



## Valves, Fittings and Tubing

Medium and High Pressure

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



ENGINEERING YOUR SUCCESS.

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## The world leader in high pressure valves, fittings and tubing

Since its inception in 1945, Parker Autoclave Engineers (P-AE) has been dedicated to manufacturing high pressure and extreme temperature valve, fitting, and instrument tubing systems which are coordinated together to operate safely and reliably. Today, Parker Autoclave Engineers is a world leader combining our high pressure knowledge, manufacturing expertise, and technological innovation to offer a broad range of products and services to our customers, across a wide range of industries.

### Low Pressure (0-15,000 psi) Valves, Fittings and Tubing

While Parker Autoclave Engineers products are known industry wide for their ability to operate at pressures in excess of 150,000 psi (10,340 bar), a Low Pressure line nicknamed "Speedbite", rated for applications to 15,000 psi (1034 bar) is available, but not discussed in this brochure. Speedbite valves and fittings utilize a single ferrule compression sleeve connection which provides easy, leak free performance, matched to P-AE specified instrument tubing sizes from 1/16" to 1/2".

### QSS - Quick Set System (0-15,000 psi)

Recently, to enhance the Speedbite product line, Parker Autoclave Engineers engineered (not shown in this catalog) an advanced single ferrule fitting system called the QSS-Quick Set System. Designed to work with our Medium Pressure 316 cold worked S.S. and 2507 Super Duplex™ instrument tubing, this 1/4" through 1" O.D. connection is utilized in our valves and fittings to provide a simple to install connection in all sizes up to 15,000 psi (1034 bar). For more information, or to order a complete catalog, contact your nearest Parker Autoclave Engineers representative.

### Needle Valves

All Parker Autoclave Engineers Needle Valves incorporate a rising stem/block design while the non-rotating feature of the stem prevents galling. In addition, the valves are designed with metal to metal seating for bubble tight shut-off, long stem/seat life even in abrasive flow conditions, and excellent overall corrosion resistance.

Valve Pattern options are shown in the next section. Three different stem types are available. A Vee stem is chosen when the application calls for direct on-off, metal to metal shut-off with fast opening capabilities. If an application calls for tighter flow control, Parker Autoclave Engineers offers a non-rotating regulating stem, and for the most precise flow control, Parker Autoclave Engineers recommends a MicroMetering™ stem design.

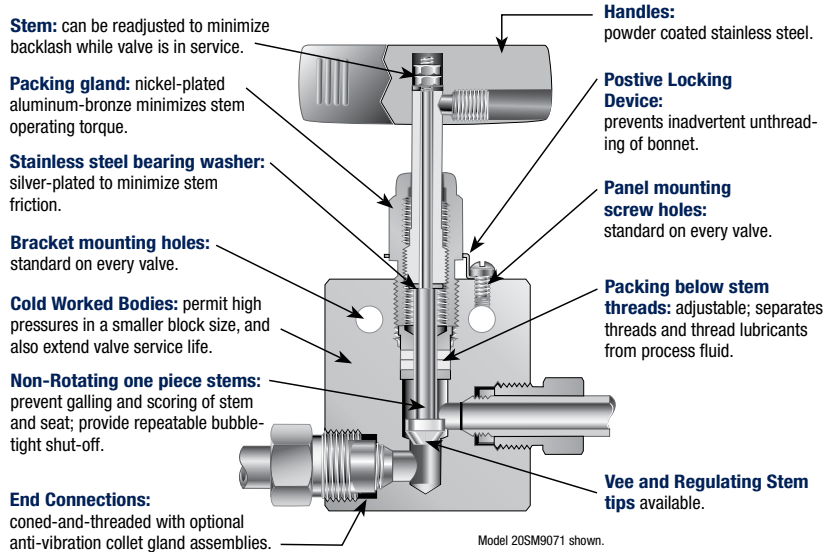
Each pressure group has a complete line of valves, tubing and fittings as well as specialty items, providing all the components required to complete any HP/HT project. Parker Autoclave Engineers components are offered in 316SS as standard, but can be ordered in a variety of optional materials such as: Super Duplex, 6Mo, Hastelloy\* B & C, Inconel, Monel, Nickel, Titanium or any one of our 40 other supported materials.

For more information see our website at [www.Autoclave.com](http://www.Autoclave.com). To order a complete VFT Catalog, contact your nearest Parker Autoclave Engineers representative or the company direct at 814-860-5700.

\* Hastelloy is a trademark of Haynes International Inc.

# Manual Needle Valves

Parker Autoclave Engineers valves are designed to operate safely and reliably at pressures to 150,000 psi (10342 bar). Several important features make this dependable service possible under widely varying conditions.



## Non-rotating stem

Prevents stem/seat galling when valve is opened and closed.

## Metal-to-Metal seating

Provides bubble-tight shut-off, longer stem/seat life in abrasive flow, greater durability for repeated on/off cycles and excellent corrosion resistance.

## PTFE encapsulated packing

Ensures dependable stem and body sealing. The stem sleeve and packing gland materials extend thread life and reduce the handle torque required to operate the valve.

## Manual valve options

Five different body patterns, a variety of materials and stem types, extreme temperature models, abrasive service options, panel mounting and several handle styles are among the available options.

|                 | O.D. Tube Size In (mm) | Pressure Rating psi (bar) | *Rated C <sub>y</sub> (full open) | Valve Stem Type |  |  |  |  |  |  |
|-----------------|------------------------|---------------------------|-----------------------------------|-----------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                 |                        |                           |                                   |                 | 2 Way Straight                                                                     | 2 Way Angle                                                                        | 3 Way 2 on Pressure                                                                | 3 Way 1 on Pressure                                                                  | 2 Way Angle Replaceable Seat                                                         | 3 Way 2 Stem Manifold                                                                |
| Medium Pressure | 1/4 (6.35)             | 20,000 (1380)             | .31                               | Vee Reg         | 20SM4071<br>20SM4081                                                               | 20SM4072<br>20SM4082                                                               | 20SM4073<br>20SM4083                                                               | 20SM4074<br>20SM4084                                                                 | 20SM4872<br>20SM4882                                                                 | 20SM4075<br>20SM4085                                                                 |
|                 | 3/8 (9.53)             | 20,000 (1380)             | .75                               | Vee Reg         | 20SM6071<br>20SM6081                                                               | 20SM6072<br>20SM6082                                                               | 20SM6073<br>20SM6083                                                               | 20SM6074<br>20SM6084                                                                 | 20SM6872<br>20SM6882                                                                 | 20SM6075<br>20SM6085                                                                 |
|                 | 9/16 (14.30)           | 20,000 (1380)             | 1.30                              | Vee Reg         | 20SM9071<br>20SM9081                                                               | 20SM9072<br>20SM9082                                                               | 20SM9073<br>20SM9083                                                               | 20SM9074<br>20SM9084                                                                 | 20SM9872<br>20SM9882                                                                 | 20SM9075<br>20SM9085                                                                 |
|                 | 3/4 (19.10)            | 20,000 (1380)             | 2.50                              | Vee Reg         | 20SM12071<br>20SM12081                                                             | 20SM12072<br>20SM12082                                                             | 20SM12073<br>20SM12083                                                             | 20SM12074<br>20SM12084                                                               | 20SM12872<br>20SM12882                                                               | 20SM12075<br>20SM12085                                                               |
|                 | 1 (25.40)              | 20,000 (1380)             | 4.40                              | Vee Reg         | 20SM16071<br>20SM16081                                                             | 20SM16072<br>20SM16082                                                             | 20SM16073<br>20SM16083                                                             | 20SM16074<br>20SM16084                                                               | 20SM16872<br>20SM16882                                                               | 20SM16075<br>20SM16085                                                               |
|                 | 9/16 (14.30)           | 10,000 (690)              | 1.75                              | Vee Reg         | 10SM9071<br>10SM9081                                                               | 10SM9072<br>10SM9082                                                               | 10SM9073<br>10SM9083                                                               | 10SM9074<br>10SM9084                                                                 | 10SM9872<br>10SM9882                                                                 | 10SM9075<br>10SM9085                                                                 |
|                 | 3/4 (19.10)            | 10,000 (690)              | 2.80                              | Vee Reg         | 10SM12071<br>10SM12081                                                             | 10SM12072<br>10SM12082                                                             | 10SM12073<br>10SM12083                                                             | 10SM12074<br>10SM12084                                                               | 10SM12872<br>10SM12882                                                               | 10SM12075<br>10SM12085                                                               |
| High Pressure   | 1 (25.40)              | 10,000 (690)              | 5.20                              | Vee Reg         | 10SM16071<br>10SM16081                                                             | 10SM16072<br>10SM16082                                                             | 10SM16073<br>10SM16083                                                             | 10SM16074<br>10SM16084                                                               | 10SM16872<br>10SM16882                                                               | 10SM16075<br>10SM16085                                                               |
|                 | 1 (25.40)              | 30,000 (2070)             | 2.60                              | Vee Reg         | 30SC16071<br>30SC16081                                                             | 30SC16072<br>30SC16082                                                             | 30SC16073<br>30SC16083                                                             | 30SC16074<br>30SC16084                                                               | 30SC16872<br>30SC16882                                                               | 30SC16075<br>30SC16085                                                               |
|                 | 1/4 (6.35)             | 30,000 (2070)             | .12                               | Vee Reg         | 30VM4071<br>30VM4081                                                               | 30VM4072<br>30VM4082                                                               | 30VM4073<br>30VM4083                                                               | 30VM4074<br>30VM4084                                                                 | 30VM4872<br>30VM4882                                                                 | 30VM4075<br>30VM4085                                                                 |
|                 | 3/8 (9.53)             | 30,000 (2070)             | .23                               | Vee Reg         | 30VM6071<br>30VM6081                                                               | 30VM6072<br>30VM6082                                                               | 30VM6073<br>30VM6083                                                               | 30VM6074<br>30VM6084                                                                 | 30VM6872<br>30VM6882                                                                 | 30VM6075<br>30VM6085                                                                 |
|                 | 9/16 (14.30)           | 30,000 (2070)             | .33                               | Vee Reg         | 30VM9071<br>30VM9081                                                               | 30VM9072<br>30VM9082                                                               | 30VM9073<br>30VM9083                                                               | 30VM9074<br>30VM9084                                                                 | 30VM9872<br>30VM9882                                                                 | 30VM9075<br>30VM9085                                                                 |
|                 | 9/16 (14.30)           | 40,000 (2760)             | .28                               | Vee Reg         | 40VM9071<br>40VM9081                                                               | 40VM9072<br>40VM9082                                                               | 40VM9073<br>40VM9083                                                               | 40VM9074<br>40VM9084                                                                 | 40VM9872<br>40VM9882                                                                 | 40VM9075<br>40VM9085                                                                 |
|                 | 1/4 (6.35)             | 60,000 (4140)             | .08                               | Vee Reg         | 60VM4071<br>60VM4081                                                               | 60VM4072<br>60VM4082                                                               | 60VM4073<br>60VM4083                                                               | 60VM4074<br>60VM4084                                                                 | 60VM4872<br>60VM4882                                                                 | 60VM4075<br>60VM4085                                                                 |
|                 | 3/8 (9.53)             | 60,000 (4140)             | .09                               | Vee Reg         | 60VM6071<br>60VM6081                                                               | 60VM6072<br>60VM6082                                                               | 60VM6073<br>60VM6083                                                               | 60VM6074<br>60VM6084                                                                 | 60VM6872<br>60VM6882                                                                 | 60VM6075<br>60VM6085                                                                 |
|                 | 9/16 (14.30)           | 60,000 (4140)             | .14                               | Vee Reg         | 60VM9071<br>60VM9081                                                               | 60VM9072<br>60VM9082                                                               | 60VM9073<br>60VM9083                                                               | 60VM9074<br>60VM9084                                                                 | 60VM9872<br>60VM9882                                                                 | 60VM9075<br>60VM9085                                                                 |

