Needle Valve

Medium Pressure Cone & Thread 20,000 psi (1380 bar)

15SM and 20SM Series

Principle of Operation:

SM Series Valves are designed specifically for use with matching orifice Medium Pressure Cone & Thread Fittings and Tubing for the most efficient flow path possible using Cone & Thread style connections. Designed for a maximum of 20,000 psi MAWP using high tensile strength UNS S31600/S31603 cold worked 316/316L Stainless Steel material as standard, we include larger ID tubing rated to 15,000 psi (15SM valves) for even higher flow rate capability.

Medium Pressure Valve Features:

Temperature Rated -423° to 1200°F (-252° to 650°C) with associated packing/material options

- Designed for use with Medium Pressure cold worked 316/316L stainless steel tubing as standard
- 15SM Series valves available in sizes from 9/16" to 1-1/2" (See matching tubing)
- 20SM Series valves available in sizes from 1/4" to 1" (See matching tubing)
- UNS S31600/ S31603, CW 316/316L Stainless Steel body construction as standard. See Technical brochure for additional material options
- Non-rotating stem prevents stem/seat galling
- Metal-to-Metal seating achieves bubble-tight shut-off, longer stem/seat life, greater durability for repeated on/off cycles and excellent corrosion resistance. These valves can be used with liquid or gas.
- PTFE packing below stem threads provides dependable stem and body sealing. Optional packing materials available.
- Choice of Vee (shutoff) or Regulating (Flow Control) stem tips
- Replaceable Seat Option available with Right Angle 2-way body style
- Optional N-Dura Stem and Seat coating or Stellite material option for severe service available

Traceability is ensured by use of heat and purchase order codes etched on valve body that also includes model number, MAWP rating, and material type references. All valves include connection collar and gland nut unless requested otherwise. Parker Autoclave Engineers' valves are complemented by a complete line of Medium Pressure Cone & Thread fittings, tubing, check valves, relief valves, and line filters.

Note: SM Series replaces 20SC, 20SV, and 15SV Series. 15SM Series replaces 10SM Series.

All Parker Autoclave Engineers products are designed in accordance with ASME B31.3 Chapter IX High Pressure Piping standards.

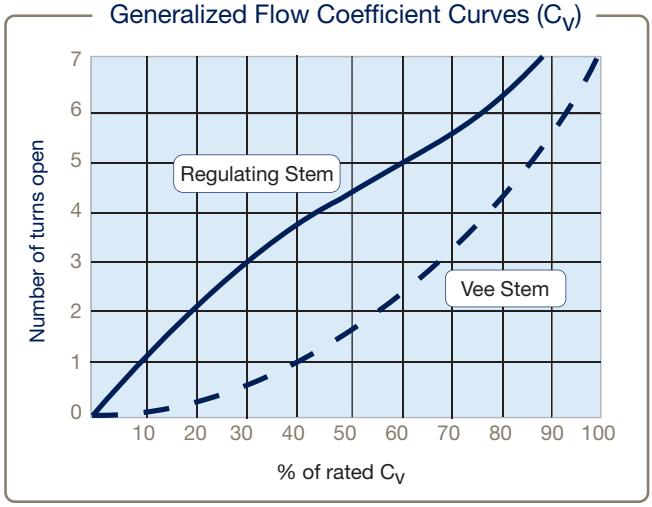
SM Series Needle Valve: Pressures to 20,000 psi (1379 bar)

Tube Outside Diameter Size (inches)	Connection Type	Orifice Size Inches (mm)	Rated C_V*	Pressure Rating psi (bar) @Room Temperature**
1/4 (20SM4)	SF250CX20	0.125 (3.18)	0.31	20,000 (1379)
3/8 (20SM6)	SF375CX20	0.219 (5.56)	0.75	20,000 (1379)
9/16 (20SM9)	SF562CX20	0.312 (7.92)	1.30	20,000 (1379)
3/4 (20SM12)	SF750CX20	0.438 (11.13)	2.50	20,000 (1379)
1 (20SM16)	SF1000CX20	0.562 (14.27)	4.40	20,000 (1379)
9/16 (15SM9)	SF562CX10	0.359 (9.12)	1.75	15,000 (1034)
3/4 (15SM12)	SF750CX10	0.516 (13.10)	2.80	15,000 (1034)
1 (15SM16)	SF1000CX10	0.688 (17.48)	5.20	15,000 (1034)
1 1/2 (15SM24)	SF1500CX	0.937 (23.80)	14	15,000 (1034)

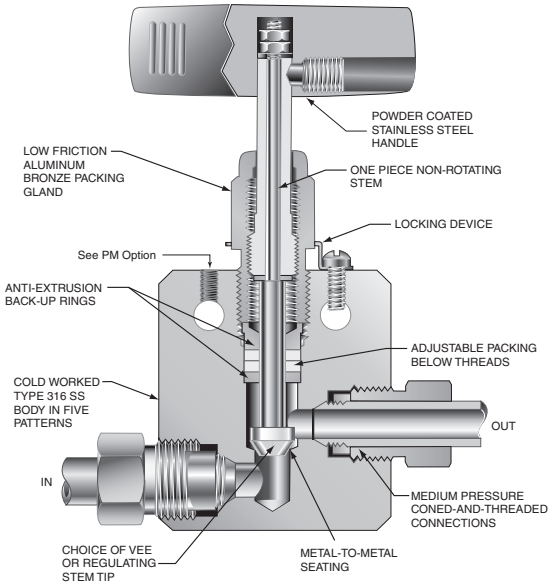
Notes

* C_V values shown are for 2-way straight valve pattern. For 2-way angle patterns, increase C_V value 50%. (Based on water). Formula for converting Cv to volumetric flow can be found in Technical Information section.

