

# Severe-Service Union-Bonnet Needle Valves



## N Series and HN Series

- Working pressures up to 10 000 psig (689 bar)
- Temperatures from  $-65$  to  $450^{\circ}\text{F}$  ( $-53$  to  $232^{\circ}\text{C}$ ) with PTFE packing; up to  $1200^{\circ}\text{F}$  ( $648^{\circ}\text{C}$ ) with Grafoil® packing
- 316 stainless steel; 316/316L dual certified stainless steel (SSD), alloys 400, 600, and C-276; and titanium materials
- Low Emissions certification per API 624 available

## Features

### Stem Designs

- Ball tip (NB)—3N, 6N, 12N, and 6HN
- Regulating (NR)—all models
- PCTFE soft-seat regulating (NKR)—all models
- PTFE soft-seat regulating (NTR)—3N, 6N, 3HN, and 6HN

### Orifice Sizes

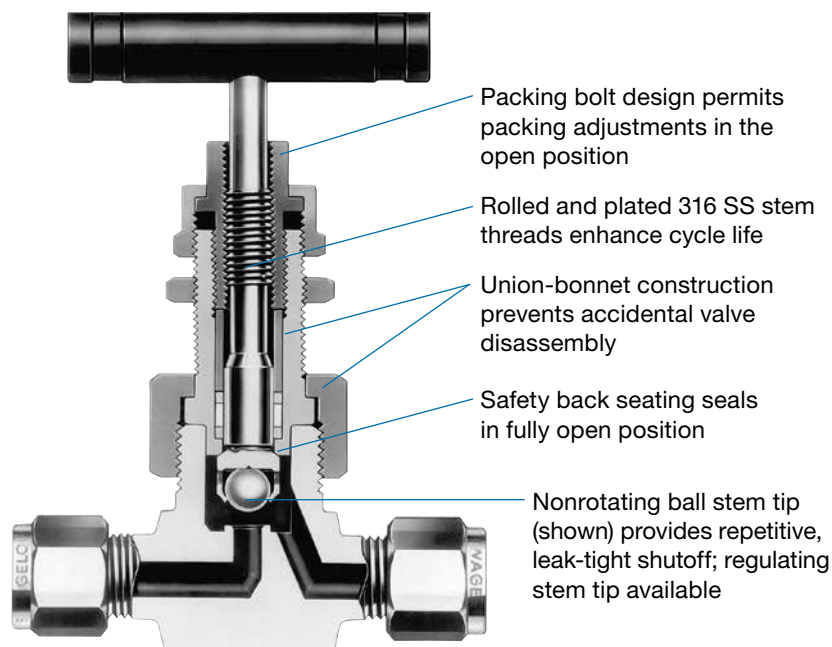
- 0.156 in. (4.0 mm)—3N and 3HN
- 0.250 in. (6.4 mm)—6N and 6HN
- 0.437 in. (11.1 mm)—12N

### Flow Coefficients ( $C_v$ )

- From 0.35 to 2.4

### Flow Patterns

- Straight—all models
- Angle—3N, 6N, and 12N



## Pressure-Temperature Ratings

Ratings are based on manual valves with optional Grafoil® packing. Ratings are limited to:

- 200°F (93°C) max with PCTFE stem tip (NKR).
- 250°F (121°C) max with UHMWPE stem packing.
- 450°F (232°C) max with PTFE stem tip (NTR) or stem packing.
- 600°F (315°C) max with PEEK stem packing and 316 SS, 316/316L SSD, alloy 600, alloy C-276, or titanium; 500°F (260°C) max with PEEK stem packing and alloy 400 (alloy 400 available in N series only).
- 1000°F (537°C) max with 316/316L SSD body, bonnet and stem components.

See **Stem Packing Materials**, page 10, for more information about packing materials.

## N Series

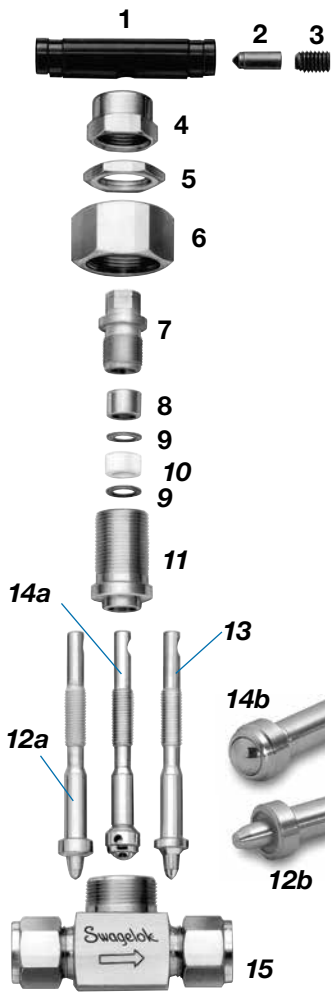
ASME Class	2500				N/A	
Material Group	2.2	N/A	3.4	3.5	N/A	N/A
Material Name	316 SS	316/316L SSD	Alloy 400	Alloy 600	Alloy C-276	Titanium
Temperature, °F (°C)	Working Pressure, psig (bar)					
-65 (-53) to 100 (37)	6000 (413)	6000 (413)	5000 (344)	6000 (413)	6000 (413)	3570 (245)
200 (93)	5160 (355)	5160 (355)	4400 (303)	5600 (385)	6000 (413)	3110 (214)
250 (121)	4910 (338)	4910 (338)	4260 (293)	5460 (376)	6000 (413)	2840 (195)
300 (148)	4660 (321)	4660 (321)	4120 (283)	5320 (366)	6000 (413)	2570 (177)
350 (176)	4470 (307)	4470 (307)	4050 (279)	5220 (359)	5975 (411)	2385 (164)
400 (204)	4280 (294)	4280 (294)	3980 (274)	5120 (352)	5880 (405)	2200 (151)
450 (232)	4130 (284)	4130 (284)	3970 (273)	5030 (346)	5710 (393)	2055 (141)
500 (260)	3980 (274)	3980 (274)	3960 (272)	4940 (340)	5540 (381)	1885 (129)
600 (315)	3760 (259)	3760 (259)	—	4780 (329)	5040 (347)	1625 (111)
650 (343)	3700 (254)	3700 (254)	—	4700 (323)	4905 (337)	—
700 (371)	3600 (248)	3600 (248)	—	4640 (319)	4730 (325)	—
750 (398)	3520 (242)	3520 (242)	—	4430 (305)	4430 (305)	—
800 (426)	3460 (238)	3460 (238)	—	4230 (291)	4230 (291)	—
850 (454)	3380 (232)	3380 (232)	—	4060 (279)	4060 (279)	—
900 (482)	3280 (225)	3280 (225)	—	3745 (258)	3745 (258)	—
950 (510)	3220 (221)	3220 (221)	—	2725 (187)	3220 (221)	—
1000 (537)	3030 (208)	3030 (208)	—	1800 (124)	3030 (208)	—
1050 (565)	3000 (206)	—	—	1155 (79.5)	3000 (206)	—
1100 (593)	2685 (184)	—	—	770 (53.0)	2685 (184)	—
1150 (621)	2285 (157)	—	—	565 (38.9)	2285 (157)	—
1200 (648)	1715 (118)	—	—	515 (35.4)	1545 (106)	—