\* C<sub>y</sub> Valves shown are for 2-way straight pattern. For 2-way angle, increase C<sub>y</sub> 50%. Note: SM Series replaces 20SC Series

# Air Actuators (for P-AE Needle Valves)

Three sizes of air operators (medium, heavy duty or extra heavy) are offered for remote on-off operation or automatic operation of Parker Autoclave Engineers medium or high pressure valves. The actuators are available in air-to-open (normally closed) and air-to-close (normally open) designs.

## Ordering Procedure (Consult factory to insure proper selection)

To order a valve with an air operator, select the duty rating and type of the air operator from the chart on page 5 & 6. Add the air operator identifying suffix to the catalog number of the Parker Autoclave Engineers valve. To order a 2-way straight, 30VM vee stem, 9/16" (14.3 mm) valve with a medium duty air-to-close piston air operator, specify: ex: 30VM9071-C1S. For a high pressure diaphragm operated air actuated valve, an example would be: 30VM9071-CM.

| Duty Rating              | Operator  | Type         | Order Suffix |
|--------------------------|-----------|--------------|--------------|
| Medium                   | Diaphragm | Air to Open  | OM           |
|                          |           | Air to Close | CM           |
|                          | Piston    | Air to Open  | O1S          |
|                          |           | Air to Close | C1S          |
| Heavy                    | Diaphragm | Air to Open  | OH           |
|                          |           | Air to Close | CH           |
|                          | Piston    | Air to Open  | O2S          |
|                          |           | Air to Close | C2S          |
| Extra Heavy Single Stage | Piston    | Air to Open  | HO1S         |
|                          |           | Air to Close | HC1S         |
| Extra Heavy Two Stage    | Piston    | Air to Open  | HO2S         |
|                          |           | Air to Close | HC2S         |



60VM9071-OM  
Air To Open  
Piston Activated

**Note:** For outdoor service actuators, please see main catalog.



# Air Actuators (for P-AE Needle Valves)



10V6071-C1S  
Air To Close  
Piston Activated

This table is designed to allow quick selection of an appropriate piston or diaphragm air actuator based on valve style and size, maximum system operating pressure and maximum available air pressure.

For example, if the system operating pressure is 25,000 psi (1723 bar) and the available air pressure is 60 psi (4.1 bar) and an air-to-open (spring fail closed) valve is required, a 30VM or 60VM valve with a heavy duty air operator can be used.

**Note:** See main catalog for complete sizing information.

## Air to Close: Actuator Selection Guide

| Valve Series | O.D.<br>Tube<br>in. (mm) | Medium                          |                              | Heavy                           |                              | Extra Heavy Single Stage        |                              | Extra Heavy Two Stage           |                              |
|--------------|--------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|
|              |                          | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) |
| 10SM         | 9/16<br>(14.30)          | 8,600<br>(593)                  | 100<br>(6.9)                 | 10,000<br>(690)                 | 55<br>(3.8)                  | 10,000<br>(690)                 | 45<br>(3.10)                 | 10,000<br>(690)                 | 20<br>(1.4)                  |
|              | 3/4<br>(19.10)           | 4,800<br>(331)                  | 100<br>(6.9)                 | 10,000<br>(690)                 | 100<br>(6.9)                 | 10,000<br>(690)                 | 70<br>(4.83)                 | 10,000<br>(690)                 | 35<br>(2.4)                  |
|              | 1<br>(25.40)             | 2,800<br>(193)                  | 100<br>(6.9)                 | 6,300<br>(434)                  | 100<br>(6.9)                 | 8,500<br>(586)                  | 95<br>(6.55)                 | 10,000<br>(690)                 | 55<br>(3.79)                 |
| 20SM         | 1/4<br>(6.35)            | 20,000<br>(1380)                | 95<br>(6.5)                  | 20,000<br>(1380)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 19,000<br>(1310)                | 100<br>(6.9)                 | 20,000<br>(1380)                | 55<br>(3.8)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 10,700<br>(734)                 | 100<br>(6.9)                 | 20,000<br>(1380)                | 85<br>(5.9)                  | 20,000<br>(1380)                | 65<br>(4.48)                 | 20,000<br>(1380)                | 30<br>(2.1)                  |
|              | 3/4<br>(19.10)           | 6,100<br>(421)                  | 100<br>(6.9)                 | 13,600<br>(938)                 | 100<br>(6.9)                 | 19,000<br>(1310)                | 100<br>(6.90)                | 20,000<br>(1380)                | 50<br>(3.4)                  |
|              | 1<br>(25.40)             | 3,900<br>(269)                  | 100<br>(6.9)                 | 8,800<br>(607)                  | 100<br>(6.9)                 | 12,500<br>(862)                 | 100<br>(6.90)                | 20,000<br>(1380)                | 75<br>(5.1)                  |
| 30SC         | 1<br>(25.40)             | -                               | -                            | -                               | -                            | -                               | -                            | 30,000<br>(2068)                | 80<br>(5.5)                  |
| 30VM         | 1/4<br>(6.35)            | 30,000<br>(2068)                | 55<br>(3.8)                  | 30,000<br>(2068)                | 30<br>(2.0)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 30,000<br>(2068)                | 75<br>(5.2)                  | 30,000<br>(2068)                | 40<br>(2.8)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 30,000<br>(2068)                | 75<br>(5.2)                  | 30,000<br>(2068)                | 40<br>(2.8)                  | -                               | -                            | -                               | -                            |
| 40VM         | 9/16<br>(14.30)          | 40,000<br>(2758)                | 90<br>(6.2)                  | 40,000<br>(2758)                | 45<br>(3.1)                  | -                               | -                            | -                               | -                            |
| 60VM         | 1/4<br>(6.35)            | 60,000<br>(4137)                | 75<br>(5.2)                  | 60,000<br>(4137)                | 40<br>(2.8)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 60,000<br>(4137)                | 75<br>(5.2)                  | 60,000<br>(4137)                | 40<br>(2.8)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 60,000<br>(4137)                | 90<br>(6.2)                  | 60,000<br>(4137)                | 45<br>(3.1)                  | -                               | -                            | -                               | -                            |

**Note:** Actuator Selection Guide (choose actuator based on available air pressure)



# Air Actuators (for P-AE Needle Valves)

This table is designed to allow quick selection of an appropriate piston and diaphragm air actuator based on valve style and size, maximum system operating pressure and maximum available air pressure.