** Maximum Allowable Working Pressures decrease as temperatures increase - see pressure/temperature rating guide in Technical Information section.



SM Series Flow Curve for Vee and Regulating Stem Valves



To ensure proper fit use Parker Autoclave tubing

Valve Packing Options:

Standard Parker Autoclave Engineers valves with PTFE packing may be operated from 0°F (-18°C) to 450°F (232°C). High and Cryogenic temperature packing and/or extended stuffing box are available for service from -423°F (-252°C) to 1200°F (650°C) by adding the following suffixes to catalog order number:

- **-B** Cryogenic trim materials and PTFE packing required when below 0°F (-18°C) to -100°F (-73°C)
- **-LT** Extended packing option with PTFE packing and Cryogenic trim materials to -423°F (-252°C)
- **-TG** Standard valve with PTFE-Glass packing -100°F (-73°C) to 600°F (316°C) (See also -B option above when below 0°F (-18°C)
- **-GY** Standard valve with Graphite Yarn packing 32°F (0°C) to 800°F (427°C). Used when selecting HT option. **(Note: 3/4" valve rated 8000 psi (552 bar) and 1" rated 6000 psi (412 bar) max with Graphite Yarn packing.)**
- **-HT** Extended stuffing box valve with Graphite Braided Yarn packing to 1200°F (650°C)

For the effect on max pressure due to High Temperatures, please see "Technical Brochure" in main catalog.

Note: Refer to Tools, Installation & Operation catalog for proper connection, packing, seating & running torques.

Ordering Guide:

For complete information on available stem types, optional connections and additional valve options, see pages 8-9 or contact your Sales Representative. SM Series valves are furnished complete with connection components, unless otherwise specified.

Building a Part Number: ***Example: 20SM4071***

Example Part Number:	20SM	4	07	1	XX
Ordering Parameters/Options:	Valve Series	Outside Diameter Tube Size	Stem/Seat Type	Body Pattern	Options
Table Reference: (see below)	A	B	C	D	E

A - Valve Series	
15SM	15,000 psi Medium Pressure Needle Valve (9/16" thru 1 1/2" sizes)
20SM	20,000 psi Medium Pressure Needle Valve (1/4 thru 1" sizes)

B - Outside Diameter Tube Size	
4	1/4" (20SM only)
6	3/8" (20SM only)
9	9/16"
12	3/4"
16	1"
24	1-1/2" (15SM only)

C - Stem/Seal Type (see page 8 for optional stem types)	
07	Non-Rotating Vee Stem (on-off service)
08	Non-Rotating Regulating Stem (tapered tip for regulating and shutoff)
87	Vee Stem with Replaceable Seat (angle valve only)
88	Regulating Stem with Replaceable Seat (angle valve only)

Notes:

Valve Manuals can be found on our website at **www.Autoclave.com**. Connection, Running and Seating Torques can be found in the product manual or in our Tools and Installation Catalog Section. Valves that have not been cycled for a substantial period of time may require higher initial actuation torque.

*Replaceable seat option is sold with two (2) seat surfaces 180° apart.

D - Body Pattern	
1	Two-Way Straight
2	Two-Way Angle
3	Three-Way, Two on Pressure
4	Three-Way, One on Pressure
5	Three-Way, Two Stem Manifold Valve

E - Options (choose as many as necessary)	
For additional valve options see pages 8 & 9 or contact factory.	
B	Low temperature service below 0°F (-18°C) (included in LT code)
LT	Low Temperature Extension (to -423°F) (includes PTFE packing)
TG	PTFE Glass (25%) Packing (to 600°F)
GY4	Graphite Yarn Packing (to 800°F)
HT4	High Temperature Extension (to 1200°F) (includes GY packing)
PM	Panel Mount, (additional hardware included)
K	Antivibration Gland replaces standard gland
*SOG	NACE Material, Hardness Verification/Certificate
HYG	Hydrogen/Helium upgrade/Seat Testing
*** 2507	UNS 32750, 2507 Super Duplex Wetted Materials
*** IN625	UNS N06625 Inconel 625 Wetted Materials
*** HC	UNS N10276 Hastelloy C276 Wetted Materials
Pneumatic and Electric Actuator Options - see individual brochures for Suffix Codes Other materials available upon request. See Technical Brochure for list of common material options.	

Notes:

316 SS valve bodies are cold worked and not suitable for use in NACE (ISO 15156) applications. If required, contact factory for options.

