Process Interface Valves

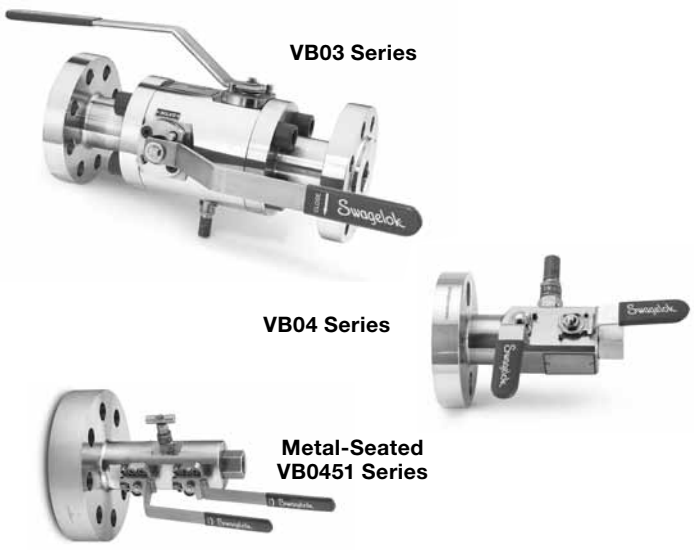
Kenmac® Series Process Interface Valves and Process Monoflanges

- Stainless steel, carbon steel, and duplex stainless steel materials
- 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)

Swagelok

Contents

Process Interface Valves



Process Monoflanges

Process Instrumentation and Piping

Swagelok® process instrumentation and piping products 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

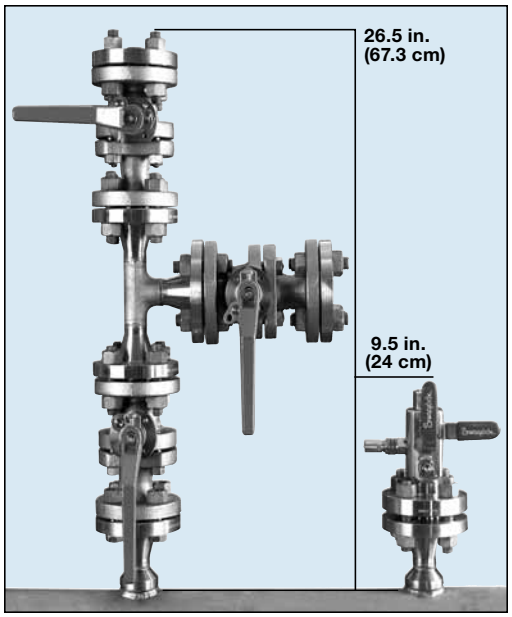
- Oil and gas
- Chemical
- Petrochemical
- Power generation

Applications

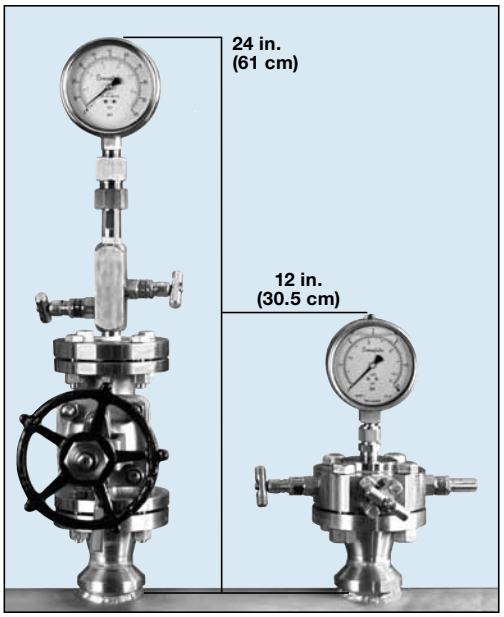
- Process piping isolation points
- Direct mount to instruments
- Close coupling of instruments
- Chemical injection and sampling points
- Double block and bleed isolation
- Vents and drains

Installation Advantages

- Compact size and reduced weight minimize space envelope and support structure required.
- Installation of a single valve unit is faster than multiple valves.
- Single valve unit reduces the number of joints and potential leak paths.
- Single-source unit reduces maintenance time and costs.