For example, if the system operating pressure is 25,000 psi (1723 bar) and the available air pressure is 60 psi (4.1 bar) and an air-to-open (spring fail closed) valve is required, a 30VM or 60VM valve with a heavy duty air operator can be used.

**Note:** See main catalog for complete sizing information.



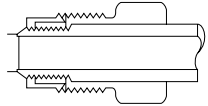
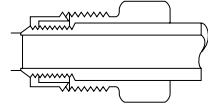
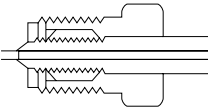
60VM4882-0M  
Air to Open  
Diaphragm Activated

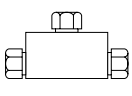
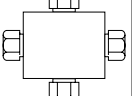
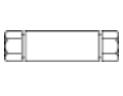
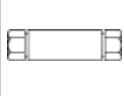
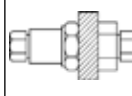
## Air to Open: Actuator Selection Guide

| Valve Series | O.D.<br>Tube<br>in. (mm) | Medium                          |                              | Heavy                           |                              | Extra Heavy Single Stage        |                              | Extra Heavy Two Stage           |                              |
|--------------|--------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|
|              |                          | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) | System<br>Pressure<br>psi (bar) | Air<br>Pressure<br>psi (bar) |
| 10SM         | 9/16<br>(14.30)          | 7,900<br>(545)                  | 95<br>(6.6)                  | 10,000<br>(690)                 | 75<br>(5.1)                  | 10,000<br>(690)                 | 60<br>(4.13)                 | 10,000<br>(690)                 | 40<br>(2.8)                  |
|              | 3/4<br>(19.10)           | -                               | -                            | -                               | -                            | 10,000<br>(690)                 | 95<br>(6.6)                  | 10,000<br>(690)                 | 60<br>(4.1)                  |
|              | 1<br>(25.40)             | -                               | -                            | -                               | -                            | 6,500<br>(448)                  | 100<br>(6.90)                | 10,000<br>(690)                 | 85<br>(5.9)                  |
| 20SM         | 1/4<br>(6.35)            | 20,000<br>(1380)                | 95<br>(6.6)                  | 20,000<br>(1380)                | 50<br>(3.4)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 18,250<br>(1258)                | 95<br>(6.6)                  | 18,250<br>(1258)                | 50<br>(3.4)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 9,800<br>(676)                  | 95<br>(6.6)                  | 15,700<br>(1082)                | 75<br>(5.1)                  | 20,000<br>(1380)                | 85<br>(5.86)                 | 20,000<br>(1380)                | 55<br>(3.8)                  |
|              | 3/4<br>(19.10)           | -                               | -                            | 6,000<br>(414)                  | 75<br>(5.1)                  | 15,000<br>(1034)                | 100<br>(6.90)                | 20,000<br>(1380)                | 80<br>(5.5)                  |
|              | 1<br>(25.40)             | -                               | -                            | 4,000<br>(276)                  | 75<br>(5.1)                  | 10,000<br>(690)                 | 100<br>(6.90)                | 20,000<br>(1380)                | 100<br>(6.9)                 |
| 30SC         | 1<br>(25.40)             | -                               | -                            | -                               | -                            | -                               | -                            | 30,000<br>(2068)                | 100<br>(6.9)                 |
| 30VM         | 1/4<br>(6.35)            | 30,000<br>(2068)                | 75<br>(5.2)                  | 30,000<br>(2068)                | 40<br>(2.8)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 30,000<br>(2068)                | 95<br>(6.6)                  | 30,000<br>(2068)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 30,000<br>(2068)                | 95<br>(6.6)                  | 30,000<br>(2068)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |
| 40VM         | 9/16<br>(14.30)          | 40,000<br>(2758)                | 100<br>(6.9)                 | 40,000<br>(2758)                | 55<br>(3.8)                  | -                               | -                            | -                               | -                            |
| 60VM         | 1/4<br>(6.35)            | 60,000<br>(4137)                | 95<br>(6.6)                  | 60,000<br>(4137)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |
|              | 3/8<br>(9.53)            | 60,000<br>(4137)                | 95<br>(6.6)                  | 60,000<br>(4137)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |
|              | 9/16<br>(14.30)          | 60,000<br>(4137)                | 95<br>(6.6)                  | 60,000<br>(4137)                | 50<br>(3.5)                  | -                               | -                            | -                               | -                            |

**Note:** Actuator Selection Guide (choose actuator based on available air pressure)

# Fittings, Components & Accessories

|                        | Connection Sizes<br>in. (mm)   | Pressure Rating<br>psi (bar) | Connection Type                                                                                                                                            |                                                                                     |
|------------------------|--------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Medium Pressure</b> | 1/4 to 1-1/2<br>(6.35 to 25.4) | to 20,000<br>(1380)          | Coned-and-threaded type for high strength and repeated make-up. Anti-Vibration collet gland available in line collar and gland to minimize block thickness |  |
| <b>High Pressure</b>   | 1<br>(25.4)                    | to 43,000<br>(2964)          | Coned-and-threaded type for high strength and repeated make-up. Anti-vibration collet gland available.                                                     |  |
|                        | 1/4 to 9/16<br>(6.35 to 14.3)  | to 60,000<br>(4140)          | Coned-and-threaded type for high strength and repeated make-up. Anti-vibration collet gland available. Nested collar and gland to minimize block width.    |  |

|                        |                               |                              |  |  |  |  |  |  |
|------------------------|-------------------------------|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                        | O.D.<br>Tube Size<br>in. (mm) | Pressure Rating<br>psi (bar) | <b>Elbow</b>                                                                      | <b>Tee</b>                                                                        | <b>Cross</b>                                                                       | <b>Straight Coupling</b>                                                            | <b>Union Coupling</b>                                                               | <b>Bulkhead Coupling</b>                                                            |
| <b>Medium Pressure</b> | 1/4 (6.35)                    | 20,000 (1380)                | CLX4400                                                                           | CTX4440                                                                           | CXX4444                                                                            | 20FX4466                                                                            | 20UFX4466                                                                           | 20BFX4466                                                                           |
|                        | 3/8 (9.53)                    | 20,000 (1380)                | CLX6600                                                                           | CTX6660                                                                           | CXX6666                                                                            | 20FX6666                                                                            | 20UFX6666                                                                           | 20BFX6666                                                                           |
|                        | 9/16 (14.3)                   | 20,000 (1380)                | CLX9900                                                                           | CTX9990                                                                           | CXX9999                                                                            | 20FX9966                                                                            | 20UFX9966                                                                           | 20BFX9966                                                                           |
|                        | 3/4 (19.1)                    | 20,000 (1380)                | CLX12                                                                             | CTX12                                                                             | CXX12                                                                              | 20FX12                                                                              | 20UFX12                                                                             | 20BFX12                                                                             |
|                        | 1 (25.4)                      | 20,000 (1380)                | CLX16                                                                             | CTX16                                                                             | CXX16                                                                              | 20FX16                                                                              | 20UFX16                                                                             | 20BFX16                                                                             |
|                        | 1-1/2 (38.1)                  | 15,000 (1034)                | CLX24                                                                             | CTX24                                                                             | CXX24                                                                              | 15FX24                                                                              | 15UFX24                                                                             | 15BFX24                                                                             |
| <b>High Pressure</b>   | 1 (25.4)                      | 43,000 (2964)                | 43CL16                                                                            | 43CT16                                                                            | 43CX16                                                                             | 43F16                                                                               | 43UF16                                                                              | 43BF16                                                                              |
|                        | 9/16 (14.3)                   | 40,000 (2760)                | 40CL9900                                                                          | 40CT9990                                                                          | 40CX9999                                                                           | 40F9933                                                                             | 40UF9933                                                                            | 40BF9933                                                                            |
|                        | 1/4 (6.35)                    | 60,000 (4140)                | CL4400                                                                            | CT4440                                                                            | CX4444                                                                             | 60F4433                                                                             | 60UF4433                                                                            | 60BF4433                                                                            |
|                        | 3/8 (9.53)                    | 60,000 (4140)                | CL6600                                                                            | CT6660                                                                            | CX6666                                                                             | 60F6633                                                                             | 60UF6633                                                                            | 60BF6633                                                                            |
|                        | 9/16 (14.3)                   | 60,000 (4140)                | CL9900                                                                            | CT9990                                                                            | CX9999                                                                             | 60F9933                                                                             | 60UF9933                                                                            | 60BF9933                                                                            |