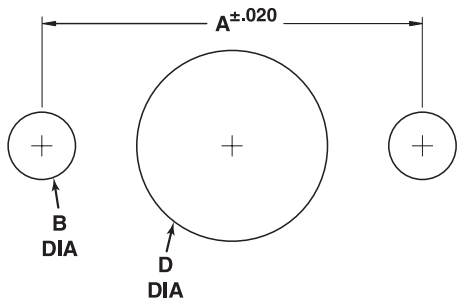
* SOG suffix also changes CW 316 SS Body material to Annealed 316 SS suitable for NACE service, Pressure reduction of 60% possible

*** Special Materials often have reduced MAWP ratings, see Technical brochure for assistance and for additional material options.

4 - GY packing increases friction on stem which can limit max pressure in larger valves (3/4" is limited to 8,000 psi and 1" is limited to 6000 psi)

Note: use of optional material only changes "wetted parts" to selected material. Items like collars and glands remain CW 316/316L SS. Use **-SOG** (Includes hardness check for NACE) or **-AP** suffix

Panel Hole Size:



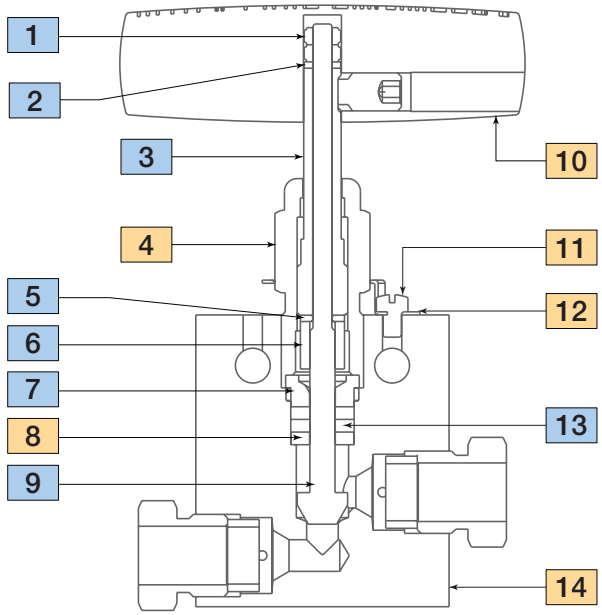
Needle Valve Panel Mount

	Inches			
Valve Size	A	B	Screw Size	D
4 & 6	1.25	.22	10 - 24	.75
9	1.375	.22	10 - 24	1.00
12	1.75	.22	10 - 24	1.12
16	2.50	.22	10 - 24	1.62
24	N/A	N/A	N/A	N/A
Use suffix **-PM** for extra mounting hardware				

Material of Construction:

Item #	Description	Material
1	Hex Nut	300 Series SS
2	Thrust Washer	17-4 PH
3	Stem Sleeve	316 SS
4	Packing Gland	AMPCO 45
5	Thrust Washer	17-4 PH
6	Stem Collar	316 SS
7	Packing Washer	AMPCO 45
8	Bottom Washer	316 SS
9	Vee Stem, 9/16" Shown	316 SS
10	Handle	316 SS
11	HD Screw #10-24	18-8 SS
12	Locking Device	302 SS
13	Packing	PTFE
14	Body, 20SM 9/16" Shown	316 SS
•	Seat Retainer	316 SS
•	Replaceable Seat	17-4 PH

Typical spare parts found in Repair Kits (• indicates not shown)



Basic Repair Kits for 316 SS Material:

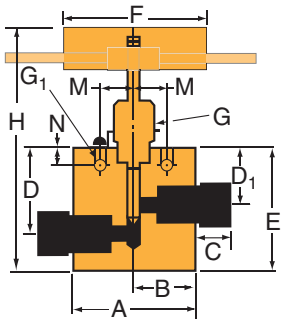
Stem Type		Basic Repair Kit for 316 SS Material					
		Outside Diameter Tube:					
		1/4"	3/8"	9/16"	3/4"	1"	1-1/2"
15SM/20SM Vee Stem (includes body option codes 1, 2, 3, & 4)	VEE	RSM407	RSM607	RSM907	RSM1207	RSM1607	R15SM2407
20SM Regulating Stem (includes body option codes 1, 2, 3, & 4)	REG	RSM408	RSM608	RSM908	R20SM1208	R20SM1608	R15SM2408
15SM 2 Way, Replaceable Seat and Stem	VEE REG	RSM4872 RSM4882	RSM6872 RSM6882	R15SM9872 R15SM9882	R15SM12872 R15SM12882	R15SM16872 R15SM16882	R15SM24872 R15SM24882
20SM 2 Way, Replaceable Seat and Stem	VEE REG	RSM4872 RSM4882	RSM6872 RSM6882	R20SM9872 R20SM9882	R20SM12872 R20SM12882	R20SM16872 R20SM16882	- -
15SM 3 Way, 2 Stem Manifold	VEE REG	RSM4075 RSM4085	RSM6075 RSM6085	RSM9075 R15SM9085	RSM12075 R15SM12085	RSM16075 R15SM16085	RSM24075 R15SM24085
20SM 3 Way, 2 Stem Manifold	VEE REG	RSM4075 RSM4085	RSM6075 RSM6085	RSM9075 R20SM9085	RSM12075 R20SM12085	RSM16075 R20SM16085	- -

