	11.5 (292)	—	10.2 (259)	1.46 (37.1)	—	21.9 (9.9)	18.2 (8.3)
	300/600①	4.00 (102)	11.5 (292)	11.5 (292)	10.2 (259)	1.46 (37.1)	1.46 (37.1)	23.1 (10.5)	18.8 (8.5)
	900/1500	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	1.21 (30.7)	1.21 (30.7)	22.9 (10.4)	19.1 (8.7)
	2500	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	1.52 (38.6)	1.52 (38.6)	28.1 (12.7)	21.7 (9.8)
3/4 (DN20)	150①	4.00 (102)	11.5 (292)	—	10.2 (259)	1.46 (37.1)	—	23.8 (10.8)	19.2 (8.7)
	300/600	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	0.95 (24.1)	0.95 (24.1)	21.9 (9.9)	18.6 (8.4)
	900/1500	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	1.33 (33.8)	1.33 (33.8)	25.7 (11.7)	20.4 (9.3)
	2500	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	1.58 (40.1)	1.58 (40.1)	30.5 (13.8)	22.8 (10.3)
1 (DN25)	150	4.00 (102)	11.0 (279)	11.0 (279)	10.0 (254)	0.63 (16.0)	0.89 (22.6)	20.8 (9.4)	18.1 (8.2)
	300/600	5.40 (137)	11.0 (279)	11.0 (279)	10.0 (254)	1.02 (25.9)	1.02 (25.9)	23.4 (10.6)	19.3 (8.8)
	900/1500	5.40 (137)	11.9 (302)	11.9 (302)	10.5 (267)	1.45 (36.8)	1.45 (36.8)	31.3 (14.2)	23.1 (10.5)
	2500	5.40 (137)	11.9 (302)	11.9 (302)	10.5 (267)	1.71 (43.4)	1.71 (43.4)	39.2 (17.8)	27.4 (12.4)
1 1/2 (DN40)	150	5.40 (137)	11.2 (284)	11.2 (284)	10.1 (257)	0.77 (19.6)	1.02 (25.9)	25.2 (11.4)	20.5 (903)
	300/600	5.40 (137)	11.2 (284)	11.2 (284)	10.1 (257)	1.21 (30.7)	1.21 (30.7)	31.7 (14.4)	23.7 (10.8)
	900/1500	6.80 (173)	12.2 (310)	12.2 (310)	10.6 (269)	1.58 (40.1)	1.58 (40.1)	43.4 (19.7)	29.5 (13.4)
	2500	6.80 (173)	13.3 (338)	13.4 (340)	10.9 (277)	2.08 (52.8)	2.14 (54.3)	66.6 (30.2)	41.7 (18.9)
2 (DN50)	150	5.40 (137)	11.2 (284)	11.2 (284)	10.1 (257)	0.83 (21.1)	1.08 (27.4)	31.2 (14.2)	23.6 (10.7)
	300/600	5.40 (137)	11.2 (284)	11.2 (284)	10.1 (257)	1.33 (33.8)	1.39 (35.3)	36.3 (16.5)	26.1 (11.8)
	900/1500	6.80 (173)	12.3 (312)	12.4 (315)	10.7 (272)	1.83 (46.5)	1.89 (48.0)	64.7 (29.3)	40.2 (18.2)
	2500	6.80 (173)	13.5 (343)	13.6 (345)	10.9 (277)	2.33 (59.2)	2.39 (60.7)	90.5 (41.1)	52.5 (23.8)

① Studded flange design required; studs are not provided. Dimensions shown do not include customer-procured stud dimensions. Contact your authorized Swagelok representative for more information on studded flange specifications.

VB0451 Series

Ordering Information

Build a metal-seated process interface valve ordering number by combining the designators as shown below.

	A	B	C	D	E	F	G	H	J
VB04	51	SM	G	1	D	1	C	C	B

A Configuration
- **51** = 3/8 in. (9.5 mm) Double block and bleed
- **52** = 3/8 in. (9.5 mm) Single block and bleed

B Materials
- **SM** = 316 stainless steel
- **CM** = Carbon steel
- **DM** = Duplex stainless steel

C Seats, Seals
- **G** = 316 stainless steel, graphite (for **SM** 316 stainless steel and **CM** carbon steel materials)
- **H** = 6-moly, graphite (for **DM** duplex stainless steel material)

D ASME Class
- **1** = 150
- **3** = 300/600
- **5** = 900/1500
- **6** = 2500

E Process Connection Size
- **A** = 1/2 in. (DN 15)
- **B** = 3/4 in. (DN 20)
- **C** = 1 in. (DN 25)
- **D** = 1 1/2 in. (DN 40)
- **E** = 2 in. (DN 50)

F Process Connection Type
- **1** = Flange, RF smooth (3.2 to 6.3 µm)
- **2** = Flange, RF serrated (6.3 to 12.5 µm)
- **3** = Flange, RTJ
- **4** = Flange, FF serrated (6.3 to 12.5 µm)
- **5** = Flange, FF smooth (3.2 to 6.3 µm)

G Outlet Connection
- **3** = Flange
- **C** = 1/2 in. female NPT

H Bleed Connection
- **C** = 1/2 in. female NPT

J Handle Options
- **B** = Block, lockable levers; bleed, antitamper①
- **D** = Block, lockable levers; bleed, bar

① Antitamper key sold separately. See page 35.

Servicing of Metal-Seated Valves

Swagelok metal-seated process interface valves do not require packing adjustment and cannot be field serviced. Any service must be performed by Swagelok. Contact your authorized Swagelok representative for assistance.

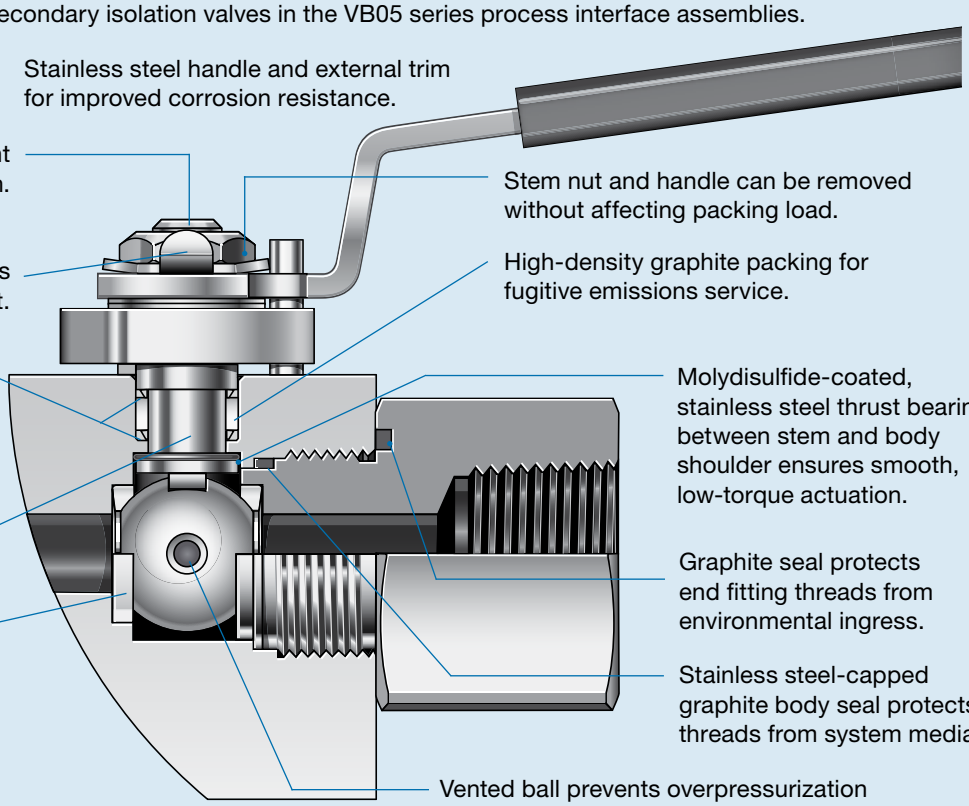
⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**

⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

VB05 Series Advantages

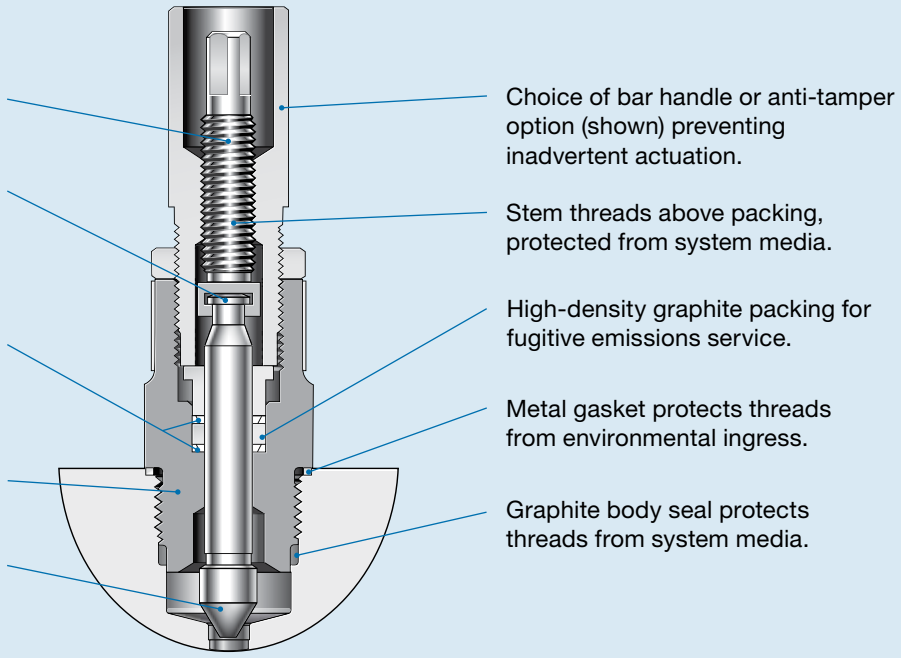
Ball Valve Module

Ball valves act as primary and secondary isolation valves in the VB05 series process interface assemblies.



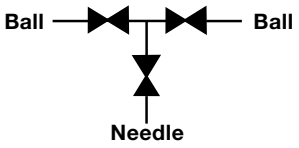
Integral Screwed-Bonnet Needle Valve Module

Integral screwed bonnet needle valves act as the vent valves in the VB05 series process interface assemblies.



VB05 Series

Swagelok process interface valves provide a unidirectional transition from process to instrumentation systems in a single, compact assembly. Benefits include fewer leak points and reduced size and weight compared to traditional systems.



VB05 Series with Female NPT Outlet

Features

- Process interface in one compact ball/needle/ball valve assembly
- One-piece forged body construction
- Floating ball design with 3/8 in. (9.5 mm) bore size
- Blowout-proof valve stems and needles
- Pressure-temperature and wall thickness requirements in accordance with ANSI/ASME B16.34
- Ball and needle valves perform to Shell MESC SPE 77/300 Tightness Class B for reduced fugitive emissions service
- Graphite seals compliant with Shell MESC SPE 85/203
- Flange connections compatible with ASME B16.5, NPT connections compatible with ASME B1.20.1
- Low Emissions certification per API 641 and API 624 standard

Testing

A percentage of the order is fugitive emissions tested with helium in accordance with Shell MESC SPE 77/312 at the working pressure to a requirement of Leakage Class B.

Materials of Construction

Component	Valve Body Materials		
	Stainless Steel	**Carbon Steel**	**Duplex Stainless Steel**
	Material Grade/ASTM Specification		
Body	*Stainless steel/ A182 F316, F316L SS*	*Carbon steel/ A350 LF2*	*Duplex stainless steel/ A182 F51*
End fitting, flange end fitting, outer packing washers, ball valve ball and stem, needle valve bonnet	*316 SS, 316L SS/A479*		*S31803/ A479*
Ball valve seat, inner packing washers	*Reinforced PEEK*		
Ball valve stem bearing	*S31803/A479 with molydisulfide coating*		
Needle	*S17400 SS/A564 condition H1150D*		*S31803/A479*
Environmental seal for flange end fitting	*Silver-plated 316 SS/A240*		
Body seals	*Stainless steel-capped graphite*		
Valve packings, needle valve body seal	*Graphite*		
Environmental seal for needle valve	Silver-plated 316 SS/A240		
Environmental seal for end fitting	Graphite		
Gland bolts	B8M/A193		
Gland flange	S17400 SS/A564		
All other components	316 SS		

Wetted components listed in *italics.*

VB05 Series

Pressure-Temperature Ratings

Swagelok process interface valves carry the pressure-temperature ratings of their flange end connections, which meet ASME B16.5 dimensional specifications and pressure ratings in a range of flange sizes and pressure classes.

ASME Class	1500		
Material Group	2.2	1.1	2.8
Material Name	Stainless Steel	Carbon Steel	Duplex Stainless Steel
Temperature, °F (°C)	Working Pressure, psig (bar)		
–58 (–50) to –50 (–46)	3600 (248)	—	3750 (258)
–50 (–46) to 100 (37)	3600 (248)	3705 (255)	3750 (258)
200 (93)	3095 (213)	3395 (233)	3720 (256)
250 (121)	2945 (202)	3332 (229)	3527 (243)

ASME Class	2500		
Material Group	2.2	1.1	2.8
Material Name	Stainless Steel	Carbon Steel	Duplex Stainless Steel
Temperature, °F (°C)	Working Pressure, psig (bar)		
–58 (–50) to –50 (–46)	6000 (413)	—	6250 (430)
–50 (–46) to 100 (37)	6000 (413)	6170 (425)	6250 (430)
200 (93)	5160 (355)	5655 (389)	6200 (427)
250 (121)	4910 (338)	5552 (382)	5880 (405)

Shell Specifications Reference

- Shell MESC SPE 77/300, *Procedure and Technical Specification for Type Acceptance Testing (TAT) of Industrial Valves*
- Shell MESC SPE 85/203, *Graphitic Packing Material*
- Shell MESC SPE 77/312, *Fugitive Emissions Production Testing*

⚠ A packing adjustment may be required periodically to increase service life and to prevent leakage.