|                        |                               |                                 | Connection Components                                                               |                                                                                     |                                                                                     | Check Valves                                                                        |                                                                                      |                                                                                       | Line Filters                                                                          |                                                                                       | Safety Heads                                                                          |
|------------------------|-------------------------------|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                        |                               |                                 |  |  |  |  |  |  |  |  |  |
|                        | O.D.<br>Tube Size<br>in. (mm) | Pressure<br>Rating<br>psi (bar) | <b>Gland</b>                                                                        | <b>Collar</b>                                                                       | <b>Plug</b>                                                                         | <b>O-Ring</b>                                                                       | <b>Ball</b>                                                                          | <b>Excess Flow</b>                                                                    | <b>Dual Disc</b>                                                                      | <b>Cup Type</b>                                                                       | <b>Safety Heads</b>                                                                   |
| <b>Medium Pressure</b> | 1/4 (6.35)                    | 20,000 (1380)                   | CGLX40                                                                              | CCLX40                                                                              | CPX40                                                                               | CXO4400                                                                             | CXB4400                                                                              | CXK4402                                                                               | -                                                                                     | CXF4                                                                                  | CSX4600*                                                                              |
|                        | 3/8 (9.53)                    | 20,000 (1380)                   | CGLX60                                                                              | CCLX60                                                                              | CPX60                                                                               | CXO6600                                                                             | CXB6602                                                                              | CXK6602                                                                               | -                                                                                     | CXF6                                                                                  | CSX6600*                                                                              |
|                        | 9/16 (14.3)                   | 20,000 (1380)                   | CGLX90                                                                              | CCLX90                                                                              | CPX90                                                                               | CXO9900                                                                             | CXB9900                                                                              | CXK9902                                                                               | CLFX9900                                                                              | CXF9                                                                                  | CSX9600*                                                                              |
|                        | 3/4 (19.1)                    | 20,000 (1380)                   | CGLX120                                                                             | CCLX120                                                                             | CPX120                                                                              | CXO12                                                                               | CXB12                                                                                | CXK1202                                                                               | -                                                                                     | CXF12                                                                                 | -                                                                                     |
|                        | 1 (25.4)                      | 20,000 (1380)                   | CGLX160                                                                             | CCLX160                                                                             | CPX160                                                                              | CXO16                                                                               | CXB16                                                                                | CXK1602                                                                               | -                                                                                     | CXF16                                                                                 | -                                                                                     |
|                        | 1-1/2 (38.1)                  | 15,000 (1034)                   | CGLX240                                                                             | CCLX240                                                                             | CPX240                                                                              | CXO240                                                                              | CXB240                                                                               | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| <b>High Pressure</b>   | 1 (25.4)                      | 43,000 (2964)                   | CGLX160                                                                             | CCLX160                                                                             | 43CP160                                                                             | 43CO16                                                                              | 43CB16                                                                               | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
|                        | 9/16 (14.3)                   | 40,000 (2760)                   | AGL90                                                                               | ACL90                                                                               | AP90                                                                                | -                                                                                   | -                                                                                    | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
|                        | 1/4 (6.35)                    | 60,000 (4140)                   | AGL40                                                                               | ACL40                                                                               | AP40                                                                                | CKO4400                                                                             | CB4401                                                                               | CK4402                                                                                | CLF4400                                                                               | CF4                                                                                   | CS4600*                                                                               |
|                        | 3/8 (9.53)                    | 60,000 (4140)                   | AGL60                                                                               | ACL60                                                                               | AP60                                                                                | CKO6600                                                                             | CB6601                                                                               | CK6602                                                                                | CLF6600                                                                               | CF6                                                                                   | CS6600*                                                                               |
|                        | 9/16 (14.3)                   | 60,000 (4140)                   | AGL90                                                                               | ACL90                                                                               | AP90                                                                                | CKO9900                                                                             | CB9901                                                                               | CK9902                                                                                | CLF9900                                                                               | CF9                                                                                   | CS9600*                                                                               |

\* Note: See main catalog for complete model number.

# Tubing

Parker Autoclave Engineers offer a complete selection of Austenetic, cold drawn stainless steel tubing designed to match the performance standards of Parker Autoclave Engineers valves and fittings. PAE tubing is manufactured specifically for medium and high pressure applications requiring both strength and corrosion resistance. The tubing is furnished in random lengths between 20 and 26.5 feet (6.1 and 8.0 meter).

## Inspection and Testing

Parker Autoclave Engineers tubing is inspected to assure it will be free of seams, laps, fissures or other flaws, as well as carburization or intergranular carbide precipitation. The outside and inside diameters of the tubing are subject to special inspection and are controlled within close tolerances to assure proper fit. Sample pieces of tube for each lot are tested to confirm mechanical properties. Hydrostatic testing is also performed on a statistical basis and is conducted at the working pressure of the tube. Parker Autoclave Engineers will perform 100% hydrostatic testing or autofrettage for high cyclic applications at an additional cost if desired.

| Catalog Number | Tube Material | Fits Connection Type | Tube Size in (mm) |              | Wall Thickness Nom. in (mm) | Flow Area in <sup>2</sup> (mm <sup>2</sup> ) | Working Pressure psi (bar)   |               |               |               |               |
|----------------|---------------|----------------------|-------------------|--------------|-----------------------------|----------------------------------------------|------------------------------|---------------|---------------|---------------|---------------|
|                |               |                      | O.D. in (mm)      | I.D. in (mm) |                             |                                              | -325 to 100°F (-198 to 38°C) | 200°F (93°C)  | 400°F (204°C) | 600°F (316°C) | 800°F (427°C) |
| MS15-092       | 316SS         | SF250CX              | 1/4 (6.35)        | .109 (2.77)  | .070 (1.78)                 | .009 (5.81)                                  | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-192       | 304SS         |                      |                   |              |                             |                                              | 20,000 (1380)                | 18,950 (1310) | 17,200 (1190) | 17,000 (1170) | 16,150 (1110) |
| MS15-093       | 316SS         | SF375CX              | 3/8 (9.53)        | .203 (5.16)  | .086 (2.18)                 | .032 (20.6)                                  | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-193       | 304SS         |                      |                   |              |                             |                                              | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-085       | 316SS         | SF562CX              | 9/16 (14.3)       | .312 (7.92)  | .125 (3.17)                 | .076 (49)                                    | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-187       | 304SS         |                      |                   |              |                             |                                              | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-097       | 316SS         | SF562CX              | 9/16 (14.3)       | .359 (9.12)  | .101 (2.56)                 | .101 (65.2)                                  | 15,000 (1034)                | 15,000 (1034) | 14,400 (992)  | 13,650 (941)  | 12,670 (874)  |
| MS15-194       | 304SS         |                      |                   |              |                             |                                              | 15,000 (1034)                | 14,170 (977)  | 12,900 (890)  | 12,750 (880)  | 12,670 (874)  |
| MS15-095       | 316SS         | SF750CX              | 3/4 (19.1)        | .438 (11.1)  | .156 (3.96)                 | .151 (97.4)                                  | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 16,800 (1160) |
| MS15-098       | 316SS         |                      |                   | .516 (13.1)  | .117 (2.97)                 | .209 (135)                                   | 15,000 (1034)                | 15,000 (1034) | 14,400 (993)  | 13,650 (941)  | 12,670 (874)  |
| MS15-096       | 316SS         | SF1000CX             | 1 (25.4)          | .562 (14.3)  | .219 (5.56)                 | .248 (160)                                   | 20,000 (1380)                | 20,000 (1380) | 19,250 (1330) | 18,050 (1250) | 12,670 (874)  |
| MS15-099       | 316SS         |                      |                   | .688 (17.5)  | .156 (4.02)                 | .371 (239)                                   | 15,000 (1034)                | 15,000 (1034) | 14,400 (993)  | 13,650 (941)  | 12,670 (874)  |
| 13041          | 316SS         | SF1500CX             | 1-1/2 (38.1)      | .937 (23.8)  | .281 (7.14)                 | .589 (444.8)                                 | 15,000 (1034)                | 15,000 (1034) | 14,430 (995)  | 13,530 (932)  | 12,600 (868)  |
| MS15-081       | 316SS         | F250C                | 1/4 (6.35)        | .083 (2.11)  | .083 (2.11)                 | .005 (3.22)                                  | 60,000 (4140)                | 60,000 (4140) | 57,750 (3980) | 54,250 (3740) | 50,700 (3490) |
| MS15-182       | 304SS         |                      |                   |              |                             |                                              | 60,000 (4140)                | 56,800 (3910) | 51,650 (3560) | 50,700 (3500) | 48,450 (3340) |
| MS15-087       | 316SS         | F375C                | 3/8 (9.53)        | .125 (3.18)  | .125 (3.18)                 | .012 (7.74)                                  | 60,000 (4140)                | 60,000 (4140) | 57,750 (3980) | 54,250 (3740) | 50,700 (3490) |
| MS15-183       | 304SS         |                      |                   |              |                             |                                              | 60,000 (4140)                | 56,800 (3910) | 51,650 (3560) | 50,700 (3500) | 48,450 (3340) |
| MS15-090       | 316SS         | F562C40              | 9/16 (14.3)       | .25 (6.35)   | .156 (4.02)                 | .048 (31)                                    | 40,000 (2760)                | 40,000 (2760) | 38,500 (2655) | 36,100 (2489) | 33,800 (2330) |
| MS15-083       | 316SS         | F562C                | 9/16 (14.3)       | .187 (4.78)  | .187 (4.78)                 | .028 (18)                                    | 60,000 (4140)                | 60,000 (4140) | 57,750 (3980) | 54,250 (3740) | 50,700 (3490) |
| MS15-185       | 304SS         |                      |                   |              |                             |                                              | 60,000 (4140)                | 56,800 (3910) | 51,650 (3560) | 50,700 (3500) | 48,450 (3340) |
| MS15-211       | 316SS         | -                    | 1 (25.4)          | .438 (11.1)  | .281 (7.14)                 | .151 (97.4)                                  | 43,000 (2964)                | 43,000 (2964) | 43,000 (2964) | 41,380 (2853) | 36,330 (2504) |

**Note:** For autofrettage tubing, add suffix "ESR42" to the tubing part number.



# Coned and Threaded Nipples

For rapid system make-up, Parker Autoclave Engineers supplies pre-cut, coned-and-threaded nipples in various sizes and lengths for Parker Autoclave Engineers valves and fittings.