Traditional 3-Valve Assembly (left) and Swagelok VB04 Series Double Block and Bleed Valve (right)



Globe-Gauge Root Valve Assembly (left) and Swagelok Process Monoflange Valve (right)

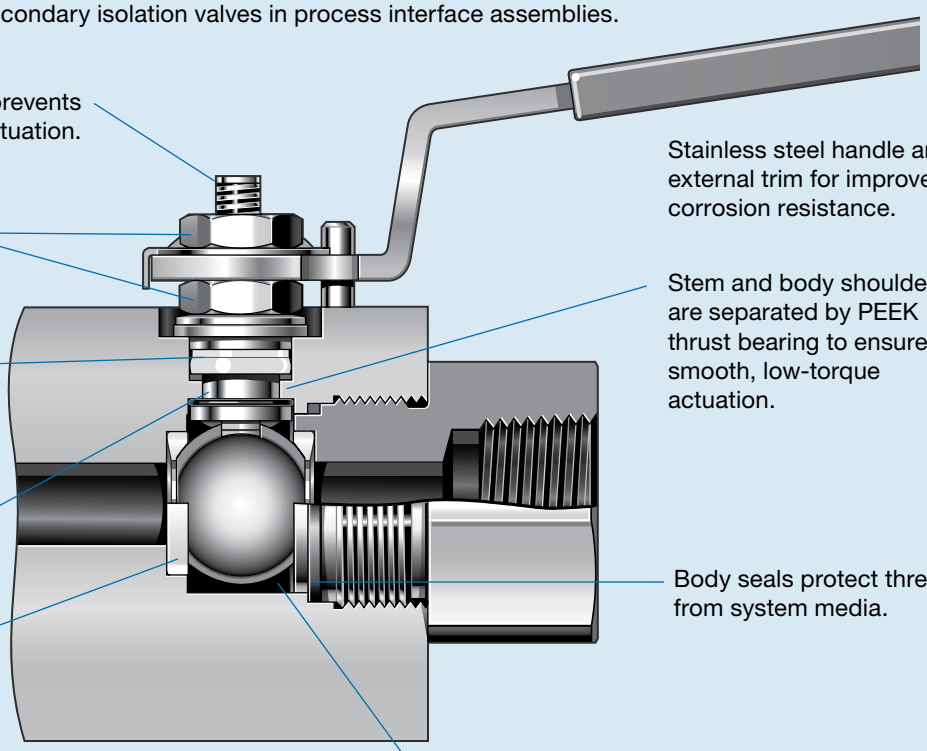
Custom Configurations

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 block and bleed combinations are available. Block and bleed globe valve module options are also available for all configurations. Contact your authorized Swagelok sales and service representative for assistance with any special requirements.

Process Instrumentation and Piping

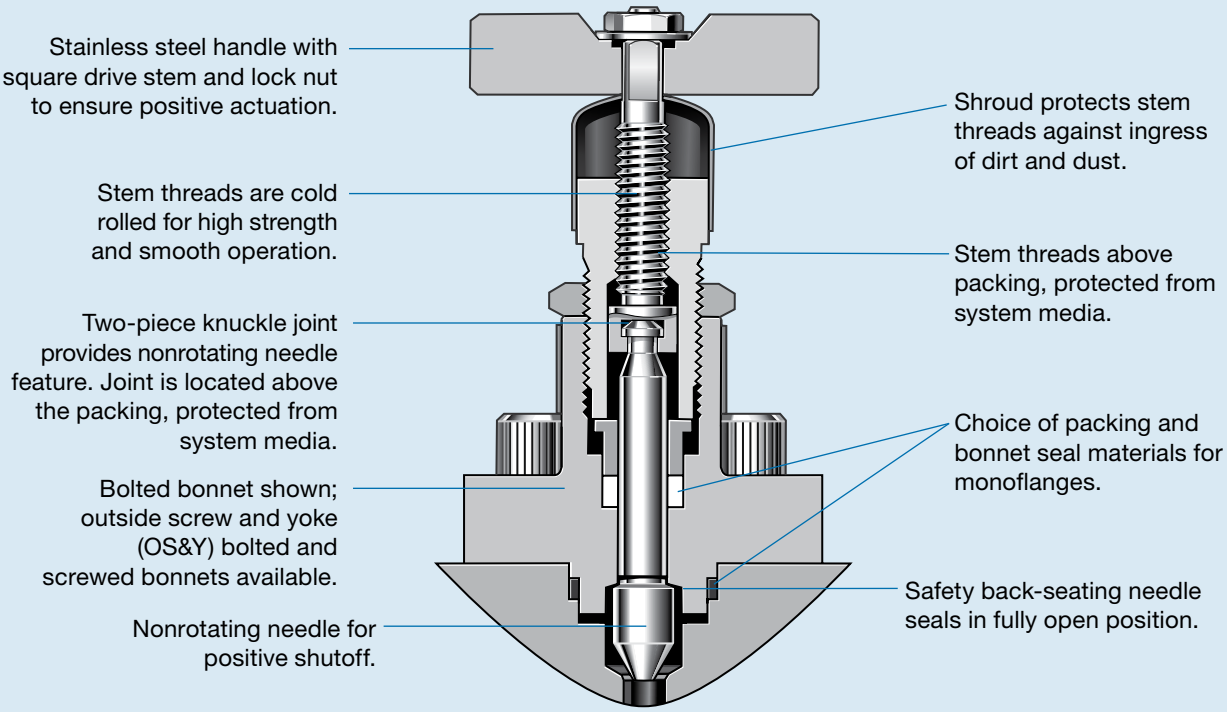
Ball Valve Module Advantages

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



Needle Valve Module Advantages

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



Flange Connections

Pressure-Temperature Ratings

Swagelok process instrumentation and piping products 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 taken from ASME B16.5-2003, Tables 2-2.2 and F2-2.2. Ratings are for F316/F316L stainless steel. For valve working temperature ratings, see page 6 for process interface valves and page 16 for process monoflanges.