When ordering for valves bought with additional suffix options, please include those exact suffix codes when ordering repair kit. (Example: the stem for a manual valve is manufactured differently for a pneumatically actuated valve and the repair kit must include the exact actuator suffix codes)
Valve Manuals can be found on our website at **www.Autoclave.com**.
Connection, Running and Seating Torques can be found in the product manual or in our Tools and Installation Catalog Section

SM Series Needle Valve Dimensions:

2 Way Straight - 15SM

		Catalog Number			
Stem Type	VEE REG	15SM9071 15SM9081	15SM12071 15SM12081	15SM16071 15SM16081	15SM24071 15SM24081
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	**A**	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	2.38 (60.45)	3.00 (76.20)	3.75 (95.25)	5.25 (133.35)
	D1	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)	3.75 (95.25)
	E	2.88 (73.15)	3.75 (95.25)	4.63 (117.60)	6.44 (163.53)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	5.93 (150.86)	7.00 (177.80)	9.00 (228.84)	11.04 (280.42)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



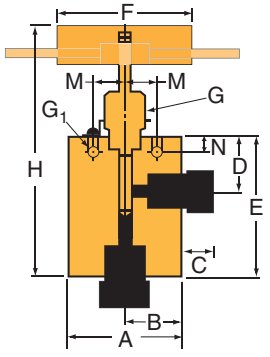
Bar handle replaces Blue "T" handle on sizes 3/4" and up

2 Way Straight - 20SM

	Catalog Number				
	20SM4071 20SM4081	20SM6071 20SM6081	20SM9071 20SM9081	20SM12071 20SM12081	20SM16071 20SM16081
	1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
	0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
A	2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
B	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
C	0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
D	1.62 (41.15)	1.62 (41.15)	2.38 (60.45)	3.00 (76.20)	3.75 (95.25)
D1	1.19 (30.23)	1.19 (30.23)	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)
E	2.00 (50.80)	2.00 (50.80)	2.88 (73.15)	3.75 (95.25)	4.63 (117.60)
F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
H*	4.69 (119.13)	4.63 (117.48)	5.93 (150.86)	7.00 (177.80)	9.00 (228.84)
M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

2 Way Angle - 15SM

		Catalog Number			
Stem Type	VEE REG	15SM9072 15SM9082	15SM12072 15SM12082	15SM16072 15SM16082	15SM24072 15SM24082
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	**A**	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)	3.75 (95.25)
	D1	-	-	-	-
	E	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)	6.75 (171.45)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	6.43 (163.56)	7.50 (190.50)	9.00 (228.84)	11.35 (288.32)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



Bar handle replaces Blue "T" handle on sizes 3/4" and up

2 Way Angle - 20SM

	Catalog Number				
	20SM4072 20SM4082	20SM6072 20SM6082	20SM9072 20SM9082	20SM12072 20SM12082	20SM16072 20SM16082
	1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
	0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
A	2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
B	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
C	0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
D	1.19 (30.23)	1.19 (30.23)	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)
D1	-	-	-	-	-
E	2.44 (61.90)	2.44 (61.90)	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)
F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
H*	4.81 (122.25)	4.81 (122.25)	6.43 (163.56)	7.50 (190.50)	9.00 (228.84)
M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

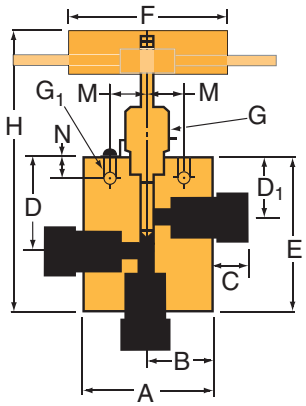
H* - Dimension is with stem in closed position

All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

SM Series Needle Valve Dimensions:

3 Way, 2 On Pressure - 15SM

		Catalog Number			
Stem Type	VEE REG	15SM9073 15SM9083	15SM12073 15SM12083	15SM16073 15SM16083	15SM24073 15SM24083
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	A	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	2.38 (60.45)	3.00 (76.20)	3.75 (95.25)	5.25 (133.35)
	D1	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)	3.75 (95.25)
	E	3.63 (92.08)	4.63 (117.48)	5.88 (149.50)	8.13 (206.38)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	6.52 (165.59)	7.88 (200.03)	9.75 (247.89)	12.73 (323.22)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



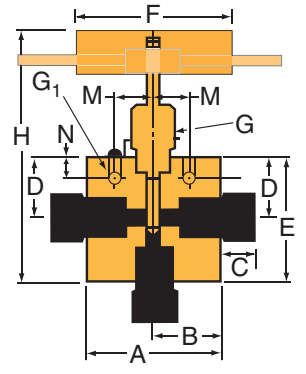
Bar handle replaces Blue "T" handle on sizes 3/4" and up