## Special lengths

In addition to the standard lengths listed in the table below, nipples are available in any custom length. Consult factory.

## Materials

Catalog numbers in table refer to Type 316 stainless steel, unless specified.

| Working Fits<br>Connection<br>Type | Tube Size in (mm) |                 | Pressure at<br>100°F (38°C)<br>psi (bar) | Catalog Number  |              |              |              |              |               |               |
|------------------------------------|-------------------|-----------------|------------------------------------------|-----------------|--------------|--------------|--------------|--------------|---------------|---------------|
|                                    | O.D.              | I.D.            |                                          | 2.75"<br>Length | 3"<br>Length | 4"<br>Length | 6"<br>Length | 8"<br>Length | 10"<br>Length | 12"<br>Length |
| SF250CX                            | 1/4<br>(6.35)     | .109<br>(2.77)  | 20,000<br>(1380)                         | CNX4402         | CNX4403      | CNX4404      | CNX4406      | CNX4408      | CNX44010      | CNX44012      |
| SF375CX                            | 3/8<br>(9.53)     | .203<br>(5.16)  | 20,000<br>(1380)                         |                 | CNX6603      | CNX6604      | CNX6606      | CNX6608      | CNX66010      | CNX66012      |
| SF562CX                            | 9/16<br>(14.3)    | .312<br>(7.92)  | 20,000<br>(1380)                         |                 |              | CNX9904      | CNX9906      | CNX9908      | CNX99010      | CNX99012      |
| SF562CX                            | 9/16<br>(14.3)    | .359<br>(9.12)  | 15,000<br>(1034)                         |                 |              | CNLX9904     | CNLX9906     | CNLX9908     | CNLX99010     | CNLX99012     |
| SF750CX                            | 3/4<br>(19.1)     | .438<br>(11.1)  | 20,000<br>(1380)                         |                 |              | CNX1204      | CNX1206      | CNX1208      | CNX12010      | CNX12012      |
| SF750CX                            | 3/4<br>(19.1)     | .515<br>(13.1)  | 15,000<br>(1034)                         |                 |              | CNLX1204     | CNLX1206     | CNLX1208     | CNLX12010     | CNLX12012     |
| SF1000CX                           | 1<br>(25.4)       | .562<br>(14.3)  | 20,000<br>(1380)                         |                 |              |              | CNX1606      | CNX1608      | CNX16010      | CNX16012      |
| SF1000CX                           | 1<br>(25.4)       | .688<br>(17.5)  | 15,000<br>(1034)                         |                 |              |              | CNLX1606     | CNLX1608     | CNLX16010     | CNLX16012     |
| SF1500CX                           | 1-1/2<br>(38.1)   | .937<br>(23.79) | 15,000<br>(1034)                         |                 |              |              | CNLX2406 *   | CNLX2408 *   | CNLX24010 *   | CNLX24012 *   |
| F250C                              | 1/4<br>(6.35)     | .083<br>(2.11)  | 60,000<br>(4140)                         | CN4402          | CN4403       | CN4404       | CN4406       | CN4408       | CN44010       | CN44012       |
| F375C                              | 3/8<br>(9.53)     | .125<br>(3.18)  | 60,000<br>(4140)                         |                 | CN6603       | CN6604       | CN6606       | CN6608       | CN66010       | CN66012       |
| F562C                              | 9/16<br>(14.3)    | .187<br>(4.78)  | 60,000<br>(4140)                         |                 |              | CN9904       | CN9906       | CN9908       | CN99010       | CN99012       |
| F562C40                            | 9/16<br>(14.3)    | .250<br>(6.35)  | 40,000<br>(2760)                         |                 |              | 40CN9904 *   | 40CN9906 *   | 40CN9908 *   | 40CN99010 *   | 40CN99012 *   |
| F1000C43                           | 1<br>(25.4)       | .438<br>(11.1)  | 43,000<br>(2964)                         |                 |              |              | 43CN1606     | 43CN1608     | 43CN16010     | 43CN16012     |

Note: \* only available in 316 material

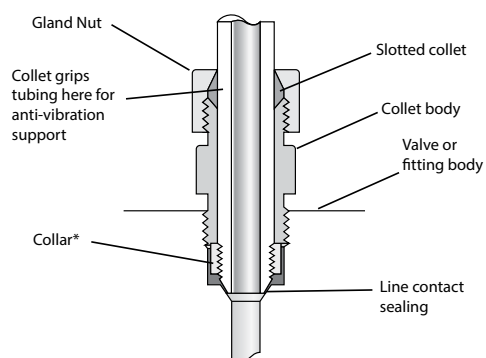


# Anti Vibration Collet Gland Assemblies

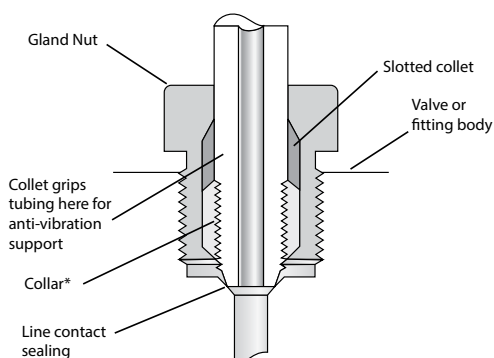
Vibration and/or shock can be present in tubing systems, especially if the valve or fitting happens to be located on an unsupported line near a compressor or pump. For this reason, Parker Autoclave Engineers coned-and-threaded connections are offered with the Parker Autoclave Engineers Anti-Vibration Collet Gland Assemblies. Completely interchangeable with standard Parker Autoclave Engineers high pressure connections, the Collet Gland Assemblies provide equally effective pressure handling capability.

| O.D. Tubing Size<br>in (mm) | Catalog Number               |                              |
|-----------------------------|------------------------------|------------------------------|
|                             | Medium Pressure<br>to 20,000 | High Pressure<br>to 60,000   |
| 1/4 (6.35)                  | KCBGLX40-316MC               | KCGL40-316                   |
| 3/8 (9.53)                  | KCBGLX60-316MC               | KCGL60-316                   |
| 9/16 (14.3)                 | KCBGLX90-316MC               | KCGL90-316                   |
| 3/4 (19.1)                  | KCBGLX120-316MC              | -                            |
| 1 (25.4)                    | KCBGLX160-316MC              | <sup>+</sup> KCBGLX160-316MC |
| 1-1/2 (38.1)                | KCBGLX240-316MC              | -                            |

<sup>+</sup> 1" High Pressure to 43,000 psi (2964 bar)



**Series KCBGLX**  
Pressures to 20,000 psi (1380 bar)



**Series KCGL**  
Pressures to 60,000 psi (1440 bar)

\* Collar not included in complete assembly.



# Male/Female Adapters

Male/female adapters are designed to adapt a female connection direct to another size and/or type of connection. In selecting an adapter involving two different sized connections, the larger connection should be on the male end where it is possible to maximize the mechanical strength of the adapter. See valve fitting and tubing catalog for complete selection.