Working Pressure by Class, psig

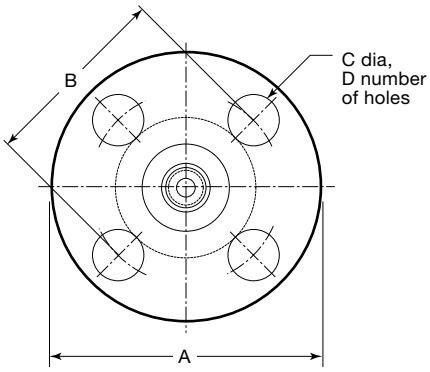
Temperature °F	ASME Class					
	150	300	600	900	1500	2500
	Working Pressure, psig					
–20 to 100	275	720	1440	2160	3600	6000
200	235	620	1240	1860	3095	5160
300	215	560	1120	1680	2795	4660
400	195	515	1025	1540	2570	4280
500	170	480	955	1435	2390	3980
600	140	450	900	1355	2255	3760
650	125	440	885	1325	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

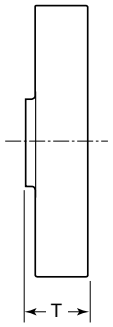
Working Pressure by Class, bar

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.





T dimension depends on series and configuration.

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

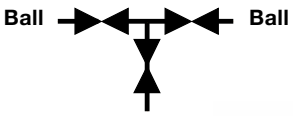
Nominal Flange Size in.	Dimensions in. (mm)			Mounting Holes
	A	B	C	D
1/2	4.75 (121)	3.25 (82.6)	0.88 (22.4)	4
3/4	5.13 (130)	3.50 (88.9)	0.88 (22.4)	4
1	5.88 (149)	4.00 (102)	1.00 (25.4)	4
1 1/2	7.00 (178)	4.88 (124)	1.13 (28.7)	4
2	8.50 (216)	6.50 (165)	1.00 (25.4)	8
3 (cl 900)	9.50 (241)	7.50 (190)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

Process Interface Valves

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.



VB04 Series with Female NPT Outlet

VB03 Series

VB04 Series with Flange Outlet

Features

- Process interface in one compact ball/needle/ball valve assembly
- Three-piece, bolted-body (VB03 series) or one-piece forged body (VB04 series) construction
- Bore sizes available:
  - 1, 1 1/2, and 2 in. (25, 38, and 50 mm) (VB03 series)
  - 3/8, 1/2, and 3/4 in. (9.5, 14, and 20 mm) (VB04 series)
- Flange connections in accordance with ASME B16.5 RF and RTJ; NPT connections in accordance with ASME B1.20.1
- Antiblowout valve stems and needles
- Nonrotating needle vent valve
- Hydrostatic test certificates complete with full chemical and physical material certifications available

Pressure-Temperature Ratings

Working Pressures

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 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

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 are selected in accordance with NACE MR0175/ ISO 15156. To order, contact your authorized Swagelok representative.

⚠ **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.**

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*
Balls, ball valve end connections, needle valve bonnet	*316 SS, 316L SS/ A479*		*S31803/ A479*
Ball valve stems	*316 SS/A479*①		*S31803/A479*
Ball valve seats	*PEEK*		
Ball valve lip seals	*PTFE outer jacket, Elgiloy® spring*		
Needle	*S17400 SS/A564 condition H1150D*		
Body seals, needle valve packing, needle valve bonnet seal	*Graphite*		
Body bolts (VB03 series)	B8M/A320	L7M/A320	PTFE-coated L7M/A320
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.*