⚠ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

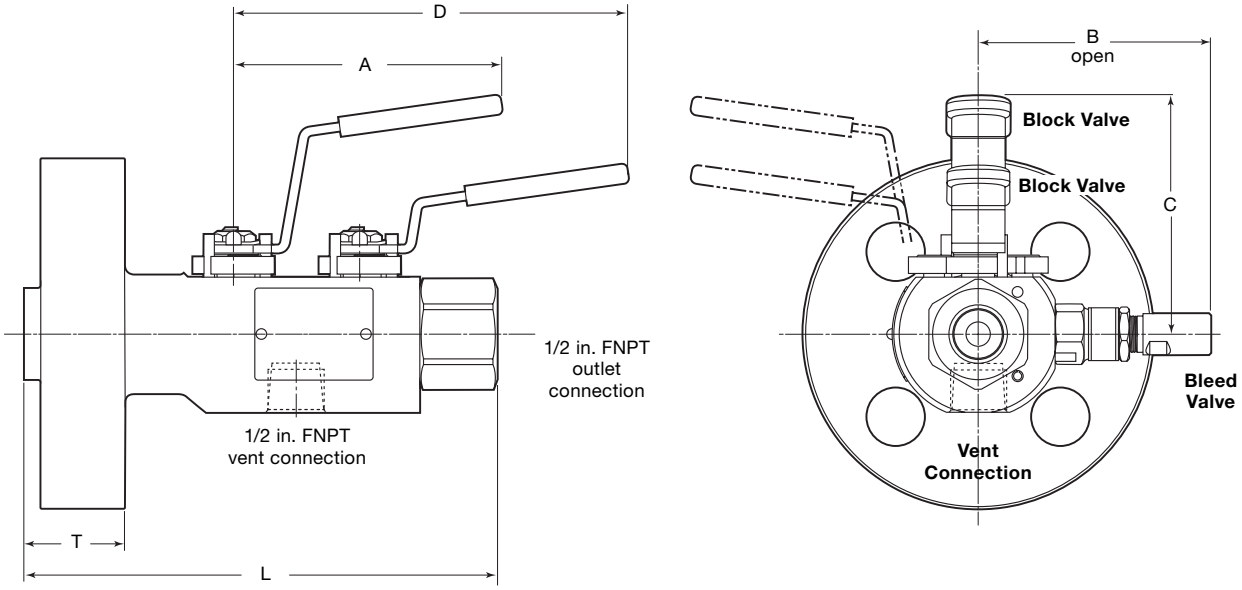
⚠ To increase service life, ensure proper needle valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.

VB05 Series

Valve Dimensions

Dimensions are for reference only and are subject to change.

Raised-Face (RF) Flange Process Connection,
1/2 in. Female NPT Outlet Connection
3/8 in. (9.5 mm) Bore Size



3/8 in. (9.5 mm) Bore

Flange Size in.	ASME Class	Dimensions, in. (mm)						Weight lb (kg)
		A	B	C	D	Flange/NPT L	RF Flange T	
1/2 (DN 15)	900/1500	4.03 (102)	3.53 (89.7)	3.59 (91.2)	5.93 (151)	7.11 (181)	1.21 (30.7)	10.6 (4.8)
	2500						1.52 (38.6)	13.1 (5.9)
3/4 (DN 20)	900/1500					7.11 (181)	1.33 (33.8)	12.0 (5.4)
	2500						1.58 (40.1)	13.8 (6.3)
1 (DN 25)	900/1500					7.46 (190)	1.45 (36.8)	14.8 (6.7)
	2500						1.71 (43.4)	18.3 (8.3)
1 1/2 (DN 40)	900/1500					8.05 (205)	1.58 (40.1)	21.3 (9.7)
	2500						2.08 (52.9)	31.3 (14.2)
2 (DN 50)	900/1500					8.05 (205)	1.83 (46.5)	31.1 (14.1)
	2500					8.44 (214)	2.33 (59.2)	43.1 (19.5)

VB05 Series

Ordering Information

Build a VB05 series process interface valve ordering number by combining the designators as shown below.

	A	B	C	D	E	F	G	H	J
VB05	01	**SA**	D	**5**	**D**	**1**	C	C	**A**

A Configuration

Standard (ball/needle/ball [block/bleed/block])

01 = 3/8 in. (9.5 mm) bore (all process connection sizes)

B Materials

SA = 316 SS
CA = Carbon steel
DL = Duplex SS

C Seats, Body Seals, Stem Seals

D = Reinforced PEEK, graphite

D ASME Class

1 = 150
3 = 300/600
5 = 900/1500
6 = 2500

E Process Connection Size

A = 1/2 in. (DN 15)
B = 3/4 in. (DN 20)
C = 1 in. (DN 25)
D = 1 1/2 in. (DN 40)
E = 2 in. (DN 50)

F Process Connection Type

1 = Flange, RF smooth (3.2 to 6.3 µm)
2 = Flange, RF serrated (6.3 to 12.5 µm)
3 = Flange, RTJ
4 = Flange, FF serrated (6.3 to 12.5 µm)
5 = Flange, FF smooth (3.2 to 6.3 µm)

G Outlet Connection

C = 1/2 in. female NPT
3 = Flange

H Vent Connection

C = 1/2 in. female NPT

J Handle Options

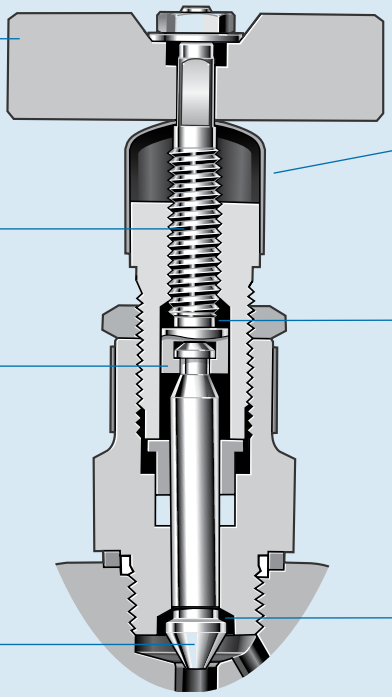
A = Block, nonlockable levers; bleed, antitamper①
C = Block, nonlockable levers; bleed, bar
D = Block, lockable levers; bleed, bar

① Antitamper key sold separately. See **Accessories,** page 35.