3 Way, 2 On Pressure - 20SM

	Catalog Number				
	20SM4073 20SM4083	20SM6073 20SM6083	20SM9073 20SM9083	20SM12073 20SM12083	20SM16073 20SM16083
	1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
	0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
A	2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
B	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
C	0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
D	1.63 (41.28)	1.63 (41.28)	2.38 (60.45)	3.00 (76.20)	3.75 (95.25)
D1	1.19 (30.23)	1.19 (30.23)	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)
E	2.63 (66.68)	2.63 (66.68)	3.63 (92.08)	4.63 (117.48)	5.88 (149.35)
F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
H*	5.00 (127.00)	5.00 (127.00)	6.51 (165.59)	7.88 (200.03)	9.75 (247.89)
M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

3 Way, 1 On Pressure - 15SM

		Catalog Number			
Stem Type	VEE REG	15SM9074 15SM9084	15SM12074 15SM12084	15SM16074 15SM16084	15SM24074 15SM24084
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	A	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)	3.75 (95.25)
	D1	-	-	-	-
	E	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)	6.63 (168.28)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	6.31 (160.56)	7.50 (190.50)	9.09 (231.13)	11.23 (285.06)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



Bar handle replaces Blue "T" handle on sizes 3/4" and up

3 Way, 1 On Pressure - 20SM

	Catalog Number				
	20SM4074 20SM4084	20SM6074 20SM6084	20SM9074 20SM9084	20SM12074 20SM12084	20SM16074 20SM16084
	1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
	0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
A	2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
B	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
C	0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
D	1.19 (30.23)	1.19 (30.23)	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)
D1	-	-	-	-	-
E	2.44 (61.90)	2.44 (61.90)	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)
F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
H*	4.81 (122.25)	4.81 (122.25)	6.31 (160.65)	7.50 (190.50)	9.00 (228.84)
M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

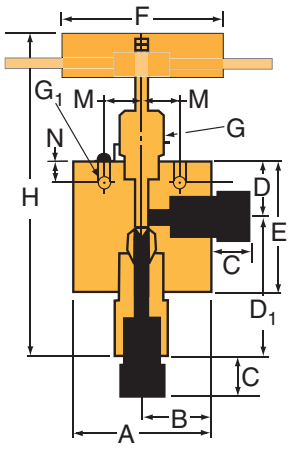
H* - Dimension is with stem in closed position

All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

SM Series Needle Valve Dimensions:

2 Way Angle Replaceable Seat - 15SM

Stem Type	VEE REG	Catalog Number			
		15SM9872 15SM9882	15SM12872 15SM12882	15SM16872 15SM16882	15SM24872 15SM24882
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	A	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	1.75 (44.45)	2.25 (57.15)	2.69 (68.33)	3.75 (95.25)
	D1	2.50 (63.50)	3.44 (87.38)	4.38 (111.13)	5.22 (132.59)
	E	3.38 (85.85)	4.25 (107.95)	5.25 (133.35)	6.75 (171.45)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	7.34 (186.68)	9.00 (228.60)	11.00 (279.64)	13.57 (344.68)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



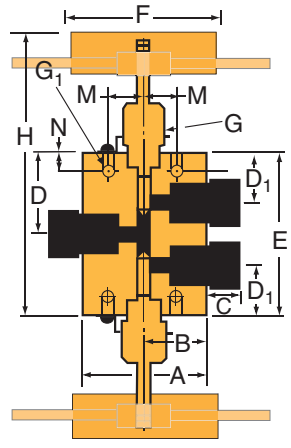
Bar handle replaces Blue "T" handle on sizes 3/4" and up

2 Way Angle Replaceable Seat - 20SM

Catalog Number				
20SM4872 20SM4882	20SM6872 20SM6882	20SM9872 20SM9882	20SM12872 20SM12882	20SM16872 20SM16882
1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
1.19 (30.23)	1.19 (30.23)	1.75 (44.45)	2.25 (57.15)	2.69 (68.33)
2.13 (53.98)	2.13 (53.98)	2.50 (63.50)	3.44 (87.38)	4.38 (111.13)
2.25 (57.15)	2.25 (57.15)	3.13 (79.38)	4.25 (107.95)	5.25 (133.35)
3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
5.75 (146.05)	5.75 (146.05)	7.34 (186.68)	9.00 (228.60)	11.00 (279.64)
0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

3 Way, 2 On Pressure - 15SM

Stem Type	VEE REG	Catalog Number			
		15SM9075 15SM9085	15SM12075 15SM12085	15SM16075 15SM16085	15SM24075 15SM24085
Outside Diameter Tube		**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**	**1.50 (38.10)**
Orifice Diameter		0.359 (9.12)	0.516 (13.11)	0.688 (17.48)	0.937 (23.80)
Dimensions: inches (mm)	A	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)	5.75 (146.05)
	B	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)	2.88 (73.03)
	C	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)	1.00 (25.40)
	D	2.56 (65.07)	3.25 (85.55)	3.75 (95.25)	5.25 (133.35)
	D1	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)	3.75 (95.25)
	E	5.13 (130.18)	6.50 (165.10)	7.50 (190.50)	10.50 (266.70)
	F	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	23.75 (603.25)
	G	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	N/A (N/A)
	G1	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	0.75 (19.05)
	H*	8.13 (206.50)	9.75 (247.65)	12.18 (309.40)	15.10 (383.54)
	M	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	1.88 (47.63)
	N	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	1.50 (38.10)
Block Thickness		1.00 (25.40)	1.38 (35.05)	1.75 (44.45)	2.25 (57.19)