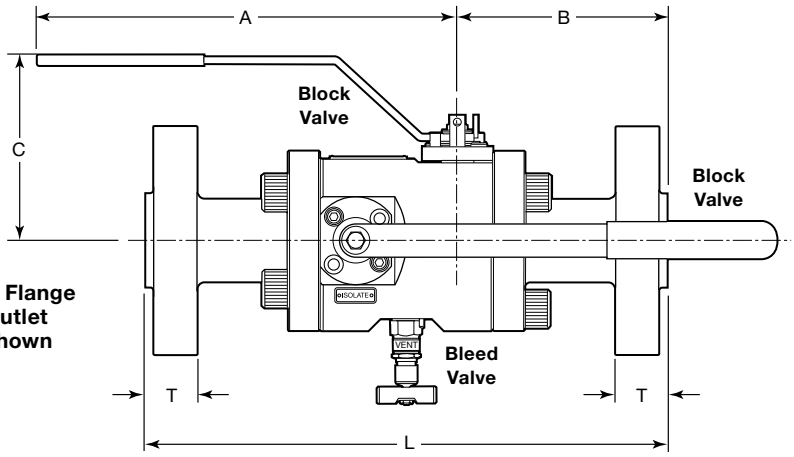
Swagelok

Process Interface Valves

Dimensions, VB03 Series

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 Shown

Full-Bore

Flange Size in.	Bore in. (mm)	ASME Class	Dimensions, in. (mm)							Weight lb (kg)
			A	B	C	RF Flanges		RTJ Flanges		
						L	T	L	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)

Reduced-Bore

Flange Size in.	Bore in. (mm)	ASME Class	Dimensions, in. (mm)							Weight lb (kg)
			A	B	C	RF Flanges		RTJ Flanges		
						L	T	L	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)

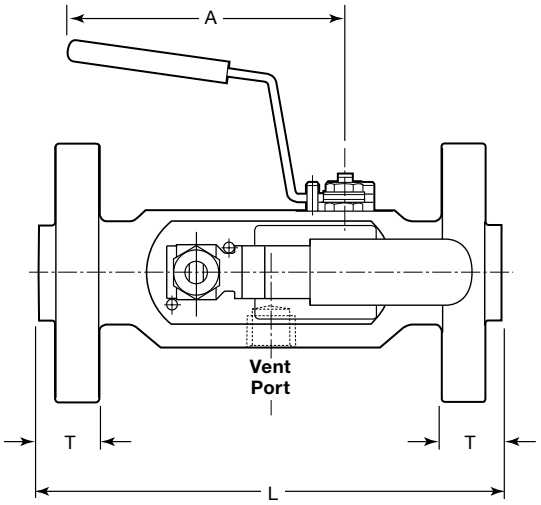
Process Interface Valves

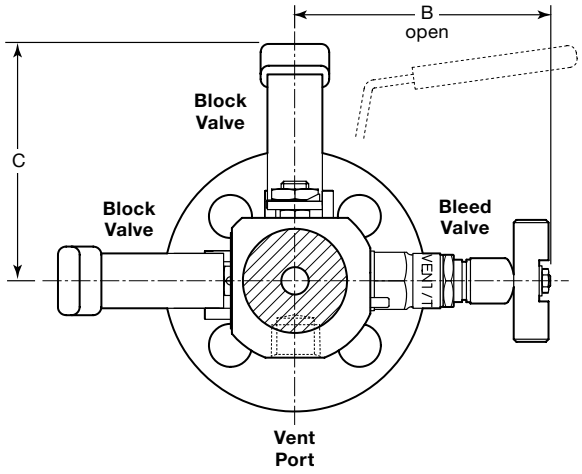
Dimensions, VB04 Series

Dimensions are for reference only and are subject to change.

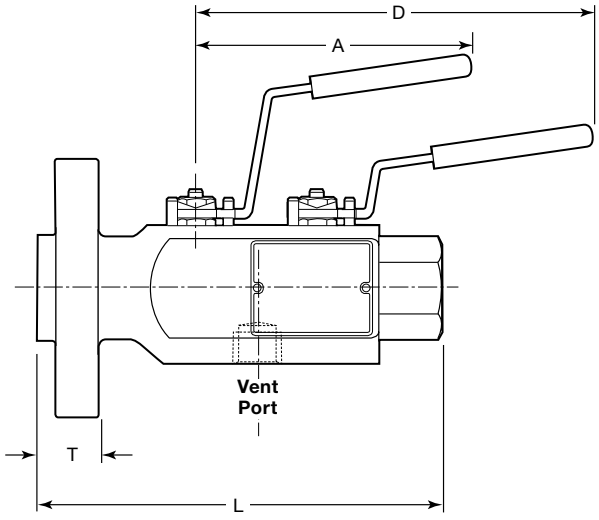
For additional flange dimensions, see page 5.

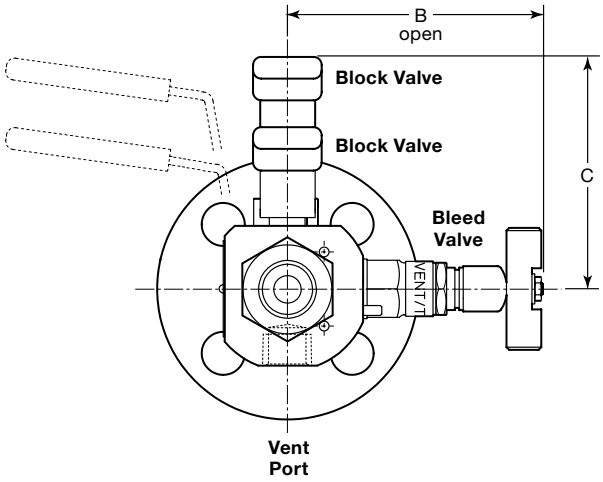
Raised-Face (RF) Flange
Process and Outlet Connections
All Bore Sizes