Process Monoflanges Advantages

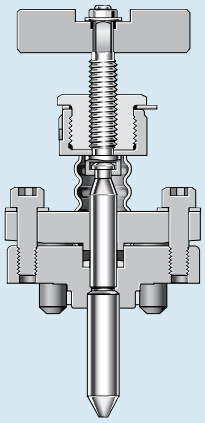
Needle Valve Module

Needle valves act as primary and secondary isolation and vent valves in process monoflanges.

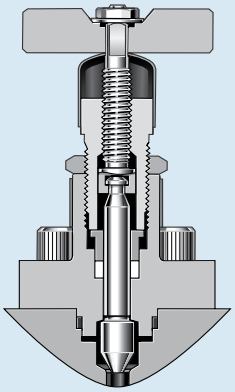


Screwed Bonnet

Additional Needle Valve Modules



Bolted OS&Y Bonnet



Bolted Bonnet

Process Monoflanges

Swagelok process monoflanges replace multivalve assemblies with single, flange-mounted manifold configurations. The main advantages over a typical system include compactness and weight savings, which can reduce stress from loading and vibration; fewer potential leak points; and reduced installation and maintenance times.

Features

- Compact block, block and bleed, and double block and bleed assemblies with minimal potential leak points
- Outside screw and yoke (OS&Y) bolted-bonnet (MN02 series), bolted-bonnet (MN04 series), and integral screwed-bonnet (MN03 series) construction
- Compatible with ASME B16.5 flange connections from 1/2 to 2 in. (DN 15 to DN 50), RF and RTJ
- Antiblowout valve stems and nonrotating needles
- Hydrostatic test certificates complete with full chemical and physical material certifications available
- Low Emissions certification per API 624 available

Pressure-Temperature Ratings

Class 150 to class 2500, up to working temperatures listed below, in accordance with ASME B16.5; see page 5.

Valve Working Temperatures

Valve Body Material	Packing Material	
	PTFE①	Graphite
	Working Temperature, °F (°C)	
Stainless steel	–58 to 400 (–50 to 204)	–58 to 850 (–50 to 454)
Carbon steel	–50 to 400 (–46 to 204)	–50 to 850 (–46 to 454)
Duplex stainless steel	–58 to 400 (–50 to 204)	–58 to 536 (–50 to 280)

① Carbon/glass-filled PTFE for Low Emissions Option has a maximum of 450°F (232°C).

Duplex Elevated Temperature Rating

If Duplex stainless steel is exposed to temperatures exceeding 536°F (280°C) for prolonged periods, the microstructure changes which results in a reduction in impact strength. For pressure vessel applications, 536°F (280°C) is required as a maximum according to VdTUV-Wb 418 and NGS 1606.

Materials of Construction

Component	Valve Body Materials		
	Stainless Steel	Carbon Steel	Duplex Stainless Steel
	Material Grade/ASTM Specification		
Body	*Stainless steel/ A182 F316, F316L SS*	*Carbon steel/ A350 LF2*	*Duplex stainless steel/ A182 F51*
Bonnet	*316 SS, 316L SS/A479 (all MN03 and MN04 series valves and MN02 series secondary block and bleed valves); CF8M/A351 (MN02 series primary block valve)*		*S31803/A479 (MN03 and MN04 series); J92205/A890 (MN02 series)*
Bonnet seal, gland packing	*Graphite or PTFE①*		
Needle	*S17400 SS/A564 condition H1150D or alloy K-500*		*S17400 SS/A564 condition H1150D; alloy K-500; or duplex stainless steel/ A182 F51*
Stem	316 SS, 316L SS/A479		
Bonnet bolts (MN02 and MN04 series)	B8M/ A320		Duplex stainless steel S31803
All other components	316 SS		

Wetted components listed in *italics.*

① Optional Low Emissions configurations supplied with graphite for the MN02 series primary block valve and carbon/glass-filled PTFE for MN02 secondary block and bleed valves and all MN03 series valves.

⚠ **A packing adjustment may be required periodically to increase service life and to prevent leakage.**

⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**

⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

Process Monoflanges

Configurations

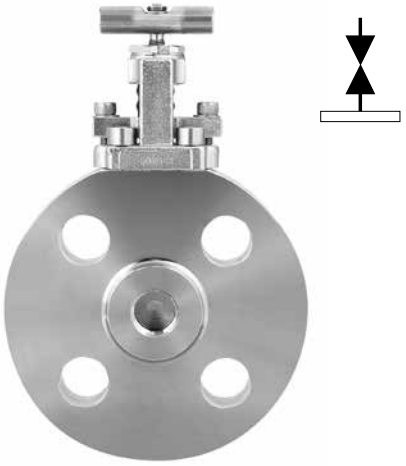
Process monoflanges comprise:

- A primary block valve of OS&Y bolted-bonnet needle, bolted-bonnet needle, or integral screwed-bonnet needle valve construction
- As ordered, a secondary block valve and a bleed valve of integral screwed-bonnet needle valve construction.

OS&Y bolted-bonnet (MN02 series) monoflanges are shown; configurations are also available in bolted-bonnet (MN04 series) and integral screwed-bonnet (MN03 series) monoflanges.

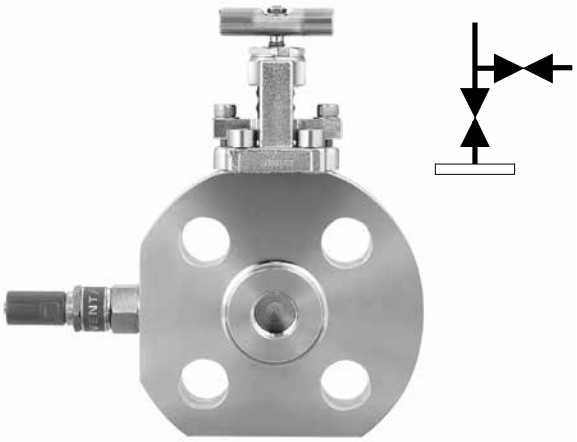
Block Valve

- OS&Y bolted-bonnet, bolted-bonnet, or screwed-bonnet primary isolating process valve



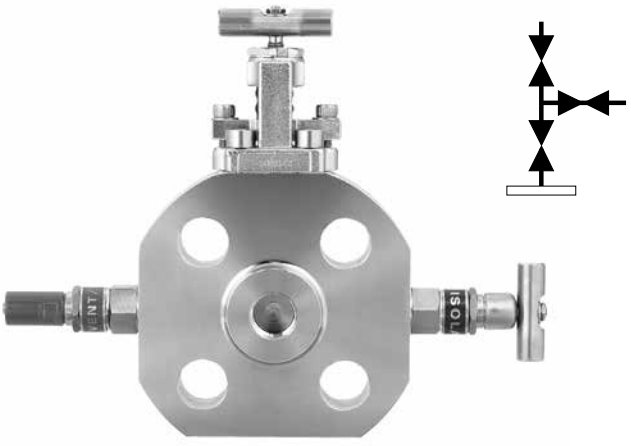
Block and Bleed Valve

- OS&Y bolted-bonnet, bolted-bonnet, or screwed-bonnet primary isolating process valve
- Screwed bonnet vent valve (bar or antitamper handle)