## HN Series (High Pressure)

ASME Class	N/A	N/A
Material Group	N/A	N/A
Material Name	316 SS	316/316L SSD
Temperature °F (°C)	Working Pressure psig (bar)	
-65 (-53) to 100 (37)	10 000 (689)	10 000 (689)
200 (93)	9 290 (640)	9 290 (640)
250 (121)	8 840 (609)	8 840 (609)
300 (148)	8 390 (578)	8 390 (578)
350 (176)	8 045 (554)	8 045 (554)
400 (204)	7 705 (530)	7 705 (530)
450 (232)	7 435 (512)	7 435 (512)
500 (260)	7 165 (493)	7 165 (493)
600 (315)	6 770 (466)	6 770 (466)
650 (343)	6 660 (458)	6 660 (458)
700 (371)	6 480 (446)	6 480 (446)
750 (398)	6 335 (436)	6 335 (436)
800 (426)	6 230 (429)	6 230 (429)
850 (454)	6 085 (419)	6 085 (419)
900 (482)	5 905 (406)	5 905 (406)
950 (510)	5 795 (399)	5 795 (399)
1000 (537)	5 450 (375)	5 450 (375)
1050 (565)	5 400 (372)	—
1100 (593)	4 835 (333)	—
1150 (621)	4 115 (283)	—
1200 (648)	3 085 (212)	—

For more information about pressure ratings of valves with tube fitting end connections, refer to Swagelok® *Tubing Data* catalog, [MS-01-107](#). Pressure ratings of valves with VCR® or VCO® fitting end connections are based on the ratings of the mating fitting; refer to Swagelok *VCR Metal Gasket Face Seal Fittings* catalog, [MS-01-24](#), and Swagelok *VCO O-Ring Face Seal Fittings* catalog, [MS-01-28](#), (VCR and VCO fittings available in N series only).

## Materials of Construction



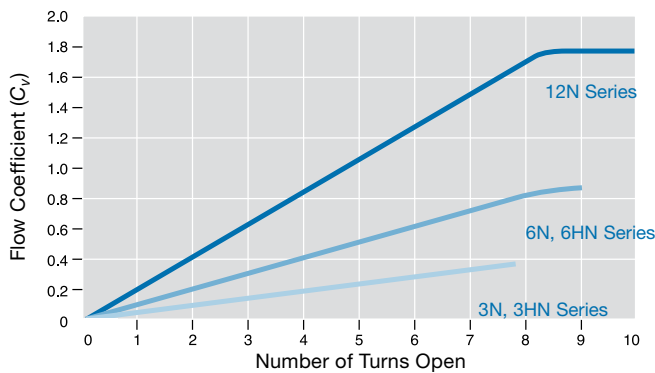
Component	Valve Body Material					
	316 SS	316/316L SSD	Alloy 400	Alloy 600	Alloy C-276	Titanium
	<b>Material Grade/ASTM Specification</b>					
1 Handle	Anodized aluminum 2024T4/B211					
2 Handle pin	Nickel cadmium-plated steel/A108					
3 Set screw	Nickel cadmium-plated steel					
4 Lock nut	316 SS/A276 or A479					
5 Panel nut	316 SS/B783					
6 Union nut	316 SS/A276					
7 Packing bolt						
8 Gland	316 SS/A276	316 SS/A479 or B895	Alloy 400/B164	Silver-plated alloy 600/B166	Alloy C-276/B574	Ti grade 4/B348
9 Packing supports	Glass-filled PTFE					
10 Packing	PTFE/D1710					
11 Bonnet	316 SS/A479	316/316L SSD/A479	Alloy 400/B164	Alloy 600/B166	Alloy C-276/B574	Ti grade 4/B348
12a NTR or NKR soft-seat regulating stem shank	Silver-plated 316 SS/A276	Silver-plated 316/316L SSD/A276	Alloy 400/B164	Silver-plated alloy 600/B166	Alloy C-276/B574	Ti grade 4/B348
12b Soft-seat tip	NTR stem—PTFE/D1710; NKR stem—PCTFE					
13 NR regulating stem	Silver-plated 316 SS/A276	Silver-plated 316/316L SSD/A276	Alloy 400/B164	Silver-plated alloy 600/B166	Alloy C-276/B574	Ti grade 4/B348
14a NB ball tip stem shank	Material must be selected; see <b>Ball Stem Tip Materials</b> , page 6.					
14b NB ball stem tip						
15 Body	316 SS/A479	316/316L SSD/A479	Alloy 400/B164, B127, or B564	Alloy 600/B166 or B564	Alloy C-276/B564	Ti grade 4/B348 or Ti grade F4/B381
Lubricant	Nickel antiseize with hydrocarbon carrier (all valves); hydrocarbon-based (NB ball tip)					

Wetted components listed in *italics*.