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





Process Interface Valves

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

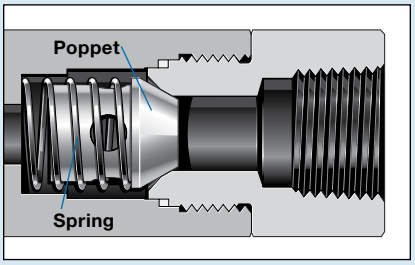
Flange Size in.	ASME Class	Dimensions, in. (mm)						Weight lb (kg)
		A	B	C	L	T		
						RF Flange	RTJ Flange	
1 1/2 (DN 40)	150	7.12 (181)	4.25 (108)	5.55 (141)	10.7 (273)	0.77 (19.5)	1.02 (25.9)	29.5 (13.4)
	300/600					1.21 (30.8)	1.21 (30.8)	35.1 (15.9)
	900/1500				11.7 (298)	1.58 (40.2)	1.58 (40.2)	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)

Process Interface Valves

Options

Integral Check Valves

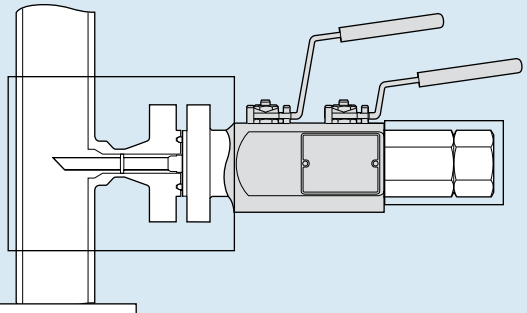
Integral check valves are available on both flange and NPT connections. The metal-seated check valve is ideal for chemical injection applications in oil and gas production.



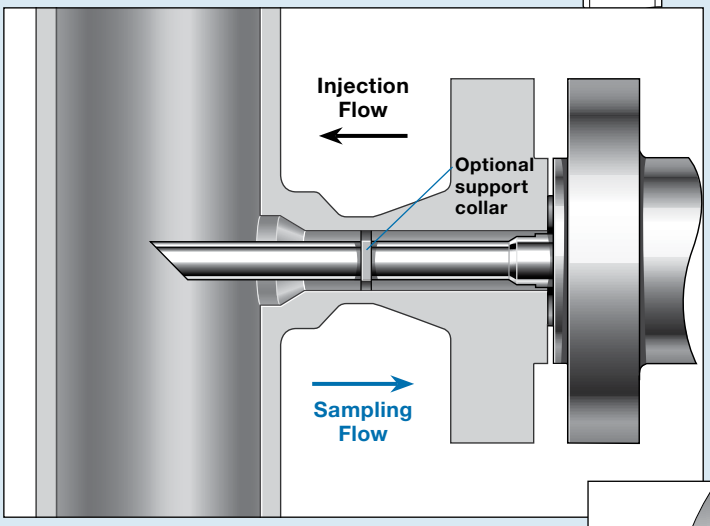
NPT Connection with Integral Check Valve

Chemical Injection and Process Sampling Options

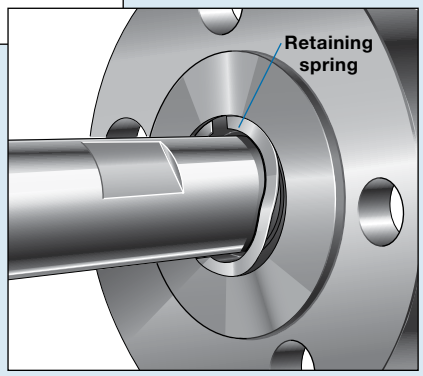
Select process interface valves may be ordered in optional injection or sampling valve configurations, providing double block and bleed protection for specialized applications.



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.

Process Interface Valves

Ordering Information, VB03 Series

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

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

A Configuration
- **01** = Full-bore ball/needle/ball (block/bleed/block)
- **02** = Reduced-bore ball/needle/ball (block/bleed/block)

B Materials
- **SA** = 316 stainless steel
- **CA** = Carbon steel
- **DA** = Duplex stainless steel

C Seats, Body Seals, Stem Seals
- D = PEEK, graphite, PTFE

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

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

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

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 21.