Double Block and Bleed Valve

- OS&Y bolted-bonnet, bolted-bonnet, or screwed-bonnet primary isolating process valve
- Secondary OS&Y bolted bonnet, bolted bonnet or screwed bonnet
- Needle valve vent (bar or antitamper handle)



Process Monoflanges

Dimensions, Outside Screw and Yoke (OS&Y) Bolted-Bonnet Assemblies (MN02 Series)

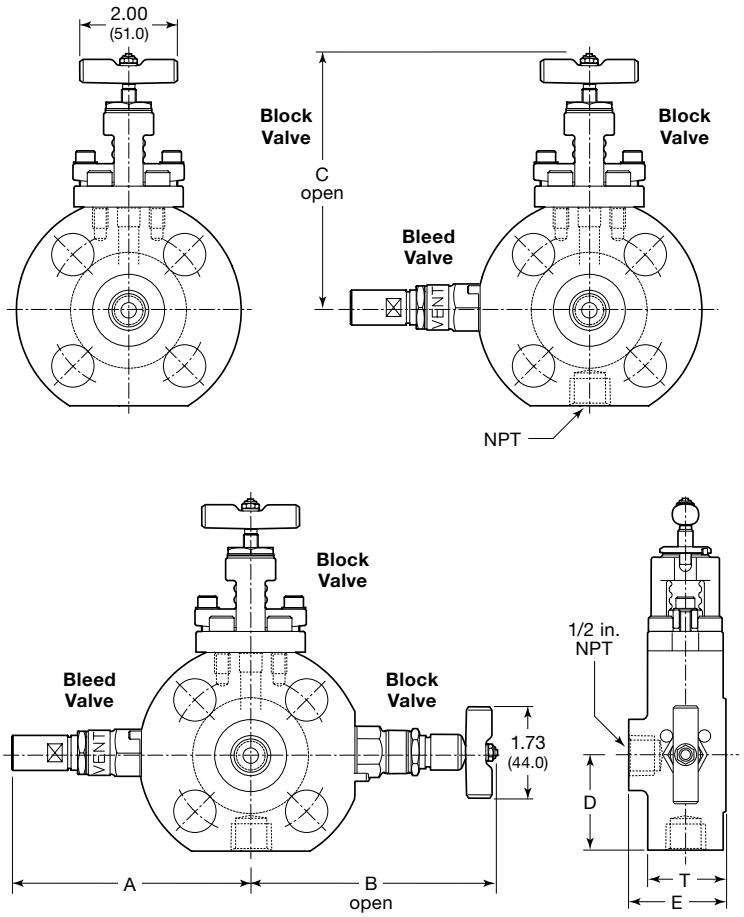
Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.

MN02 Series (OS&Y Bolted-Bonnet) Bore Sizes

Configuration	Bore Diameter in. (mm)
MN0201 (block)	0.23 (6.0)
MN0202 (block and bleed)	0.23 (6.0)
MN0203 (double block and bleed)	0.15 (4.0)

Note: All vent ports 0.15 in. (4.0 mm)



Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)
						RF Flange		RTJ Flange		
		A	B	C	D	E	T	E	T	
1/2 (DN 15)	150	3.94 (100)	4.33 (110)	4.88 (124)	1.69 (43.0)	2.03 (51.5)	1.63 (41.5)	—	—	4.4 (2.0)
	300/600	4.17 (106)	4.49 (114)		1.77 (45.0)			2.03 (51.5)	1.63 (41.5)	4.6 (2.1)
	900/1500	4.57 (116)	4.88 (124)	5.51 (140)	1.97 (50.0)					7.0 (3.2)
	2500	4.72 (120)	5.04 (128)	5.75 (146)	2.17 (55.0)					9.0 (4.1)
3/4 (DN 20)	150	4.17 (106)	4.49 (114)	5.12 (130)	1.77 (45.0)	2.03 (51.5)	1.63 (41.5)	—	—	4.8 (2.2)
	300/600	4.57 (116)	4.88 (124)		2.05 (52.0)			2.03 (51.5)	1.63 (41.5)	7.0 (3.2)
	900/1500	4.72 (120)	5.04 (128)	5.51 (140)	2.17 (55.0)					8.4 (3.8)
	2500	4.96 (126)	5.28 (134)	5.75 (146)	2.36 (60.0)	2.11 (53.5)		2.11 (53.5)		10.4 (4.7)
1 (DN 25)	150	4.33 (110)	4.65 (118)	5.12 (130)	1.97 (50.0)	2.03 (51.5)	1.63 (41.5)	2.03 (51.5)	1.63 (41.5)	6.0 (2.7)
	300/600	4.72 (120)	5.04 (128)	5.51 (140)	2.17 (55.0)					7.9 (3.6)
	900/1500	5.12 (130)	5.43 (138)	6.06 (154)	2.76 (70.0)	2.11 (53.5)		2.11 (53.5)		11.7 (5.3)
	2500	5.35 (136)	5.43 (138)		2.95 (75.0)		1.87 (47.5)		1.87 (47.5)	13.2 (6.0)
1 1/2 (DN 40)	150	4.72 (120)	5.04 (128)	5.51 (140)	2.36 (60.0)	2.03 (51.5)	1.63 (41.5)	2.03 (51.5)	1.63 (41.5)	8.6 (3.9)
	300/600	5.35 (136)	5.43 (138)	6.06 (154)	2.95 (75.0)	2.11 (53.5)		2.11 (53.5)		13.0 (5.9)
	900/1500	5.75 (146)	5.67 (144)		3.35 (85.0)	2.19 (55.5)		2.19 (55.5)		17.4 (7.9)
	2500	6.30 (160)	6.61 (168)	7.24 (184)	3.74 (95.0)	2.67 (67.9)	2.20 (55.9)	2.67 (67.9)	2.20 (55.9)	27.8 (12.6)
2 (DN 50)	150	5.35 (136)	5.43 (138)	6.06 (154)	2.95 (75.0)	2.11 (53.5)	1.63 (41.5)	2.11 (53.5)	1.63 (41.5)	12.8 (5.8)
	300/600		5.67 (144)	6.42 (163)	3.12 (80.0)	2.19 (55.5)		2.19 (55.5)		15.0 (6.8)
	900/1500	6.54 (166)	6.61 (168)	7.24 (184)	4.13 (105)	2.42 (61.5)	1.95 (49.5)	2.42 (61.5)	1.95 (49.5)	28.0 (12.7)
	2500			7.76 (197)	4.33 (110)	2.88 (73.4)	2.44 (61.9)	2.88 (73.4)	2.44 (61.9)	36.4 (16.5)