## Flow Data at 100°F (37°C)

### NR, NTR, and NKR Regulating Stems

#### Flow Coefficient at Turns Open



### NB Ball Stem Tip

The NB stem is designed to be used in a fully open or fully closed position. See **Dimensions** for flow coefficients.

## Testing

Every N series and HN series needle valve is factory tested with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm<sup>3</sup>/min. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

## Cleaning and Packaging

All N series and HN series needle valves are cleaned and packaged in accordance with Swagelok *Standard Cleaning and Packaging* (SC-10) catalog, [MS-06-62](#). Cleaning and packaging in accordance with Swagelok *Special Cleaning and Packaging* (SC-11) catalog, [MS-06-63](#), to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C are available as an option.

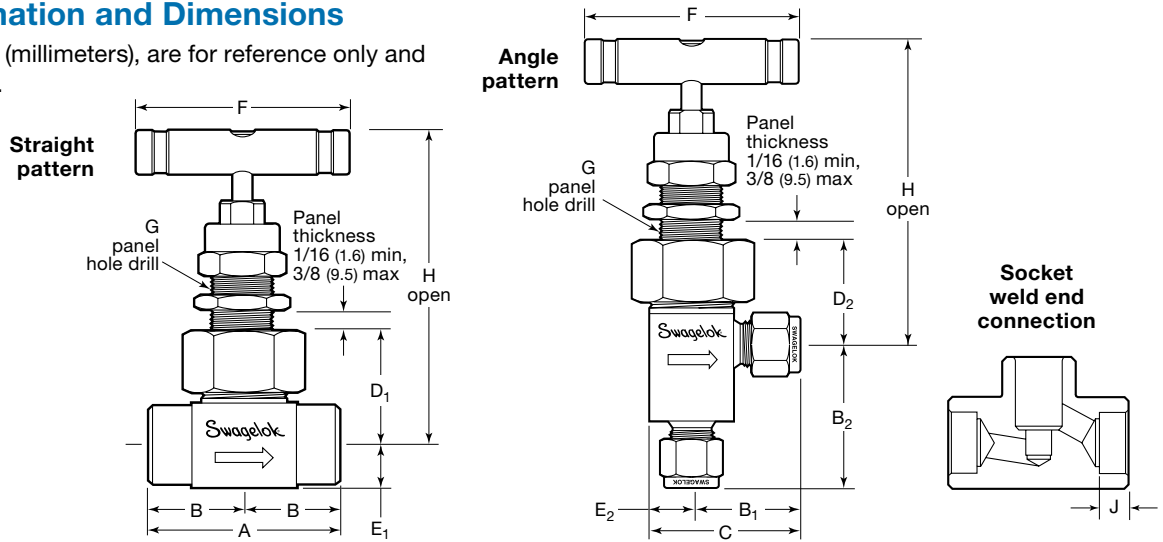
## Low Fugitive Emissions

The American Petroleum Institute's API 624 tests for fugitive emissions to atmosphere for 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 valves with PTFE packing. For more information, contact your authorized Swagelok sales and service representative.