## How to use the Ordering Chart:

1. Locate MALE end in the vertical column.
2. Locate desired FEMALE end of adapter across top of chart.
3. The catalog number of the required adapter is located at the intersection of the two columns.



| FEMALE END ▶         |                                   |                      |                  | P-AE Medium Pressure     |                          |                           |                          |                         |                             | P-AE High Pressure      |                        |                        |                         |                           |
|----------------------|-----------------------------------|----------------------|------------------|--------------------------|--------------------------|---------------------------|--------------------------|-------------------------|-----------------------------|-------------------------|------------------------|------------------------|-------------------------|---------------------------|
|                      |                                   |                      |                  | 1/4<br>(6.35)<br>SF250CX | 3/8<br>(9.53)<br>SF375CX | 9/16<br>(14.3)<br>SF562CX | 3/4<br>(19.1)<br>SF750CX | 1<br>(25.4)<br>SF1000CX | 1-1/2<br>(38.1)<br>SF1500CX | 1<br>(25.4)<br>F1000C43 | 1/4<br>(6.35)<br>F250C | 3/8<br>(9.53)<br>F375C | 9/16<br>(14.3)<br>F562C | 9/16<br>(14.3)<br>F562C40 |
| MALE<br>END<br>▼     | Fits this<br>FEMALE<br>Connection | Press.<br>psi* (bar) | 20,000<br>(1380) | 20,000<br>(1380)         | 20,000<br>(1380)         | 20,000<br>(1380)          | 20,000<br>(1380)         | 15,000<br>(1034)        | 43,000<br>(2964)            | 60,000<br>(4140)        | 60,000<br>(4140)       | 60,000<br>(4140)       | 40,000<br>(2758)        |                           |
| P-AE Medium Pressure | 1/4<br>(6.35)                     | SF250CX              | 20,000<br>(1380) |                          | 20M46K6                  | 20M49K6                   | 20M412K6                 | 20M416K6                | 15M424K6                    |                         | 20M44K3                | 20M46K3                | 20M49K3                 |                           |
|                      | 3/8<br>(9.53)                     | SF375CX              | 20,000<br>(1380) | 20M64K6                  |                          | 20M69K6                   | 20M612K6                 | 20M616K6                |                             |                         | 20M64K3                | 20M66K3                | 20M69K3                 |                           |
|                      | 9/16<br>(14.3)                    | SF562CX              | 20,000<br>(1380) | 20M94K6                  | 20M96K6                  |                           | 20M912K6                 | 20M916K6                | 15M924K6                    |                         | 20M94K3                | 20M96K3                | 20M99K3                 |                           |
|                      | 3/4<br>(19.1)                     | SF750CX              | 20,000<br>(1380) | 20M124K6                 | 20M126K6                 | 20M129K6                  |                          | 20M1216K6               | 15M1224K6                   | 20M1216K3               | 20M124K3               | 20M126K3               | 20M129K3                | 20M129K40                 |
|                      | 1<br>(25.4)                       | SF1000CX             | 20,000<br>(1380) | 20M164K6                 | 20M166K6                 | 20M169K6                  | 20M1612K6                | 20M1616K6               | 15M1624K6                   |                         | 20M164K3               | 20M166K3               | 20M169K3                |                           |
|                      | 1-1/2<br>(38.1)                   | SF1500CX             | 15,000<br>(1034) | 15M244K6                 |                          | 15M249K6                  | 15M2412K6                | 15M2416K6               | 15M2424K6                   |                         |                        |                        |                         |                           |
| P-AE High Pressure   | 1<br>(25.4)                       | F1000C43             | 43,000<br>(2964) |                          |                          |                           |                          |                         | 15M1624B6                   |                         | 43M164B3               | 43M166B3               | 43M169B3                | 43M169B40                 |
|                      | 1/4<br>(6.35)                     | F250C                | 60,000<br>(4140) | 20M44B6                  | 20M46B6                  | 20M49B6                   | 20M412B6                 |                         | 15M424B6                    |                         |                        | 60M46B3                | 60M49B3                 |                           |
|                      | 3/8<br>(9.53)                     | F375C                | 60,000<br>(4140) | 20M64B6                  | 20M66B6                  | 20M69B6                   | 20M612B6                 | 20M616B6                |                             | 43M416B6                | 60M64B3                |                        | 60M69B3                 |                           |
|                      | 9/16<br>(14.3)                    | F562C                | 60,000<br>(4140) | 20M94B6                  | 20M96B6                  | 20M99B6                   | 20M912B6                 | 20M916B6                |                             | 43M616B6                | 60M94B3                | 60M96B3                |                         |                           |
|                      | 9/16<br>(14.3)                    | F562C40              | 40,000<br>(2758) |                          |                          |                           | 20M912G6                 |                         |                             | 43M916B6                |                        |                        |                         |                           |

\* Pressure Rating - The pressure rating of Parker Autoclave Engineers couplings is based on the lower rated connection used.

## Other Adapters

Parker Autoclave Engineers supplies many other types of adapters on special orders. These include NPT, Butt weld, Socket weld, QSS, Ez-Union, Male SAE-Oring, JIC connections and others.

## Materials

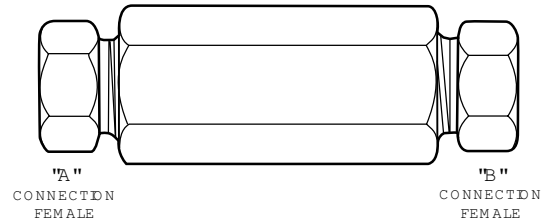
All Parker Autoclave Engineers adapters are precision machined from cold-worked Type 316 stainless steel. Other materials available on special order.

# Adapter Couplings

The couplings shown here permit the joining of any combination of standard size Parker Autoclave Engineers tubing with female-to-female couplings. Other couplings available on special order. See valve fitting and tubing catalog for complete selection.

## How to use the Ordering Chart:

1. Locate "A" connection in the vertical column.
2. Locate the desired "B" connection across the top of the chart.
3. The catalog number of the required coupling is located at the intersection of the two columns.



| “A” Connection       |                   |                 |                   | “B” Connection       |                    |                     |                    |                   |                        |                    |                  |                  |                   |                     |
|----------------------|-------------------|-----------------|-------------------|----------------------|--------------------|---------------------|--------------------|-------------------|------------------------|--------------------|------------------|------------------|-------------------|---------------------|
|                      |                   |                 |                   | P-AE Medium Pressure |                    |                     |                    |                   |                        | P-AE High Pressure |                  |                  |                   |                     |
|                      | Tube Size in (mm) | Connection Type | Press. psi* (bar) | 1/4 (6.35) SF250CX   | 3/8 (9.53) SF375CX | 9/16 (14.3) SF562CX | 3/4 (19.1) SF750CX | 1 (25.4) SF1000CX | 1-1/2 (38.1) SF15000CX | 1 (25.4) F1000C43  | 1/4 (6.35) F250C | 3/8 (9.53) F375C | 9/16 (14.3) F562C | 9/16 (14.3) F562C40 |
| P-AE Medium Pressure | 1/4 (6.35)        | SF250CX         | 20,000 (1380)     | 20FX4466             | 20F4666            | 20F4966             | 20F41266           | 20F41666          | 15FX42466              | 20F41663           | 20F4463          | 20F4663          | 20F4963           |                     |
|                      | 3/8 (9.53)        | SF375CX         | 20,000 (1380)     |                      | 20FX6666           | 20F6966             | 20F61266           | 20F61666          |                        | 20F61663           | 20F6463          | 20F6663          | 20F6963           |                     |
|                      | 9/16 (14.3)       | SF562CX         | 20,000 (1380)     |                      |                    | 20FX9966            | 20F91266           | 20F91666          | 15FX92466              |                    | 20F9463          | 20F9663          | 20F9963           |                     |
|                      | 3/4 (19.1)        | SF750CX         | 20,000 (1380)     |                      |                    |                     | 20FX12             | 20F121666         |                        |                    | 20F12463         | 20F12663         | 20F12963          |                     |
|                      | 1 (25.4)          | SF1000CX        | 20,000 (1380)     |                      |                    |                     |                    | 20FX16            |                        |                    | 20F16463         | 20F16663         | 20F16963          |                     |
|                      | 1-1/2 (38.1)      | SF1500CX        | 15,000 (1034)     |                      |                    |                     |                    |                   | 15FX24                 |                    |                  |                  |                   |                     |
| P-AE High Pressure   | 1 (25.4)          | F1000C43        | 43,000 (2964)     |                      |                    |                     |                    |                   |                        | 43F16              |                  |                  |                   |                     |
|                      | 1/4 (6.35)        | F250C           | 60,000 (4140)     |                      |                    |                     |                    |                   |                        | 43F41633           | 60F4433          | 60F4633          | 60F4933           |                     |
|                      | 3/8 (9.53)        | F375C           | 60,000 (4140)     |                      |                    |                     |                    |                   |                        | 43F61633           |                  | 60F6633          | 60F6933           |                     |
|                      | 9/16 (14.3)       | F562C           | 60,000 (4140)     |                      |                    |                     |                    |                   |                        | 43F91633           |                  |                  | 60F9933           |                     |
|                      | 9/16 (14.3)       | F562C           | 40,000 (2758)     |                      |                    |                     |                    |                   |                        |                    |                  |                  |                   | 40F9933             |



# Ball Valves

## High Pressure

Parker Autoclave Engineers Ball Valves are designed for on-off, high flow, high pressure applications and provide superior quality with maximum performance. Our unique one-piece trunnion mounted stem/ball eliminates the shear failure common in two-piece designs. Our re-torqueable seat glands result in longer seat life and our low friction stem seal reduces actuation torque and enhances cycle life.

Parker Autoclave Engineers ball valves can be operated safely up to 20,000 psi and up to 400°F (204°C), and up to 500°F with the high temperature option. 2-way, 3-way & 4-Way Switching & Crossover styles are available.