Process Monoflanges

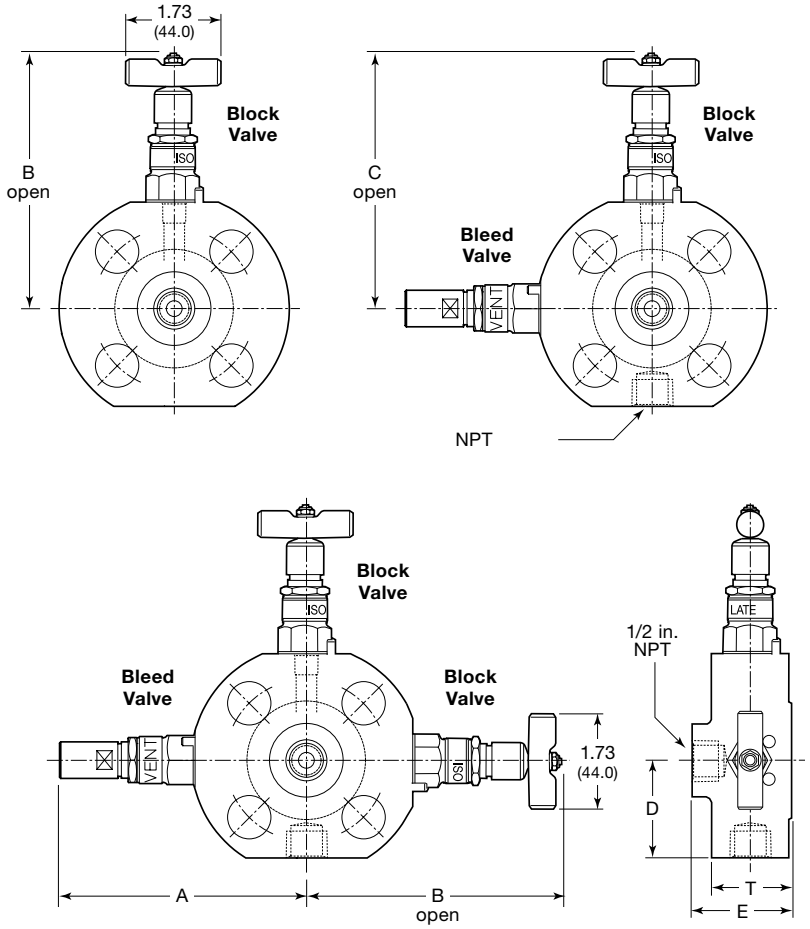
Dimensions, Integral Screwed-Bonnet Assemblies (MN03 Series)

Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.

MN03 Series (Integral Screwed-Bonnet) Bore Sizes

All bores 0.15 in. (4.0 mm)



Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)
						RF Flange		RTJ Flange		
		A	B	C	D	E	T	E	T	
1/2 (DN 15)	150	3.94 (100)	4.33 (110)	4.25 (108)	1.57 (40.0)	1.73 (44.0)	1.24 (31.5)	—	—	4.0 (1.8)
	300/600	4.17 (106)	4.49 (114)	4.49 (114)				1.79 (45.5)	1.30 (33.0)	4.2 (1.9)
	900/1500	4.57 (116)	4.88 (124)	4.88 (124)	2.17 (55.0)	1.73 (44.0)	1.32 (33.5)	1.79 (45.5)	1.38 (35.0)	6.4 (2.9)
	2500	4.72 (120)	5.04 (128)	5.04 (128)	2.36 (60.0)	1.93 (48.9)	1.51 (38.4)	1.93 (48.9)	1.51 (38.4)	8.2 (3.7)
3/4 (DN 20)	150	4.17 (106)	4.49 (114)	4.49 (114)	1.77 (45.0)	1.73 (44.0)	1.24 (31.5)	—	—	4.4 (2.0)
	300/600	4.57 (116)	4.88 (124)	4.88 (124)	2.17 (55.0)			1.79 (45.5)	1.30 (33.0)	6.4 (2.9)
	900/1500	4.72 (120)	5.04 (128)	5.04 (128)	2.36 (60.0)	1.73 (44.0)	1.32 (33.5)	1.79 (45.5)	1.38 (35.0)	7.5 (3.4)
	2500	4.96 (126)	5.28 (134)	5.28 (134)	2.56 (65.0)	2.00 (50.9)	1.59 (40.4)	2.00 (50.9)	1.59 (40.4)	9.3 (4.2)
1 (DN 25)	150	4.33 (110)	4.65 (118)	4.65 (118)	1.97 (50.0)	1.73 (44.0)	1.24 (31.5)	1.79 (45.5)	1.30 (33.0)	5.3 (2.4)
	300/600	4.72 (120)	5.04 (128)	5.04 (128)	2.36 (60.0)					7.0 (3.2)
	900/1500	5.12 (130)	5.43 (138)	5.43 (138)	2.76 (70.0)	2.00 (50.9)	1.51 (38.4)	2.00 (50.9)	1.51 (38.4)	10.6 (4.8)
	2500	5.35 (136)	5.43 (138)	5.67 (144)	2.95 (75.0)	2.00 (50.9)	1.71 (43.4)	2.00 (50.9)	1.71 (43.4)	11.9 (5.4)
1 1/2 (DN 40)	150	4.72 (120)	5.04 (128)	5.04 (128)	2.36 (60.0)	1.73 (44.0)	1.24 (31.5)	1.79 (45.5)	1.30 (33.0)	7.72 (3.5)
	300/600	5.35 (136)	5.43 (138)	5.67 (144)	2.95 (75.0)	1.81 (46.0)	1.32 (33.5)	1.87 (47.5)	1.38 (35.0)	11.7 (5.3)
	900/1500	5.75 (146)	5.67 (144)	6.07 (154)	3.35 (85.0)	2.08 (52.9)	1.59 (40.4)	2.08 (52.9)	1.59 (40.4)	15.7 (7.1)
	2500	6.30 (160)	6.61 (168)	6.61 (168)	3.94 (100)	2.38 (60.4)	2.16 (54.9)	2.38 (60.4)	2.16 (54.9)	24.9 (11.3)
2 (DN 50)	150	5.35 (136)	5.43 (138)	5.67 (144)	2.95 (75.0)	1.81 (46.0)	1.24 (31.5)	1.87 (47.5)	1.30 (33.0)	11.5 (5.2)
	300/600		5.67 (144)		3.12 (80.0)	1.89 (48.0)	1.32 (33.5)	1.95 (49.5)	1.38 (35.0)	13.4 (6.1)
	900/1500	6.54 (166)	6.61 (168)	6.85 (174)	4.13 (105)	2.38 (60.4)	1.89 (47.9)	2.38 (60.4)	1.89 (47.9)	25.1 (11.4)
	2500				4.53 (115)	2.59 (65.9)	2.44 (61.9)	2.59 (65.9)	2.44 (61.9)	32.8 (14.9)

Note: Contact your authorized sales and service representative for additional options such as single block and bleed and dual outlets.