## Ordering Information and Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

### N Series



End Connections		C <sub>v</sub>	Ordering Number	Dimensions, in. (mm)												
Inlet/Outlet	Size			A	B	B <sub>1</sub>	B <sub>2</sub>	C	D <sub>1</sub>	D <sub>2</sub>	E <sub>1</sub>	E <sub>2</sub>	F	G	H Straight	H Angle
<b>3N Series: 0.156 in. (4.0 mm) Orifice</b>																
Female NPT	1/8 in.	0.35	SS-3NBF2	2.00 (50.8)	1.00 (25.4)	0.89 (22.6)	1.00 (25.4)	1.27 (32.3)	1.28 (32.5)	0.38 (9.7)	0.38 (9.7)	1.75 (44.4)	19/32 (15.1)	3.05 (77.5)	3.23 (82.0)	—
	1/4 in.		SS-3NBF4	2.06 (52.3)	1.03 (26.2)	1.09 (27.7)				0.39 (9.9)					3.05 (77.5)	
Male NPT	1/4 in.		SS-3NBM4	2.00 (50.8)	1.00 (25.4)	1.00 (25.4)	1.38 (35.1)	1.09 (27.7)	0.38 (9.7)	0.38 (9.7)	3.05 (77.5)					
Male/female NPT	1/4 in.		SS-3NBM4-F4	2.03 (51.6)	1.03 (26.2)	0.89 (22.6)	1.27 (32.3)	1.28 (32.5)	0.39 (9.9)	0.39 (9.9)	3.23 (82.0)					
Swagelok tube fittings	1/4 in.		SS-3NBS4	2.40 (61.0)	1.20 (30.5)	1.16 (29.5)	1.48 (37.6)	1.54 (39.1)	1.09 (27.7)	1.09 (27.7)	0.38 (9.7)	0.38 (9.7)	1.75 (44.4)	19/32 (15.1)	3.05 (77.5)	3.05 (77.5)
	6 mm		SS-3NBS6MM			—	—	—	—	—						—
	8 mm		SS-3NBS8MM			—	—	—	—	—						—
Tube socket welds	1/4 in.		SS-3NBSW4T	1.82 (46.2)	0.91 (23.1)	0.88 (22.4)	1.19 (30.2)	1.25 (31.8)	1.09 (27.7)	0.38 (9.7)	0.38 (9.7)	3.05 (77.5)	0.28 (7.1)			
Male VCO fittings	1/4 in.		SS-3NBVCO4	2.06 (52.3)	1.03 (26.2)	—	—	—	—	—	—	—	—	—	—	—
Male VCR fittings	1/4 in.		SS-3NBVCR4			—	—	—	—	—	—	—	—	—	—	—
<b>6N Series: 0.250 in. (6.4 mm) Orifice</b>																
Female NPT	1/4 in.	0.86	SS-6NBF4	2.25 (57.2)	1.12 (28.4)	1.00 (25.4)	1.12 (28.4)	1.50 (38.1)	1.34 (34.0)	1.47 (37.3)	0.50 (12.7)	2.50 (63.5)	25/32 (19.8)	3.70 (94.0)	3.82 (97.0)	—
	3/8 in.		SS-6NBF6	2.83 (71.9)	1.41 (35.8)	1.29 (32.8)	1.66 (42.2)	1.79 (45.5)		1.22 (31.0)					3.57 (90.7)	
Swagelok tube fittings	3/8 in.		SS-6NBS6	3.04 (77.2)	1.52 (38.6)	1.40 (35.6)	1.65 (41.9)	1.90 (48.3)	1.34 (34.0)	1.34 (34.0)	0.50 (12.7)	0.50 (12.7)	2.50 (63.5)	25/32 (19.8)	3.70 (94.0)	3.70 (94.0)
	1/2 in.		SS-6NBS8			1.30 (33.0)	1.55 (39.4)	1.80 (45.7)	1.34 (34.0)	1.34 (34.0)	3.70 (94.0)					
	10 mm		SS-6NBS10MM			1.40 (35.6)	1.65 (41.9)	1.90 (48.3)	1.34 (34.0)	1.34 (34.0)	3.70 (94.0)					
	12 mm		SS-6NBS12MM			1.40 (35.6)	1.65 (41.9)	1.90 (48.3)	1.34 (34.0)	1.34 (34.0)	3.70 (94.0)					
Tube socket welds	3/8 in.		SS-6NBSW6T	2.25 (57.2)	1.12 (28.4)	—	1.25 (31.8)	—	1.40 (35.6)	1.40 (35.6)	0.50 (12.7)	0.50 (12.7)	3.70 (94.0)	0.31 (7.9)		
	1/2 in.		SS-6NBSW8T			1.00 (25.4)	1.00 (25.4)	1.50 (38.1)	1.40 (35.6)	1.40 (35.6)	3.76 (95.5)					
Pipe socket welds	1/4 in.		SS-6NBSW4P	—	—	—	1.12 (28.4)	—	1.47 (37.3)	1.47 (37.3)	0.50 (12.7)	0.50 (12.7)	3.82 (97.0)	0.38 (9.7)		
Male VCO fittings	1/2 in.		SS-6NBVCO8	—	—	—	—	—	—	—	—	—	—	—	—	
Male VCR fittings	1/2 in.	SS-6NBVCR8	3.12 (79.2)	1.56 (39.6)	—	—	—	1.53 (38.9)	—	0.62 (15.7)	—	—	—	3.89 (98.8)	—	

Dimensions shown with Swagelok tube fitting nuts finger-tight.

## Ordering Information and Dimensions

### N Series

Select an ordering number.

To order other valve body materials, replace **SS** in the ordering number with a material designator.

Example: **M-3NBF2**

Material	Designator
Alloy 400	M
Alloy 600	INC
Alloy C-276	HC
Titanium	TI
316/316L	SSD

### Ball Stem Tip Materials

Ordering numbers specify a cobalt-based alloy ball stem tip. N series valves of 316 SS are standard with this stem tip and require no designator.

To specify ball stem tip material for valves of other materials, add a designator to the ordering number.

Example: **INC-6NBF4-HC**

### Angle-Pattern Valves

Ordering numbers that list C dimensions are available in angle patterns. To order, add **-A** to the ordering number.

Example: **SS-12NBF8-A**

Ball Stem Tip Material/ ASTM Specification	Designator
Cobalt-based alloy	-STE
440C SS/A276	-440C
Alloy 400/B127 or B164	-M
Alloy C-276/B574 or B575	-HC
Titanium/B348 or B265	-TI

### Options and Accessories

See page 10 for information about optional stem packings, stem designs, handles, and sour gas valves.