Process Interface Valves

Ordering Information, VB04 Series

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
VB04	**01**	**SA**	D	**1**	**D**	**1**	**C**	C	**A**	**S**	**450**

A Configuration

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

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

Integral check valve (ball/needle/ball/check [block/bleed/block/check])

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

B Materials

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

C Seats, Body Seals, Stem Seals

D = PEEK, graphite, PTFE

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
N = Female NPT (3/8 in. [9.5 mm] bore and 1/2 in. [DN 15] size only; select configuration **01** and process connection size **A**)
M = Male NPT (3/8 in. [9.5 mm] bore and 1/2 in. [DN 15] size only; select configuration **01** and process connection size **A**)

G Outlet Connection

C = 1/2 in. female NPT (3/8 and 1/2 in. [9.5 and 14 mm] bore only; select configuration **01** or **02**)
3 = Flange

H Bleed Connection

C = 1/2 in. female NPT

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 21.

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

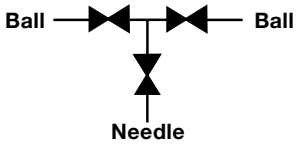
Insert probe length in millimeters, in whole numbers, up to a maximum of three characters.

Omit designator if no probe is required.

Metal-Seated Process Interface Valves

For Slurries and Liquids Containing Abrasive Particles

Swagelok VB0451 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 than standard process interface valves.



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 complete with full chemical and physical material certifications available.

Pressure-Temperature Ratings

Working Pressures

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

Testing

Every metal-seated 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.

Special Testing

Fugitive emission testing in accordance with Swagelok SCS-00014 is available on request. Contact your authorized Swagelok representative for more information.

Sour Gas Service

Metal-seated process interface valves for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156 and may affect temperature limits. For more information or to order, contact your authorized Swagelok representative.

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*.

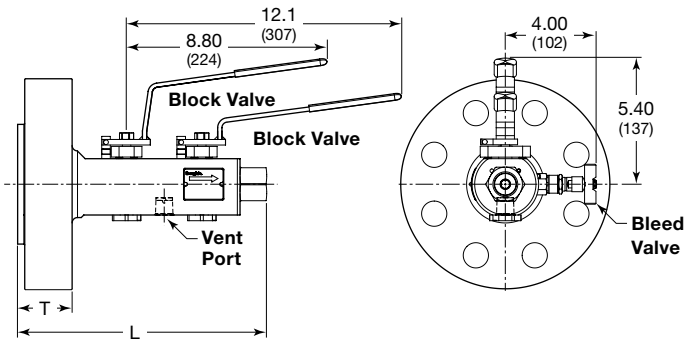
Metal-Seated Process Interface Valves

Dimensions

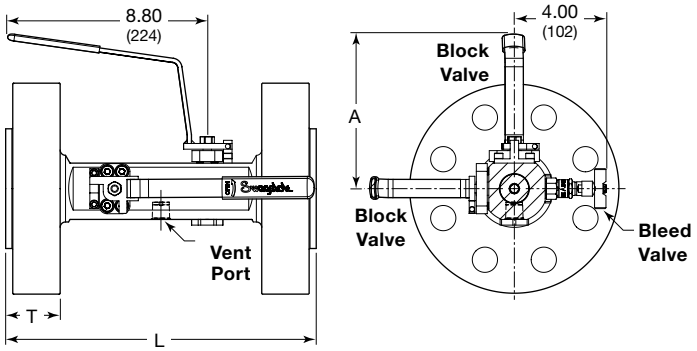
Dimensions are for reference only and are subject to change.

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.

Metal-Seated Process Interface Valves

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
VB0451	**SM**	**G**	**1**	**D**	**1**	**C**	C	**B**

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

B 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)

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

D 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)

E 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

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

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

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

① Antitamper key sold separately. See page 21.

Servicing of Metal-Seated Valves

VB0451 series metal-seated process interface valves do not require packing adjustment and cannot be field serviced. Any service must 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.**

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

Pressure-Temperature Ratings

Working Pressures

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	
	PTFE	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)

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 strenth. 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 PTFE*		
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*.

Testing

Every process monoflange 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.

Sour Gas Service

Process monoflanges for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156. To order, contact your authorized Swagelok representative.

⚠ **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

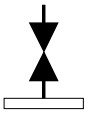
Process monoflanges comprise:

- 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.

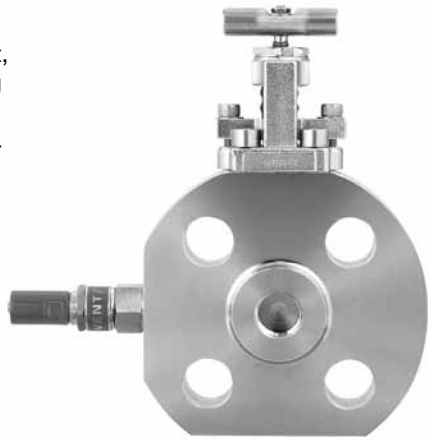
Block Valve

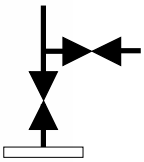
- OS&Y bolted-bonnet, bolted-bonnet, or screwed-bonnet primary isolating process valve