Bar handle replaces Blue "T" handle on sizes 3/4" and up

3 Way, 2 On Pressure - 15SM

Catalog Number				
20SM4075 20SM4085	20SM6075 20SM6085	20SM9075 20SM9085	20SM12075 20SM12085	20SM16075 20SM16085
1/4 (6.35)	**3/8 (9.53)**	**9/16 (14.29)**	**3/4 (19.05)**	**1 (25.40)**
0.125 (3.18)	0.219 (5.56)	0.312 (7.92)	0.438 (11.13)	0.562 (14.27)
2.00 (50.80)	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	4.12 (104.65)
1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	2.06 (53.32)
0.38 (9.65)	0.47 (11.94)	0.53 (13.46)	0.62 (15.75)	0.63 (16.00)
1.69 (42.85)	1.69 (42.85)	2.56 (65.07)	3.25 (82.55)	3.75 (95.25)
1.19 (30.15)	1.19 (30.15	1.75 (44.45)	2.25 (57.15)	2.81 (71.37)
3.38 (85.73)	3.38 (85.73)	5.13 (130.18)	6.50 (165.10)	7.50 (190.50)
3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)
0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)
0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)
5.69 (144.50)	5.69 (144.50)	8.13 (206.50)	9.75 (247.65)	12.18 (309.40)
0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)
0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)
0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.38 (35.05)	1.75 (44.45)

H* - Dimension is with stem in closed position

All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

Valve Options:

Pneumatic Valve Actuators:

The need to control process and vent valves from a remote location makes air operated valves a vital component to many processing operations. All Parker Autoclave Engineers' valves are available with piston type actuators. Five sizes of air actuators (light, mini-light, medium, heavy duty or extra heavy, single and double stage) are offered to meet the service requirements of Parker Autoclave Engineers' Low, Medium and High Pressure needle valves. Both air-to-open (normally closed) and air-to-close (normally open) designs are included in the product line. Optional air to open AND close actuators available upon request. Please see our Pneumatic Valve Actuator Brochure to help size the proper actuator for your application.

Electric Valve Actuators:

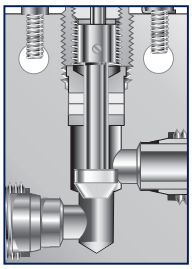
Remotely controlling process flow at high pressure enhances safety and lowers labor costs. Parker Autoclave Engineers developed a flow control valve available in several models including weatherproof and explosionproof options.

The Electrically Actuated Shut-off/Flow Regulating Actuator (FRC Series) is available for most of our SM Series Valves through 9/16" tubing size and full working pressure. Explosion proof version is rated for hydrogen service and can withstand wide process temperature ranges.

Stem Options:

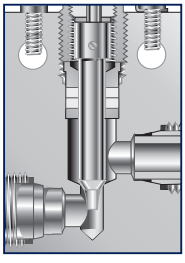
Most Parker Autoclave Engineers' valves are available with either Vee (on-off) or Regulating (Flow Control) Stems in our standard valve body seat or with our optional replaceable seat as shown below. For severe service stem (and replaceable seat if ordered) can be offered with N-Dura Diamond-Like coating (**-CS** suffix or **-CSS** (coated stem & seat)) or made from Stellite (**-SS** or **-SSRS** (Stellite stem, replaceable seat)).:

VEE Stem



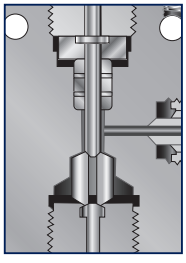
The Vee stem is used for direct on-off, metal-to-metal shut-off with quick-opening flow characteristics.

Regulating Stem



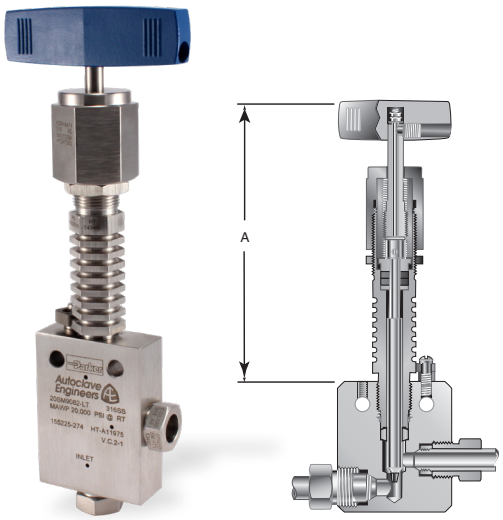
In some applications, more precise flow control is required than is possible with a Vee stem. For these cases, Autoclave offers a non-rotating, two-piece regulating stem which can be used for both control and shut-off. While it is not as precise as the control associated with the MicroMetering stem, especially with smaller flows, it does offer substantially better control than the Vee stem.

Replaceable Seat
(with Vee Stem)



Replaceable seat option is only available with Right-Angle Style body. Replaceable seat is supplied as standard with an additional seat - rotate to use second side. Can be used with either stem type. Options include Stellite material or N-Dura coating to increase service life.