End Connections		C <sub>v</sub>	Ordering Number	Dimensions, in. (mm)																				
Inlet/Outlet	Size			A	B	B <sub>1</sub>	B <sub>2</sub>	C	D <sub>1</sub>	D <sub>2</sub>	E <sub>1</sub>	E <sub>2</sub>	F	G	H Straight	H Angle	J							
<b>12N Series: 0.437 in. (11.1 mm) Orifice</b>																								
Female NPT	1/2 in.	2.4	SS-12NBF8	3.12 (79.2)	1.56 (39.6)	1.31 (33.3)	1.56 (39.6)	2.00 (50.8)	1.82 (46.2)	2.00 (50.8)	0.62 (15.7)	0.69 (17.5)	3.50 (88.9)	1 1/32 (26.2)	4.78 (121)	4.97 (126)	—							
	3/4 in.		SS-12NBF12	3.25 (82.6)	1.62 (41.1)	—	—	—	1.91 (48.5)	—	0.78 (19.8)	—			4.88 (124)	—								
	1 in.		SS-12NBF16	3.62 (91.9)	1.81 (46.0)	—	—	—	2.13 (54.1)	—	1.00 (25.4)	—			5.10 (129)	—								
Male/ female NPT	1/2 in.	1.9	SS-12NBM8-F8	3.12 (79.2)	1.56 (39.6)	1.31 (33.3)	1.56 (39.6)	2.00 (50.8)	1.82 (46.2)	2.00 (50.8)	0.62 (15.7)	0.69 (17.5)			3.50 (88.9)	1 1/32 (26.2)		4.78 (121)	4.97 (126)	—				
	3/4 in.		SS-12NBM12-F12	3.25 (82.6)	1.62 (41.1)	—	—	—	1.91 (48.5)	—	0.78 (19.8)	—						4.88 (124)	—					
	1 in.		SS-12NBM16-F16	3.62 (91.9)	1.81 (46.0)	—	—	—	2.13 (54.1)	—	1.00 (25.4)	—						5.10 (129)	—					
Swagelok tube fittings	1/2 in.	2.1	SS-12NBS8	3.92 (99.6)	1.96 (49.8)	1.68 (42.7)	2.08 (52.8)	2.37 (60.2)	1.82 (46.2)	1.88 (47.8)	0.62 (15.7)	0.69 (17.5)						3.50 (88.9)	1 1/32 (26.2)		4.78 (121)	4.85 (123)	—	
	3/4 in.		SS-12NBS12	4.09 (104)	2.04 (51.8)	—	—	—	1.88 (47.8)	—	0.69 (17.5)	—												
	1 in.	SS-12NBS16	3.92 (99.6)	1.96 (49.8)	1.68 (42.7)	2.08 (52.8)	2.37 (60.2)	1.82 (46.2)	1.88 (47.8)	0.62 (15.7)	0.69 (17.5)													
12 mm	SS-12NBS12MM	3.92 (99.6)	1.96 (49.8)	1.68 (42.7)	2.08 (52.8)	2.37 (60.2)	1.82 (46.2)	1.88 (47.8)	0.62 (15.7)	0.69 (17.5)														
Tube socket welds	1/2 in.	2.2	SS-12NBSW8T	—	—	1.31 (33.3)	1.69 (42.9)	2.00 (50.8)	1.82 (46.2)	—	0.62 (15.7)	—	3.50 (88.9)	1 1/32 (26.2)			4.78 (121)				4.85 (123)	0.38 (9.7)		
	3/4 in.		SS-12NBSW12T	—	—	—	—	—	—	—	—	0.44 (11.2)												
Pipe socket welds	1/2 in.	2.4	SS-12NBSW8P	3.12 (79.2)	1.56 (39.6)	1.31 (33.3)	1.56 (39.6)	2.00 (50.8)	1.88 (47.8)	2.00 (50.8)	0.69 (17.5)	0.69 (17.5)										3.50 (88.9)		1 1/32 (26.2)
Male VCO fittings	3/4 in.	2.2	SS-12NBVCO12	—	—	—	—	—	1.82 (46.2)	—	0.62 (15.7)	—			4.78 (121)	—				—				
Male VCR fittings	1/2 in.	1.9	SS-12NBVCR8	—	—	—	—	—	—	—	—	—												

## Ordering Information and Dimensions

### HN Series (High Pressure)

Select an ordering number.

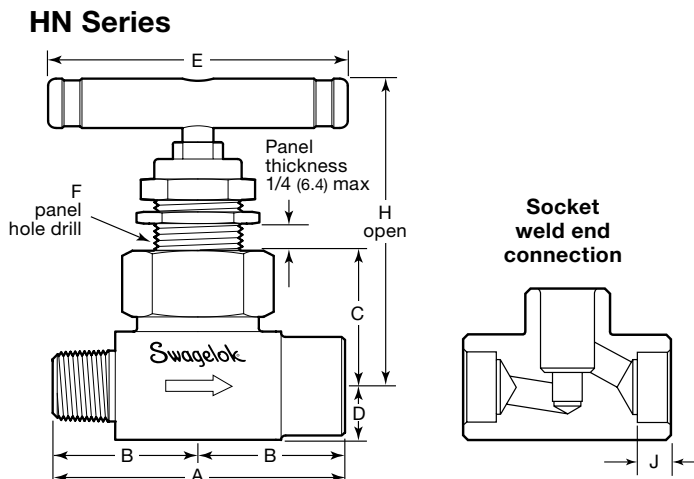
Ordering numbers specify a regulating stem tip. Cobalt-based alloy ball stem tips are available for 6HN series valves. To order, replace **NR** in the ordering number with **NB**.

Example: 6HNB4

### Options and Accessories

See page 10 for information about optional stem designs, stem packings, and sour gas valves.

Dimensions, in inches (millimeters), are for reference only and are subject to change.