Block and Bleed Valve

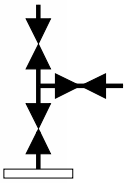
- OS&Y bolted-bonnet, bolted-bonnet, or screwed-bonnet primary isolating process valve
- Needle valve vent (bar or antitamper handle)





Double Block and Bleed Valve

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

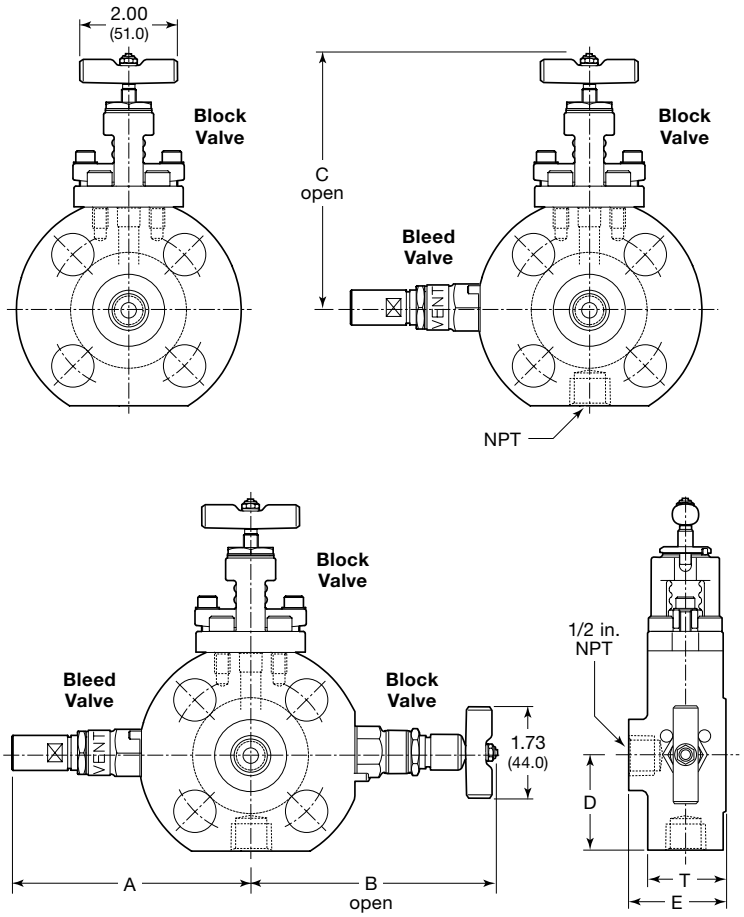


Process Monoflanges

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.



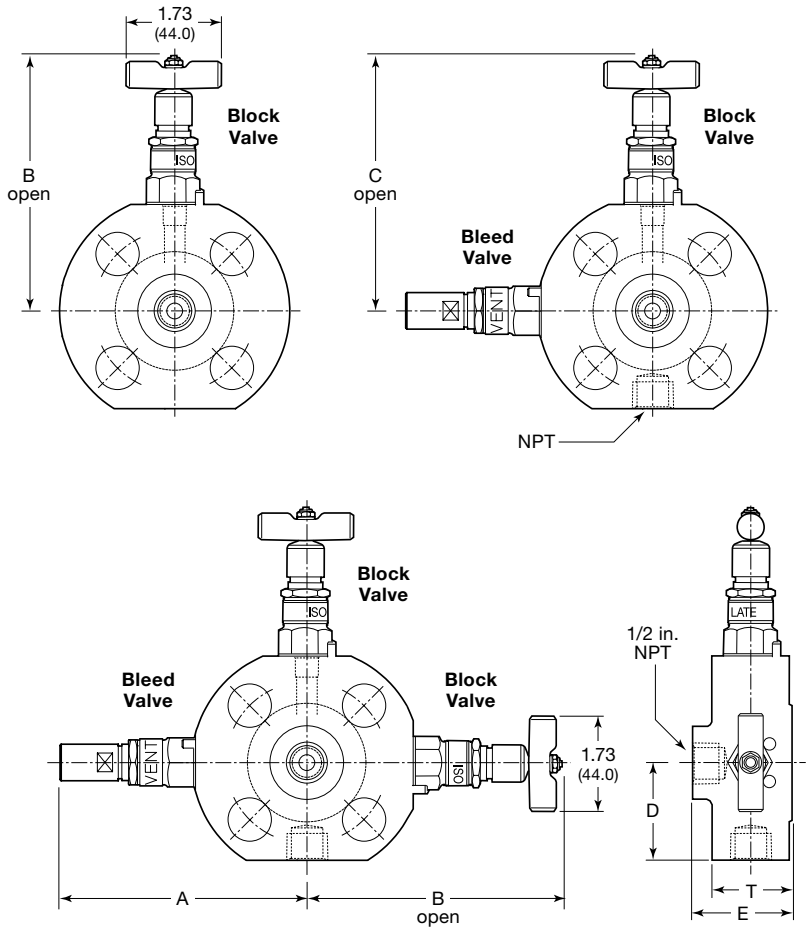
Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)
						RF Flange		RTJ Flange		
		A	B	C	D	E	T	E	T	
1/2 (DN 15)	150	3.94 (100)	4.33 (110)	4.88 (124)	1.69 (43.0)	2.03 (51.5)	1.63 (41.5)	—	—	4.4 (2.0)
	300/600	4.17 (106)	4.49 (114)		1.77 (45.0)			2.03 (51.5)	1.63 (41.5)	4.6 (2.1)
	900/1500	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.