Process Monoflanges

Dimensions, Bolted-Bonnet Assemblies (MN04 Series)

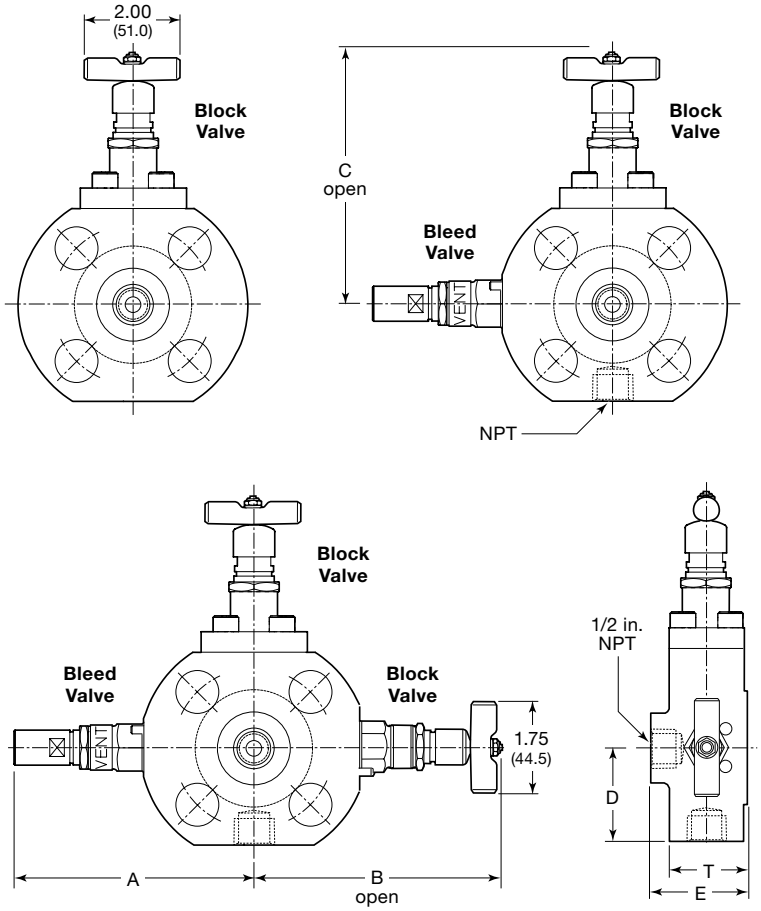
Dimensions are for reference only and are subject to change.

For additional flange dimensions, see page 5.

MN04 Series (Bolted-Bonnet) Bore Sizes

Configuration	Bore Diameter in. (mm)
MN0401 (block)	0.23 (6.0)
MN0402 (block and bleed)	0.23 (6.0)
MN0403 (double block and bleed)	0.15 (4.0)

Note: All vent ports 0.15 in. (4.0 mm)



Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)
		A	B	C	D	RF Flange E	RF Flange T	RTJ Flange E	RTJ Flange T	
1/2 (DN 15)	150	3.94 (100)	4.33 (110)	4.72 (120)	1.69 (43.0)	2.03 (51.5)	1.63 (41.5)	—	—	4.4 (2.0)
	300/600	4.17 (106)	4.49 (114)		1.77 (45.0)			2.03 (51.5)	1.63 (41.5)	4.6 (2.1)
	900/1500	4.57 (116)	4.88 (124)	5.35 (136)	1.97 (50.0)					7.0 (3.2)
	2500	4.72 (120)	5.04 (128)	5.59 (142)	2.17 (55.0)					9.0 (4.1)
3/4 (DN 20)	150	4.17 (106)	4.49 (114)	4.96 (126)	1.77 (45.0)	2.03 (51.5)	1.63 (41.5)	—	—	4.8 (2.2)
	300/600	4.57 (116)	4.88 (124)		2.05 (52.0)			2.03 (51.5)	1.63 (41.5)	7.0 (3.2)
	900/1500	4.72 (120)	5.04 (128)	5.35 (136)	2.17 (55.0)					8.4 (3.8)
	2500	4.96 (126)	5.28 (134)	5.59 (142)	2.36 (60.0)	2.11 (53.5)		2.11 (53.5)		10.4 (4.7)
1 (DN 25)	150	4.33 (110)	4.65 (118)	4.96 (126)	1.97 (50.0)	2.03 (51.5)	1.63 (41.5)	2.03 (51.5)	1.63 (41.5)	6.0 (2.7)
	300/600	4.72 (120)	5.04 (128)	5.35 (136)	2.17 (55.0)					7.9 (3.6)
	900/1500	5.12 (130)	5.43 (138)	5.91 (150)	2.76 (70.0)	2.11 (53.5)		2.11 (53.5)		11.7 (5.3)
	2500	5.35 (136)	5.43 (138)		2.95 (75.0)		1.87 (47.5)		1.87 (47.5)	13.2 (6.0)
1 1/2 (DN 40)	150	4.72 (120)	5.04 (128)	5.35 (136)	2.36 (60.0)	2.03 (51.5)	1.63 (41.5)	2.03 (51.5)	1.63 (41.5)	8.6 (3.9)
	300/600	5.35 (136)	5.43 (138)	5.91 (150)	2.95 (75.0)	2.11 (53.5)		2.11 (53.5)		13.0 (5.9)
	900/1500	5.75 (146)	5.67 (144)		3.35 (85.0)	2.19 (55.5)		2.19 (55.5)		17.4 (7.9)
	2500	6.30 (160)	6.61 (168)	7.09 (180)	3.74 (95.0)	2.67 (67.9)	2.20 (55.9)	2.67 (67.9)	2.20 (55.9)	27.8 (12.6)
2 (DN 50)	150	5.35 (136)	5.43 (138)	5.91 (150)	2.95 (75.0)	2.11 (53.5)	1.63 (41.5)	2.11 (53.5)	1.63 (41.5)	12.8 (5.8)
	300/600		5.67 (144)	6.22 (158)	3.12 (80.0)	2.19 (55.5)		2.19 (55.5)		15.0 (6.8)
	900/1500	6.54 (166)	6.61 (168)	7.09 (180)	4.13 (105)	2.42 (61.5)	1.95 (49.5)	2.42 (61.5)	1.95 (49.5)	28.0 (12.7)
	2500			7.56 (192)	4.33 (110)	2.88 (73.4)	2.44 (61.9)	2.88 (73.4)	2.44 (61.9)	36.4 (16.5)

Note: Contact your authorized sales and service representative for additional options such as single block and bleed and dual outlets.