End Connections		Ordering Number	Dimensions, in. (mm)							
Inlet/Outlet	Size		A	B	C	D	E	F	H	J
<b>3HN Series: 0.156 in. (4.0 mm) Orifice; 0.35 C<sub>v</sub></b>										
Female NPT	1/8 in.	SS-3HNRF2	2.25 (57.2)	1.13 (28.7)	1.34 (34.0)	0.50 (12.7)	2.50 (63.5)	0.81 (20.6)	3.43 (87.1)	—
	1/4 in.	SS-3HNRF4								
Male NPT	1/4 in.	SS-3HNRM4								
Male/ female NPT	1/4 in.	SS-3HNRM4-F4								
Swagelok tube fittings	1/4 in.	SS-3HNRS4								
Tube socket welds	1/4 in.	SS-3HNRSW4T	2.25 (57.2)	1.13 (28.7)						0.28 (7.1)
<b>6HN Series: 0.250 in. (6.4 mm) Orifice; 0.86 C<sub>v</sub></b>										
Female NPT	1/4 in.	SS-6HNRF4	3.13 (79.5)	1.56 (39.6)	1.81 (46.0)	0.63 (16.0)	3.50 (88.9)	1.06 (26.9)	4.27 (108)	—
	1/2 in.	SS-6HNRF8	3.25 (82.6)	1.63 (41.4)	1.90 (48.2)	0.78 (19.8)			4.36 (111)	
Male NPT	1/2 in.	SS-6HNRM8	3.13 (79.5)	1.56 (39.6)	1.81 (46.0)	0.63 (16.0)			4.27 (108)	
Male/ female NPT	1/2 in.	SS-6HNRM8-F8	3.25 (82.6)	1.63 (41.4)	1.90 (48.2)	0.78 (19.8)			4.36 (111)	

Dimensions shown with Swagelok tube fitting nuts finger-tight.

## Pneumatic Actuators

Swagelok 3N and 6N series valves can be equipped with pneumatic actuators in normally closed, normally open, and double-acting models.

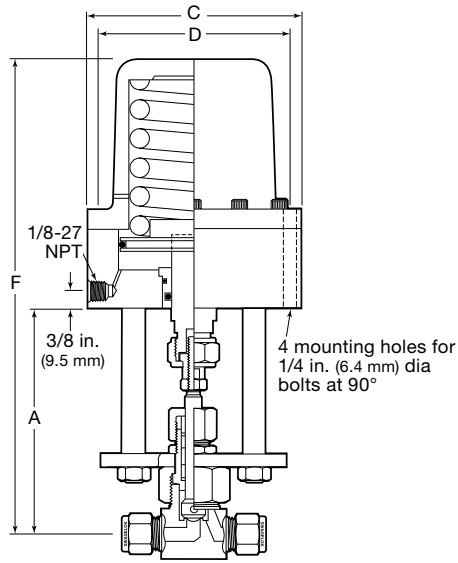
### Actuator Technical Data

#### Pressure-Temperature Ratings

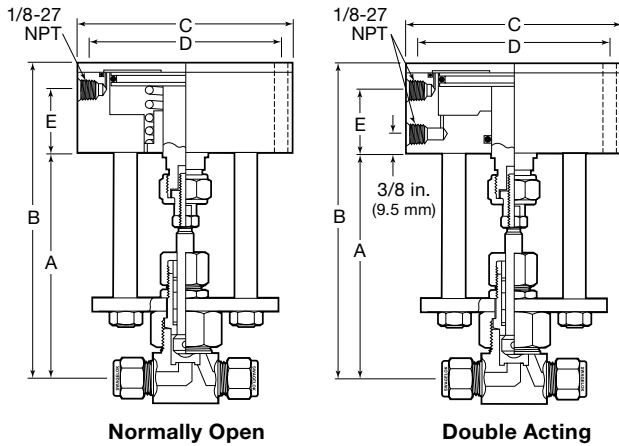
Normally closed:  
 150 psig at -20 to 300°F  
 (10.3 bar at -28 to 148°C)

Normally open and double acting:  
 150 psig at -20 to 400°F  
 (10.3 bar at -28 to 204°C)

#### Dimensions



Normally Closed



Normally Open

Double Acting

Valve Series	Dimensions, in. (mm)					
	A	B	C	D	E	F
3N	4.22 (107)	5.91 (150)	3.75 (95.3)	3.25 (82.6)	1.12 (28.4)	8.47 (215)
6N	4.47 (114)	6.22 (158)	4.25 (108)	3.81 (96.8)	1.19 (30.2)	9.41 (239)

Dimensions are for reference only and are subject to change.

## Pneumatic Actuator Performance

Minimum actuator pressures and maximum system pressures shown in the graphs below are based on factory adjustment of packing and stems lubricated with a silicone-based lubricant. Packing nut adjustment may affect actuator performance. If the load is too low, the packing may leak. **If the load is too high, the actuator may stall and the valve will not cycle.**

### Normally Closed Actuators

Adjustment of the actuator stem drive nut affects actuator spring force, which in turn affects:

- the maximum system pressure that can be shut off by the valve
- the minimum actuator pressure required to open the valve.

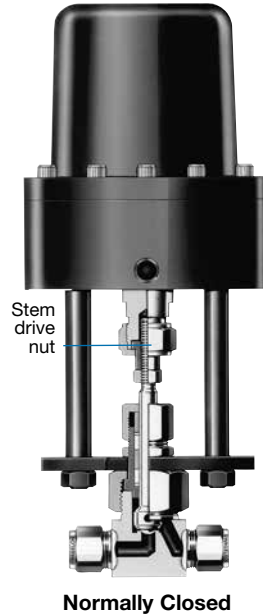
Figures 1 and 2 show the minimum actuator pressure required to open a normally closed actuator at system pressure.

Maximum system pressure for a 3N valve with normally closed actuator:

- NR, NTR, or NKR stem—3000 psig (206 bar).
- NB stem—4400 psig (303 bar).

Maximum system pressure for a 6N valve with normally closed actuator:

- NR, NTR, or NKR stem—3600 psig (248 bar).
- NB stem—4600 psig (316 bar).