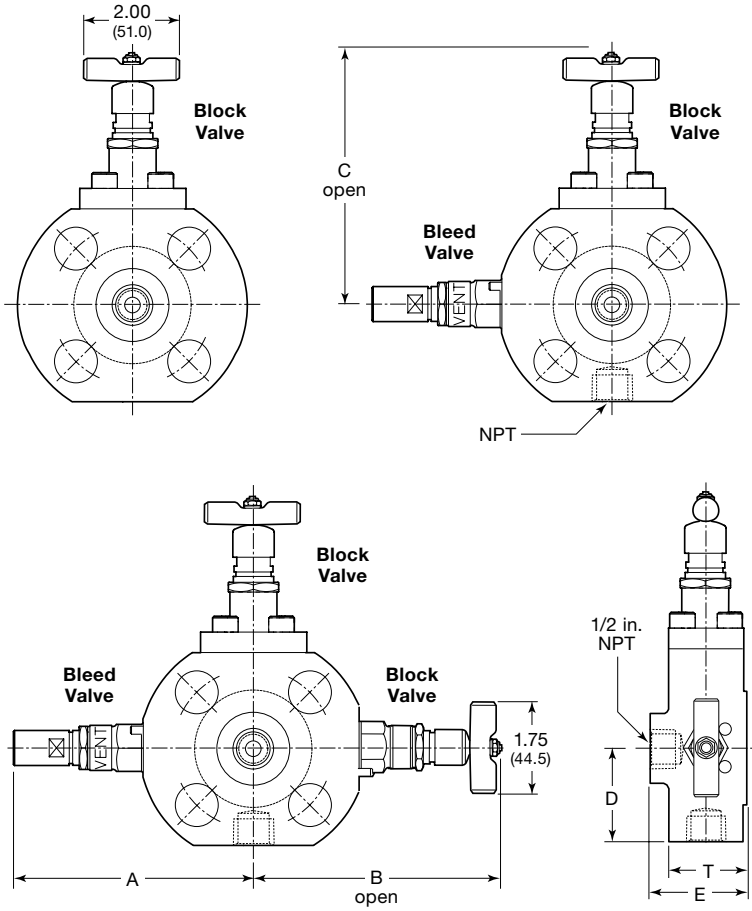
Flange Size in.	ASME Class	Dimensions, in. (mm)								Weight lb (kg)
		A	B	C	D	RF Flange E	RF Flange T	RTJ Flange E	RTJ Flange T	
1/2 (DN 15)	150	3.94 (100)	4.33 (110)	4.25 (108)	1.57 (40.0)	1.73 (44.0)	1.24 (31.5)	—	—	4.0 (1.8)
	300/600	4.17 (106)	4.49 (114)	4.49 (114)				1.79 (45.5)	1.30 (33.0)	4.2 (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)

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.



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)	4.72 (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)

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
MN	02	01	SA	A	1	A	1	C	A	A

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

C Materials
- **SA** = 316 SS body and bonnet
- **CA** = Carbon steel body, 316 SS bonnet
- **DA** = Duplex SS body and bonnet

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

F 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)

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)

H Outlet Connection
- **C** = 1/2 in. female NPT
- **2** = Monoflange wafer (thru holes)

J Bleed Connection
- **A** = 1/4 in. female NPT
- **C** = 1/2 in. female NPT
- **–** = None (required for configuration **01**)

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 below.

Accessories

Antitamper Key

- Fits all Swagelok antitamper handles.
- Order separately.

Ordering number: **S004468**

Flange Adapters

See the Swagelok *Flange Adapters* catalog, MS-02-200, for more information.

Pressure Gauges

See the Swagelok *Pressure Gauges, Industrial and Process—PGI Series* catalog, MS-02-170, for more 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.

Instrumentation Ball Valves

See the Swagelok *One-Piece Instrumentation Ball Valves—40G Series and 40 Series* catalog, MS-02-331, for more information.

Ball Valves

See the Swagelok *Ball Valves, General Purpose and Special Application—60 Series* catalog, MS-01-146, for more information.

High-Pressure Needle Valves

See the Swagelok *Forged-Body Needle Valves, 10 000 psig (689 bar)—F10 Series* catalog, MS-02-215, for more 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.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

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