### Order Matrix:

| 2B                    | 4            | S                                 | 20                                        | M                                | 4                   | - |                         |
|-----------------------|--------------|-----------------------------------|-------------------------------------------|----------------------------------|---------------------|---|-------------------------|
| Valve Series          | Ball Orifice | Material                          | Maximum Rated Pressure x1000 <sup>1</sup> | End Connection Type <sup>2</sup> | End Connection Size |   | Options                 |
| 2B = 2 Way            | 3 = 3/16"    | S = 316 SS                        | 5                                         | L = Low Pressure                 | 2 = 1/8"            |   | HT = High Temp.         |
| 3B = 3 Way            | 4 = 1/4"     | for other options contact factory | 10                                        | M = Medium Pressure              | 4 = 1/4"            |   | AO = Air to Open        |
| 3BD = 3 Way Diverter  | 6 = 3/8"     |                                   | 15                                        | H = High Pressure                | 6 = 3/8"            |   | AC = Ait to Close       |
| 4B = 4 way Crossover  | 8 = 1/2"     |                                   | 20                                        | P = NPT                          | 8 = 1/2"            |   | AOC = Ait to Open/Close |
| 4BS = 4 Way Switching | 12 = 3/4"    |                                   |                                           |                                  | 9 = 9/16"           |   | E01 = Electric 120VAC   |
|                       | 16 = 1"      |                                   |                                           |                                  | 12 = 3/4"           |   | E02 = Electric 220VAC   |
|                       |              |                                   |                                           |                                  | 1 = 1"              |   | E03 = Electric 240VAC   |

**Note:** Matrix can build valves not yet available, refer to main catalog for exact size/valve series selection

1 = Pressure chosen after considering orifice size, connection and temperature requirements - see main catalog for all available operations.

2 = Low Pressure connection sizes 1/8" through 1/2", Medium and High Pressure connections not available in 1/8" or 1/2"

## Double Block and Bleed Ball Valves

Parker Autoclave Engineers series 6DB Double Block Valve is a 2-stem ball valve combined with a separate needle valve that provides a convenient method of blocking and bleeding an instrument injection port, gauge, or provides drain line isolation, decreasing leak points and reducing overall weight. This full port quarter turn double ball valve is designed for operation up to 15,000 psi (1034 bar).



## Subsea Series Ball Valves

Parker Autoclave Engineers subsea ball valves have been designed to fulfill the ever growing demand by the Petroleum Industry for externally pressurized components. Utilizing the proven technologies that make our ball valve "best in class", we've incorporated the necessary design features to provide a reliable externally pressurized valve for the subsea industry and simplified the mounting for ROV, diver, or remote actuation capabilities. Our 2-way and 3-way Subsea Series valves are able to withstand up to 20,000 psi (1380 bar) internal pressures at up to 12,500' (3810 meters) water depth.





# Instrument Quality Gauges

## Materials and Features

- Accuracy within  $\pm 0.5\%$  of full scale range
- Plastic dial cover/solid front aluminum alloy case
- Blow-out back panel for pressure relief in the event of Bourdon tube failure
- 316 Stainless steel Bourdon tubes\*\*
- Precision stainless steel movement for accuracy and resistance to atmospheric corrosion
- Pointer zero adjustment located on front of gauge behind dial cover for convenience

## Instrument quality gauges

- Flush panel mounting - Panel mounting kits are stocked to permit flush panel mounting of any instrument quality gauge. These will be furnished at an additional charge when specified on order -- add "PM" to order number.
- Optional electrical contact face - Available for all instrument quality gauges. With adjustable low and high electrical contacts, this option permits gauges to provide pressure control for automatic or remote operation, or for fail-safe set points.

\*\* Bourdon Tube material for 0-80,000 psi (0-5116 bar) and 0-50,000 psi (0-3447 bar) gauge is Inconel 718.  
Bourdon Tube material for 0-30,000 psi (0-2068 bar) gauge is K Monel.

| Calibrated in psi Only |                      |                            |                        |
|------------------------|----------------------|----------------------------|------------------------|
| Catalog Number         | Pressure Range (psi) | Minor Interval Value (psi) | Dial Diameter (inches) |
| P-0499-CG              | 0-1000               | 10                         | 4-1/2"                 |
| P-0479-CG              | 0-1500               | 10                         | 4-1/2"                 |
| P-0480-CG              | 0-3000               | 20                         | 4-1/2"                 |
| P-0481-CG              | 0-5000               | 50                         | 4-1/2"                 |
| P-0482-CG              | 0-10,000             | 100                        | 4-1/2"                 |
| P-0483-CG              | 0-15,000             | 100                        | 4-1/2"                 |
| P-0487-CG              | 0-20,000             | 200                        | 4-1/2"                 |
| P-0488-CG**            | 0-30,000             | 200                        | 6"                     |
| P-0489-CG**            | 0-50,000             | 500                        | 6"                     |
| P-0490-CG**            | 0-80,000             | 1,000                      | 6"                     |

| Optional Electrical Contact Face |                                    |
|----------------------------------|------------------------------------|
| Catalog Number                   | Fits Gauges Dial Diameter (inches) |
| P-0713                           | 4-1/2"                             |
| P-0714                           | 6"                                 |

**Note:** Gauges available with back connections. Add B to the base catalog number. Ex: P-047B-CG  
1/4" (F250C) Coned-and-Threaded Connection Furnished with Collar and Gland



# Manifolds and Relief Valves

## Manifold Blocks

Specialty pressure manifolds minimize space requirements and reduce installation time necessary to plumb a pressure system. In addition, by reducing the number of components used in a system, manifolds reduce the number of potential leak joints.

Parker Autoclave Engineers will design and build pressure manifolds to meet specific installation, layout and pressure requirements. These manifolds are capable of withstanding pressures from vacuum to 60,000 psi (4137 bar), and are available in a variety of materials and sizes. Among the pressure connections that can be incorporated are Parker Autoclave Engineers' low, medium and high pressure, NPT, SAE, BSP and others. Transitions in system line sizes and tubing pressure series can be accomplished through a specialty manifold. These manifolds are appropriate wherever pressure tubing systems are utilized.



## Relief Valves: RVP-Metal Seat and RVS-Soft Seat Series

Series RVP & RVS relief valves provide reliable venting of gases or liquids for set pressures from 1,500 psi (103 bar) to 60,000 psi (4140 bar). Standard temperature range on RVP models is -423° F to 400° F (-253° C to 204° C). High temperature option to 750° F (400° C) also available. Temperature range on RVS model is 32° F to 400° F (0° C to 204° C). (Note: Seat material is Arlon).

These precision valves are designed for pressure gas systems, cryogenic systems, petrochemical applications and other special systems. They are capable of handling air, gases, steam, vapor and liquids. They are not recommended for steam boiler applications and are not ASME code stampable.

Relief valves are designed to open proportionally to increasing back pressure and, therefore, are not recommended for applications requiring immediate full valve flow at set pressure (such as decompositions, polymerizations, etc.). Full flow of relief valve is defined at 10% over set pressure.

| Catalog Number | Connection Size & Type (inches) |             | Orifice in (mm) | Pressure Rating<br>PSIG @ 100°F (bar @ 38°C) |               |              |
|----------------|---------------------------------|-------------|-----------------|----------------------------------------------|---------------|--------------|
|                | Inlet                           | Outlet FNPT |                 | Minimum Set                                  | Maximum Set   | Maximum Back |
| 5RVP9072       | SF562CX                         | 3/4 (19.1)  | .312 (7.92)     | 3,000 (207)                                  | 5,000 (345)   | 500 (34.5)   |
| 10RVP9072      | SF562CX                         | 3/4 (19.1)  | .250 (6.35)     | 5,000 (345)                                  | 10,000 (690)  | 500 (34.5)   |
| 15RVP9072      | SF562CX                         | 3/4 (19.1)  | .188 (4.78)     | 10,000 (689)                                 | 15,000 (1034) | 500 (34.5)   |
| 20RVP9072      | SF562CX                         | 3/4 (19.1)  | .156 (4.02)     | 15,000 (1034)                                | 20,000 (1379) | 500 (34.5)   |
| 30RVP6072      | F375C                           | 3/4 (19.1)  | .125 (3.18)     | 20,000 (1379)                                | 30,000 (2068) | 500 (34.5)   |
| 45RVP9072      | F562C                           | 3/4 (19.1)  | .093 (2.36)     | 25,000 (1724)                                | 45,000 (3103) | 500 (34.5)   |
| 60RVP6072      | F375C                           | 3/4 (19.1)  | .078 (1.98)     | 30,000 (2060)                                | 60,000 (4137) | 500 (34.5)   |
| Soft Seat      |                                 |             |                 |                                              |               |              |
| 5RVS9072       | SF562CX                         | 3/4 (19.1)  | .312 (7.92)     | 1,500 (103)                                  | 5,000 (345)   | 500 (34.5)   |
| 10RVS9072      | SF562CX                         | 3/4 (19.1)  | .250 (6.35)     | 5,000 (345)                                  | 10,000 (690)  | 500 (34.5)   |
| 20RVS9072      | SF562CX                         | 3/4 (19.1)  | .156 (4.02)     | 10,000 (690)                                 | 20,000 (1379) | 500 (34.5)   |



# Tools

## Manual Coning and Threading Tools

Parker Autoclave Engineers manufactures a manual coning tool for optimum coning performance with tubing sizes up to 9/16" (14.3 mm) O.D. This is a precision quality manual tool to permit on-site end preparation for AE medium and high pressure tubing installations. Interchangeable collets for each size tubing provide proper centering of tubing. The cutting feed arrangement permits the operator to control the depth of cut to assure against work hardening effects. Interchangeable tool steel cutting blades are used in pairs to assure more accurate and faster coning and are designed to square-off and finish the tube as the cone is completed. There is a provision for applying metal cutting lubricants to the cutting zone.