Normally Closed

Fig. 1—3N Series with Normally Closed Actuator

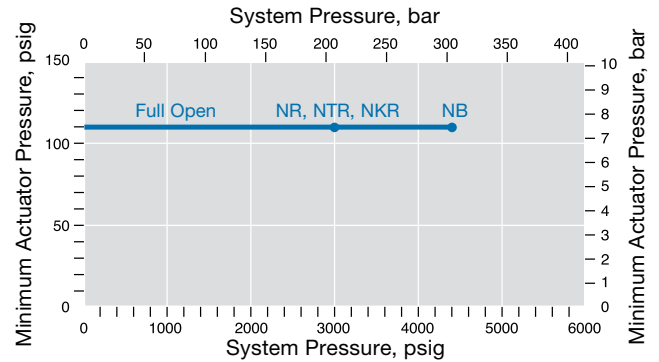
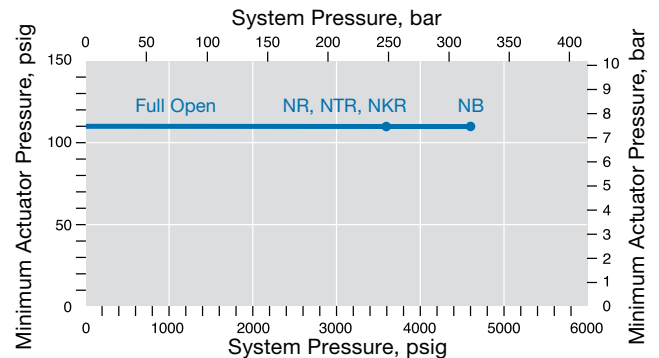


Fig. 2—6N Series with Normally Closed Actuator





## Pneumatic Actuators

### Ordering Information

To order a 3N or 6N series valve equipped with a pneumatic actuator, add a designator to the valve ordering number.

Example: SS-3NBS4-95C

Valve Series	Actuator Designator		
	Normally Closed	Normally Open	Double Acting
3N	-95C	-95O	-95D
6N	-96C	-96O	-96D

### Normally Open Actuators

The amount the stem orifice opens beyond the cracked-open position depends on system pressure, flow characteristics, and valve packing nut adjustment.

Figures 3 and 4 show the minimum actuator pressure required to close a normally open actuator at system pressure.

Minimum system pressure required to assist the spring in opening the valve:

- 3N series with normally open actuator—1000 psig (69.0 bar).
- 6N series with normally open actuator—500 psig (34.5 bar).



Normally Open



Double Acting

### Double-Acting Actuators

Figures 5 and 6 show the minimum actuator pressure required to open or close a 3N or 6N series valve with a double-acting actuator at system pressure.

Fig. 3—3N Series with Normally Open Actuator

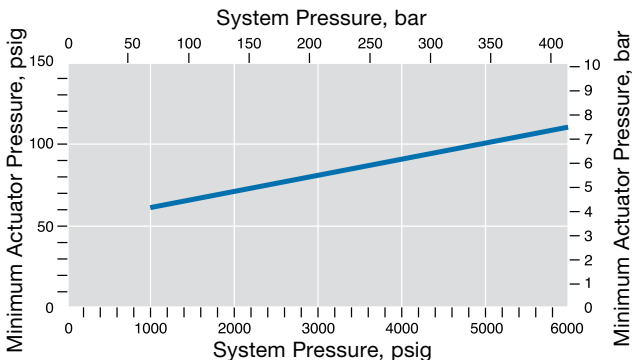


Fig. 5—3N Series with Double-Acting Actuator

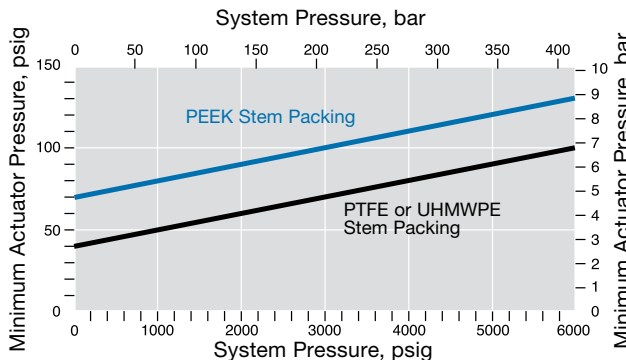


Fig. 4—6N Series with Normally Open Actuator

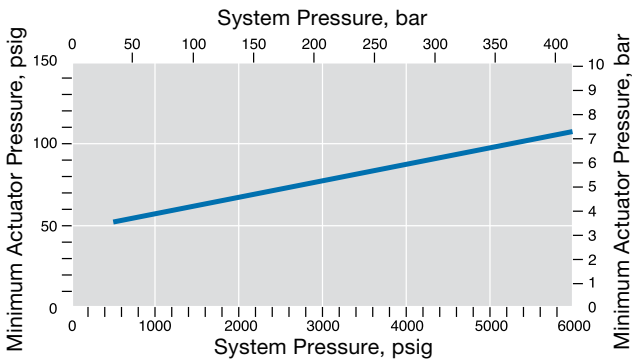
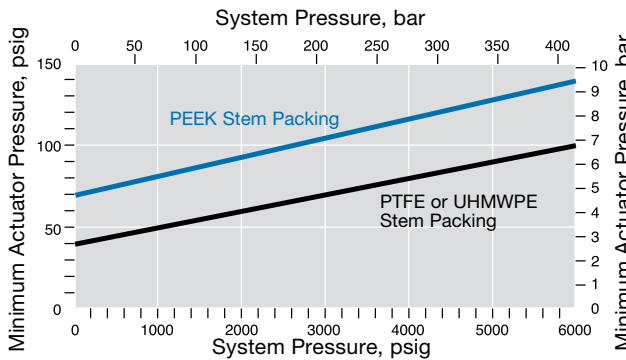


Fig. 6—6N Series with Double-Acting Actuator



## Options and Accessories

### N Series and HN Series

#### Stem Packing Materials

PTFE packing is standard. To order an optional stem packing material, add a stem packing material designator to the valve ordering number. See page 2 for pressure-temperature ratings of valves with optional stem packing materials.