Valve Options:



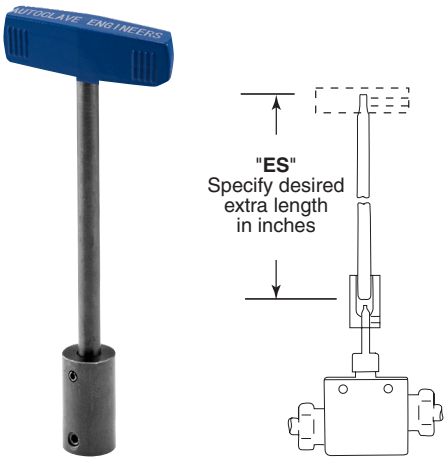
High/Low Temperature Extension:

Used in extreme temperature applications to move packing from flow stream with heatsink to moderate temperature.

-HT High Temperature (over 800°F (427°C))

-LT Low Temperature (under -100°F (-73°C))

Valve Series	Outside Diameter Tube Size (inches)	Dimensions "A" inches (mm)
15SM and 20SM	1/4"	5.50 (140)
	3/8"	5.50 (140)
	9/16"	6.31 (160)
	3/4"	6.31 (160)
	1"	6.31 (160)
	1-1/2"	13.1 (333)
HT option code includes Graphite (-GY) packing LT option code includes 316 SS Trim material and PTFE packing		



ES Stem Extender:

Stem extenders are offered for High and Low temperature operation or to extend through panel or barricade.

To order valve with Stem Extender, add "**ES-**" and length (6", 12", 18", 24") to beginning of valve part number e.g. ES12-20SM6071. Other lengths to special order.

To order Stem Extender only, provide valve model prefix e.g. ES12-20SM6. Handle not included – use same provided with original valve.

Needle Valve Clam Shell Handle Lockout:

(order separately using part numbers shown below, padlock not included)

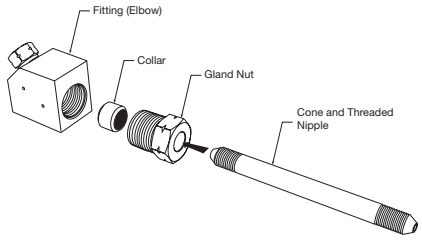
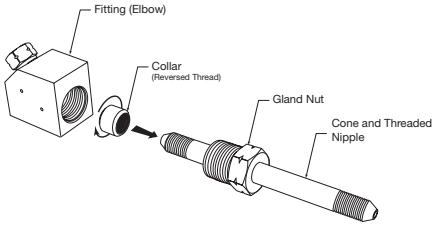
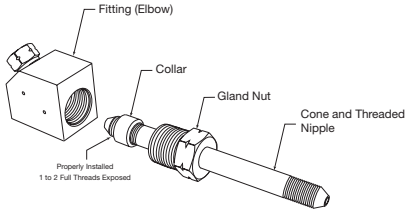
Clam Shell Handle locks are provided to lockout valves in open or closed position preventing unauthorized personnel from actuating valve during shutdown or emergency situations. This clamshell design is available in four (4) sizes dependent on handle length:

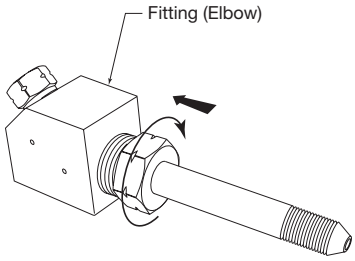
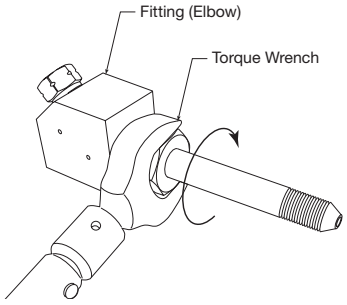
P/N AE004855 – 1" to 2.5" handle length
P/N 90088 – 2.5" to 5.0" handle length
P/N 90194 – 6.5" to 10" handle length
P/N AE004350 – 8" to 13" handle length

Assembly Instructions

SM Series Medium Pressure Needle Valve - Pressures to 20,000 psi (1379 bar)

SM Medium Pressure Connection: Step by Step Assembly Instructions

Step 1	Step 2	Step 3
		
Insert Coned and Threaded Nipple through Gland (Typical Tee Fitting Assembly consisting of Fitting Body, Collar, Gland, and Coned and Threaded Nipple or Tube End.)	Thread Collar turning (Reverse Threaded to prevent rotation during torque process) onto Coned and Threaded Nipple end.	For proper Collar placement, thread Collar onto Nipple leaving 1 to 2 full threads exposed on Fitting side of Collar. Lubricate Gland Threads with anti-seize compound and tube tip with process compatible lubricant (do not use metal-flake type)

Step 4	Step 5	SM Medium Pressure Gland Torque
		For 316/316L SS, 2507 Super Duplex Tubing & Adapters
Insert Tube/Gland assembly into Fitting body, turning clockwise approximately 4-5 threads (if unable to turn full distance by hand, look for misalignment issues with tubing and correct for proper seal).	Use Torque Wrench to properly set (see chart in next frame) Cone & Thread Connections. (Available with wrench adapters in Tools and Installation brochure)	

Fitting Size	Required Torque ft-lb (N.m)
1/4" MP-20Ksi	20 (27)
3/8" MP-20Ksi	30 (75)
9/16" MP-15Ksi	55 (75)
9/16" MP-20Ksi	55 (75)
3/4" MP-15Ksi	75 (102)
3/4" MP-20Ksi	90 (122)
1" MP-15Ksi	135 (187)
1" MP-20Ksi	135 (187)
1-1/2" MP-15Ksi	200 (272)

For torques and optional materials (lower pressures), see Tools and Installation Catalog 02-0149SE

Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further information call 1-800-C-Parker.