Process Monoflanges

Ordering Information

Build a process monoflange ordering number by combining the designators as shown below.

	A	B	C	D	E	F	G	H	J	K	L
MN	03	03	SA	A	63E	15	B1	C	J	A	LE

A Series

02 = OS&Y bolted-bonnet needle valve (primary block)
03 = Integral screwed-bonnet needle valve (primary block)
04 = Bolted-bonnet needle valve (primary block)

B Configuration

01 = Block
02 = Block and bleed
03 = Double block and bleed
04 = Block and bleed, Dual Outlet
05 = Block/Bleed/Block – Bolted Bonnet/OS&Y Primary and Secondary with Screwed Vent
06 = Block/Bleed/Block – Bolted Bonnet/OS&Y Primary and Screwed Secondary and Vent - Dual Outlet

C Materials

Standard
SA = 316 SS body and bonnet
CA = Carbon steel body, 316 SS bonnet
DA = Duplex SS body and bonnet
Available
DB = Super Duplex SS
DE = Super Duplex SS (NORSOK)
DG = Duplex SS, with Duplex bolts (NORSOK)
DD = Duplex SS, with Super Duplex bolts
NA = Alloy 400
NB = Alloy 625
NC = Alloy 825
SB = 6 Moly Alloy

D Needle, Seals

A = S17400 SS, PTFE
B = S17400 SS, graphite
C = Alloy K-500, PTFE
D = Alloy K-500, graphite
E = Needle same as body material, PTFE seals (duplex SS body and bonnet only; select **DA** materials)
F = Needle same as body material, graphite seals (duplex SS body and bonnet only; select **DA** materials)

E Pressure Class

ASME
1 = 150
3 = 300/600
5 = 900/1500
6 = 2500
DIN/EN
40E = PN40
63E = PN63
100E = PN100
160E = PN160
250E = PN250
320E = PN320

F Process Connection Size

ASME
A = 1/2 in. (DN 15)
B = 3/4 in. (DN 20)
C = 1 in. (DN 25)
D = 1 1/2 in. (DN 40)
E = 2 in. (DN 50)
DIN/EN
15 = DN 15
25 = DN 25
50 = DN 50

G Process Connection

1 = Flange—RF smooth (3.2 to 6.3 µm)
2 = Flange—RF serrated (6.3 to 12.5 µm)
3 = Flange—RTJ (not available with ASME class 150 1/2 and 3/4 in. [DN 15 and DN 20] process connection sizes)
B1 or B2 = EN Raised Face

H Outlet Connection

2 = Monoflange wafer (thru holes)
A = 1/4 in. female NPT
C = 1/2 in. female NPT
F = G 1/4①
G = G 1/2①
H = 1/4 in. female Swagelok②
J = 10 mm female Swagelok②

① Compatible with Swagelok RS and RP fittings
② Not available in Duplex valve configurations.

J Bleed Connection

A = 1/4 in. female NPT
C = 1/2 in. female NPT
F = G 1/4
G = G 1/2
H = 1/4 in. female Swagelok①
V = 10 mm female Swagelok①
– = None (required for configuration **01**)

① Not available in Duplex valve configurations.

K Handles

Configuration 01
B = Block, bar
D = Block, handwheel
Configuration 02
A = Block, bar; bleed, antitamper①
B = Block and bleed, bar
C = Block, handwheel; bleed, antitamper①
D = Block, handwheel; bleed, bar
Configuration 03
A = All block, bar; bleed, antitamper①
B = All handles, bar
C = 1st block, handwheel; 2nd block, bar; bleed, antitamper①
D = 1st block, handwheel; 2nd block, bar; bleed, bar

① Antitamper key sold separately, see page 35.

L Low Emissions Options

LE = Low Emissions certification per API 624 available for MN02 and MN03 only.

Supersedes Designator D for Seals, see Materials of Contruction on page 28; select A, C, or E needle, seals.

Available Options

Option	Description	Designator
Helium Leak Testing①	Low pressure helium testing per Swagelok SCS-00014 and SCS-00150	A0083
Positive Material Identification (PMI)①	100% PMI testing per Swagelok SCS-00058	A0100
Identification Tag	Tag per customer marking (Tag size: 60 mm × 11.5 mm)	A0042
Hydrostatic Test Certificate①	Certificate per ISO 15156 (3.1)	–
High Pressure Gas Testing to support 1.1x shell pressure①	Testing and test report available upon request	–
Dye Penetrant	Testing and test report available upon request	43100
Magnetic particle examination②	Testing and test report available upon request	53237
Low Emissions per API 641/624③	Low Emissions certification per applicable API specification available	LE
Painting		
Paint Coating 1 (SCS-00174)	Primer: zinc rich ethyl silicate	1
	Topcoat: moisture curing silicon binder	
	Color: Aluminum Example: VB0401SAD1ACCC-**1**	
Paint Coating 2 (SCS-00175)	Primer: High Build Phenolic	2
	Topcoat: High Build Phenolic	
	Color - Grey Example: VB0401SAD1ACCC-**2**	
Paint Coating 3 (SCS-00176)	Primer: metallic zinc rich epoxy	3
	Topcoat: acrylic polyurethane finish	
	Color - Designator White - WH Grey - GY Yellow - YW Green - GR Brown - BR Light Brown - LB Black - BK Blue - BL Example: VB0401SAD1ACCC-**3WH**	

① For more information, contact your authorized Swagelok representative.

② Dye penetrant and magnetic particle examination tests are standard on select configurations.

③ Available on VB03, VB04, MN02, and MN03. For more information, see materials of construction.

Accessories

Antitamper Key

- Fits all Swagelok antitamper handles.
- Order separately.

Ordering number: **S004468**

Flange Adapters

Refer to Swagelok *Flange Adapters* catalog, MS-02-200, for additional information.

Pressure Gauges

Refer to Swagelok *Pressure Gauges, Industrial and Process—PGI Series* catalog, MS-02-170, for additional information.

Tubing

Swagelok can provide a variety of stainless steel tubing in fractional, metric, and Imperial sizes. For more information, contact your authorized Swagelok representative.

Tube Fittings and Adapter Fittings

Refer to Swagelok Gaugeable Tube Fittings and Adapter Fittings catalog, MS-01-140, for additional information.

Caution: Do not mix or interchange parts with those of other manufacturers.

Sample Probe Module

Refer to Swagelok *Sample Probe Module, Application Guide* catalog, MS-02-425, for additional information.

Ball Valves

Refer to Swagelok *Ball Valves, General Purpose and Special Application—60 Series* catalog, MS-01-146, for additional information.

High-Pressure Needle Valves

Refer to Swagelok *Forged-Body Needle Valves, 10 000 psig (689 bar)—F10 Series* catalog, MS-02-215, for additional information.

Safe Product Selection
When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.