Stem Packing Material	Designator
UHMWPE	-P
PEEK	-PK
Grafoil	-G

**UHMWPE (ultrahigh-molecular weight polyethylene)** is intended for service where fluorocarbons are not acceptable. UHMWPE packing is lubricated with nickel antiseize with hydrocarbon carrier; it does not require packing supports.

**PEEK (polyetheretherketone)** packing material is a 2-piece chevron design including PEEK packing supports and molybdenum disulfide, fluorinated tungsten disulfide-based lubricant; stem packing replacement kits also contain nickel antiseize with hydrocarbon carrier. PEEK packing is not available in normally open or normally closed pneumatically actuated N series valves.

**Grafoil** is a high-temperature packing material that does not require packing supports. Factory assemblies contain fluorinated tungsten disulfide-based lubricant and nickel antiseize with hydrocarbon carrier; stem packing replacement kits contain only nickel antiseize with hydrocarbon carrier. Grafoil is not available in pneumatically actuated N series valves or 12N series valves with colored phenolic knobs.

Examples: SS-3HNRF4-**P**  
 SS-6NBS8-**PK**  
 SS-12NBF8-**G**

#### Stem Packing Kits

PTFE, UHMWPE, PEEK, and Grafoil stem packing kits are available. Kits contain stem packing(s), lubricant(s), and instructions.

Valve Series	Seal Material and Kit Ordering Number			
	PTFE	UHMWPE	Grafoil	PEEK
3N, 3HN	T-9K-3N	PE-9K-3N	G-9K-3N	PK-9K-3N
6N, 6HN	T-9K-6N	PE-9K-6N	G-9K-6N	PK-9K-6N
12N	T-9K-12N	PE-9K-12N	G-9K-12N	PK-9K-12N
Lubricant	Nickel antiseize with hydrocarbon carrier			Nickel antiseize with hydrocarbon carrier and fluorinated tungsten disulfide-based; molybdenum disulfide-based coating

#### Stem Designs

N series valve ordering numbers specify NB ball stem tips. HN series valve ordering numbers specify NR regulating stem tips. To order valves with other stem designs, replace **NB** or **NR** in the ordering number with the desired stem design designator.

Examples: SS-3**NRF2**  
 SS-3HN**KRF2**

Stem Design	Designator
Regulating <sup>①</sup>	NR
PCTFE soft-seat regulating	NKR
PTFE soft-seat regulating <sup>②</sup>	NTR

<sup>①</sup> Not intended for repetitive shutoff in gas applications.

<sup>②</sup> Not available in 12N series.

#### Sour Gas Valves

Valves with female pipe ends are available for sour gas service. Materials are selected in accordance with NACE MR0175/ISO 15156. The body and bonnet are annealed 316 stainless steel; the stem is alloy 400. To order, add **-SG** to the valve ordering number.

Examples: SS-3NBF2-**SG**  
 SS-3HNRF2-**SG**

#### Special Cleaning and Packaging (SC-11)

To order N series and HN series valves with optional cleaning and packaging to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C, add **-SC11** to the valve ordering number.

Example: SS-3NBF2-**SC11**

## Options and Accessories

### N Series Handles

Anodized black aluminum bar handles are standard. Colored phenolic (with brass insert) and 316 stainless steel bar handles are available.

Exception: 12N series valves with Grafoil packing are not available with colored phenolic knobs.

To order, add a handle designator to the valve ordering number.

Examples: SS-3NBS4-**BKP**  
SS-12NBF8-**SH**

Handle	Designator
Black phenolic knob	-BKP
Blue phenolic knob	-BLP
Green phenolic knob	-GRP
Orange phenolic knob	-OGP
Red phenolic knob	-RDP
Yellow phenolic knob	-YWP
Stainless steel bar	-SH

### Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, refer to *Oxygen System Safety* technical report, [MS-06-13](#).

- ⚠ **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.**

### HN Series Ball Stem Tip Materials

Cobalt-based alloy is standard. To specify other ball tip materials, add a ball stem tip material designator to the valve ordering number:

Example: SS-6HNBF4-**M**

Ball Tip Material/ ASTM Specification	Designator
440C SS/A276	-440C
Alloy 400/B127 or B164	-M
Alloy C-276/B574 or B575	-HC

### Additional Valve Materials

Alloy 625, alloy 825, Alloy 2507 super duplex stainless steel, and 6-moly materials are available for N and HN series valves. Refer to *Severe-Service Union-Bonnet Needle Valves—Special Alloy Materials* catalog, [MS-02-365](#).

#### ⚠ WARNING

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Since 1947, Swagelok has designed, developed, and manufactured high-quality, general-purpose and specialty fluid system products to meet the evolving needs of global industries. Our focus is on understanding our customers' needs, finding timely solutions, and adding value with our products and services.

We are pleased to provide this global edition of the book-bound *Swagelok Product Catalog*, which compiles more than 100 separate product catalogs, technical bulletins, and reference documents into one convenient, easy-to-use volume. Each product catalog is up to date at the time of printing, with its revision number shown on the last page of the individual catalog. Subsequent revisions will supersede the printed version and will be posted on the Swagelok website and in the Swagelok electronic Desktop Technical Reference (eDTR) tool.

For more information, visit your Swagelok website or contact your authorized Swagelok sales and service representative.

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### 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.**

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