MARKET	KEY MARKETS		KEY PRODUCTS	
AEROSPACE	Aircraft Engines Commercial Commerical Transports Military Aircraft Regional Transports	Business and General Aviation Land-Based Weapons Systems Missiles and Launch Vehicles Unmanned Aerial Vehicles	Flight Control Systems & Components Fluid Conveyance Systems Fluid Metering Delivery & Atomization Devices Fuel Systems & Components	Hydraulic Systems & Components Inert Nitrogen Generating Systems Pneumatic Systems & Components Wheels & Brakes
CLIMATE CONTROL	Agriculture Food, Beverage and Dairy Precision Cooling Transportation	Air Conditioning Life Sciences & Medical Processing	Co2 Controls Electronic Controllers Filter Driers Hand Shut-Off Valves Hose & Fittings	Pressure Regulating Valves Refrigerant Distributors Safety Relief Valves Solenoid Valves Thermostatic Expansion Valves
ELECTRO-MECHANICAL	Aerospace Life Science & Medical Packaging Machinery Plastics Machinery & Converting Semiconductor & Electronics Factory Automation	Machine Tools Paper Machinery Primary Metals Textile Wire & Cable	AC/DC Drives & Systems Electric Actuators, Gantry Robots & Slides Electrohydrostatic Actuation Systems Electromechanical Actuation Systems Human Machine Interface	Linear Motors Stepper Motors, Servo Motors Drives & Controls Structural Extrusions
FILTRATION	Food & Beverage Life Sciences Mobile Equipment Power Generation Transportation	Industrial Machinery Marine Oil & Gas Process	Analytical Gas Generators Compressed Air & Gas Filters Condition Monitoring Engine Air, Fuel & Oil Filtration & Systems	Hydraulic, Lubrication & Coolant Filters Process, Chemical, Water Microfiltration Filters Nitrogen, Hydrogen & Zero Air Generators
FLUID and GAS HANDLING	Aerospace Agriculture Bulk Chemical Handling Construction Machinery Food & Beverage Fuel & Gas Delivery	Industrial Machinery Mobile Oil & Gas Transportation Welding	Brass Fittings & Valves Diagnostic Equipment Fluid Conveyance Systems Industrial Hose	PTFE & PFA Hose, Tubing & Plastic Fittings Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
HYDRAULICS	Aerospace Aerial lift Agriculture Construction Machinery Forestry	Industrial Machinery Mining Oil & Gas Power Generation & Energy Truck Hydraulics	Diagnostic Equipment Hydraulic Cylinders & Accumulators Hydraulic Motors & Pumps Hydraulic Systems Hydraulic Valves & Controls	Power Take-Offs Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
PNEUMATICS	Aerospace Conveyor & Material Handling Factory Automation Life Science & Medical	Machine Tools Packaging Machinery Transportation & Automotive	Air Preparation Brass Fittings & Valves Manifolds Pneumatic Accessories Pneumatic Actuators & Grippers Pneumatic Valves & Controls	Quick Disconnects Rotary Actuators Rubber & Thermoplastic Hose & Couplings Structural Extrusions Thermoplastic Tubing & Fittings Vacuum Generators, Cups & Sensors
PROCESS CONTROL	Chemical & Refining Food, Beverage & Dairy Medical & Dental	Microelectronics Oil & Gas Power Generation	Analytical Sample Conditioning Products & Systems Fluoropolymer Chemical Delivery Fittings, Valves & Pumps High Purity Gas Delivery Fittings, & Valves & Regulators	Instrumentation Fittings, Valves Regulators Medium Pressure Fittings & Valves Process Control Manifolds
SEALING and SHIELDING	Aerospace Chemical Processing Consumer Energy, Oil & Gas Fluid Power General Industrial	Information Technology Life Sciences Military Semiconductor Transportation	Dynamic Seals Elastomeric O-Rings Emi Shielding Extruded & Precision-Cut, Fabricated Elastomeric Seals	Homogeneous & Inserted Elastomeric Shapes High Temperature Metal Seals Metal & Plastic Retained Composite Seals Thermal Management

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! CAUTION !

Do not mix or interchange component parts or tubing with those of other manufacturers. Doing so is unsafe and will void warranty.

Parker Autoclave Engineers Valves, Fittings, and Tools are not designed to interface with common commercial instrument tubing and are designed to only connect with tubing manufactured to Parker Autoclave Engineers AES specifications. Failure to do so is unsafe and will void warranty.

WARNING

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Literature #: 02-0112SE September 2018

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