The threading die holder is designed to hold the appropriate die for any of the standard Parker Autoclave Engineers tubing sizes through 9/16" (14.3 mm) O.D. Interchangeable guide bushings properly guide the tool for accurate thread cutting.

**Note:** Complete tool kits are available. Consult factory



**Threading Tool**

\* For coning tool with optional Vice Arm and Oil/Chip Reservoir, add RS suffix to model number. Ex: MCTM4-RS

|                     | Tube Size       |                 | Coning Tools and Components Catalog Number |        |                             | Threading Tools and Components Catalog Number |              |               |         |               |
|---------------------|-----------------|-----------------|--------------------------------------------|--------|-----------------------------|-----------------------------------------------|--------------|---------------|---------|---------------|
|                     | O.D.<br>in (mm) | I.D.<br>in (mm) | Tool with<br>Collet & Blades               | Collet | Coning Blades<br>(Set of 2) | Tool with<br>Die & Bushing                    | Tool<br>Only | Threading Die |         | Guide Bushing |
| PAE Medium Pressure | 1/4 (6.35)      | .109 (2.77)     | MCTM4                                      | 90248  | 101F-1577                   | 402A                                          | 402          | P-0214        | 1/4-28  | 1010-0343     |
|                     | 3/8 (9.53)      | .203 (5.16)     | MCTM6                                      | 90250  | 101F-1601                   | 402C                                          | 402          | P-0215        | 3/8-24  | 1010-0344     |
|                     | 9/16 (14.3)     | .312 (7.92)     | MCTM920                                    | 90251  | 1010-5218                   | 402E                                          | 402          | P-0216        | 9/16-18 | 1010-0345     |
|                     | 9/16 (14.3)     | .359 (9.12)     | MCTM910                                    | 90251  | 101A-1897                   | 402E                                          | 402          | P-0216        | 9/16-18 | 1010-0345     |
| PAE High Pressure   | 1/4 (6.35)      | .083 (2.11)     | MCTH4                                      | 90248  | 101F-3939                   | 402A                                          | 402          | P-0214        | 1/4-28  | 1010-0343     |
|                     | 3/8 (9.53)      | .125 (3.18)     | MCTH6                                      | 90250  | 101F-1578                   | 402C                                          | 402          | P-0215        | 3/8-24  | 1010-0344     |
|                     | 9/16 (14.3)     | .188 (4.78)     | MCTH960                                    | 90251  | 1010-0883                   | 402E                                          | 402          | P-0216        | 9/16-18 | 1010-0345     |
|                     | 9/16 (14.3)     | .250 (6.35)     | MCTH940                                    | 90251  | 101C-7214                   | 402E                                          | 402          | P-0216        | 9/16-18 | 1010-0345     |

### Cutting Oil: P-8784

• All threads for PAE medium pressure and high pressure tubing are LH national fine (class 2).

**Note:** Manual coning and threading tools for 3/4" (19.1 mm) and 1" (25.4 mm) O.D. medium pressure tubing are not available. Model AEGCTM-2 Power

Coning-and-Threading Machine is recommended for this tubing. A minimum of 3" (76 mm) straight length is required to perform coning and threading operation for manual coning tool.

# Tools

## P-AE Micrometer Adjustable Torque Wrench

P-1680 20 to 150 ft. lbs. (27 to 203 Nm)

91020 75 to 250 ft. lbs. (102 to 339 Nm)

Accurate tightening for all Parker Autoclave Engineers valve packing glands and tube nuts is essential. The wrench can be adjusted to the ranges shown and is used with interchangeable wrench adapters for hex sizes from 1/2" through 1-7/8". Part numbers for wrench adapters are listed on chart.



| Packing Gland or Tube Nut Hex Size in (mm) | 1/2 (12.7) | 9/16 (14.3) | 5/8 (15.9) | 3/4 (19.05) | 13/16 (20.6) | 7/8 (22.2) | 15/16 (23.8) | 1 (25.4) | 1-1/16 (27) | 1-3/16 (30.2) | 1-3/8 (34.9) | 1-1/2 (38.1) | 1-7/8 (47.6) |
|--------------------------------------------|------------|-------------|------------|-------------|--------------|------------|--------------|----------|-------------|---------------|--------------|--------------|--------------|
| Wrench Adapter Number                      | P-1681     | P-1682      | P-1683     | P-9813      | P-1685       | P-1686     | P-1687       | P-9901   | P-1688      | P-1689        | P-1690       | P-6040       | P-10076      |

## Hydraulic Tube Bender

For single pass bending of high pressure tubing. The Parker Autoclave Engineers hydraulic tube bender is designed to bend heavy wall tubing quickly, accurately and reliably with only one setup. The tube bender is complete with pump, cylinder, frame and bending shoes which are self-contained in a portable, lockable case. (Order number: HTB)

Air operated hydraulic pump option available in place of hand pump. (Order Number: HTB-A)



## Coning and Threading Machine

Ordering Procedure: Model # AEGCTM-2 (CE Version: Model #AEGCTM-2E-CE)

Separate heads for coning and threading are powered by a single motor and drive system. Available models cone and thread Parker Autoclave Engineers medium and high pressure tubing.

Approximate dimensions: 56" high, 28" wide and 20" deep (1.4 m x .7 m x .5 m). Shipping weight is 350 pounds (159 kg). Tooling ordered separately. Consult factory.

### Features

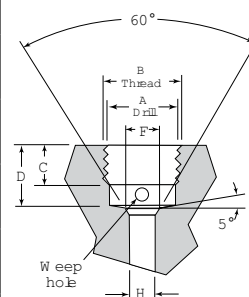
- One-half hp motor, 115 VAC 60 Hz (220 VAC 50 Hz) volt capacitor start.
- No reversing necessary on threading operation; pop-open die prevents thread damage.
- Complete tooling is available; specify tooling sizes required.
- Coning head has feed wheel for easy, precision feeding.
- Complete with oil pump and reservoir.
- Unit mounted on stand complete with locking casters for ease of mobility and stability.
- Available with optional reservoir heater
- CE mark standard on 220 VAC 50 Hz models



# Connections

## P-AE Medium Pressure SFCX

| Tube<br>O.D.<br>in (mm) | Connection<br>Type        | Dimensions inches (mm) |           |                |                |                 |                            |
|-------------------------|---------------------------|------------------------|-----------|----------------|----------------|-----------------|----------------------------|
|                         |                           | A                      | B         | C              | D              | F               | H                          |
| 1/4<br>(6.35)           | SF250CX20                 | 25/64                  | 7/16 -20  | .28<br>(7.11)  | .50<br>(12.7)  | .19<br>(4.83)   | .109<br>(2.77)             |
| 3/8<br>(9.53)           | SF375CX20                 | 33/64                  | 9/16 -18  | .38<br>(9.65)  | .62<br>(15.7)  | .31<br>(7.87)   | .203<br>(5.16)             |
| 9/16<br>(14.3)          | SF562CX10*<br>SF562CX20   | 3/4                    | 13/16 -16 | .44<br>(11.2)  | .75<br>(19.1)  | .50<br>(12.7)   | .359 (9.12)<br>.312 (7.9)  |
| 3/4<br>(19.1)           | SF750CX10*<br>SF750CX20   | 61/64 <sup>1</sup>     | 3/4 -14   | .50<br>(12.7)  | .94<br>(23.9)  | .62<br>(15.7)   | .516 (13.1)<br>.438 (11.1) |
| 1<br>(25.4)             | SF1000CX10*<br>SF1000CX20 | 1-19/64                | 1-3/8 -12 | .81<br>(20.6)  | 1.31<br>(33.3) | .88<br>(22.4)   | .688 (17.5)<br>.562 (14.3) |
| 1-1/2<br>(38.1)         | SF1500CX                  | 1-51/64                | 1-7/8 -12 | 1.00<br>(25.4) | 1.59<br>(40.5) | 1.375<br>(34.9) | .937<br>(23.8)             |

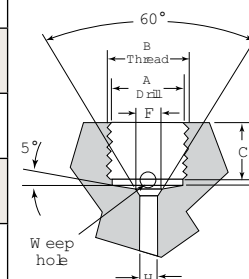


**Note:** <sup>1</sup> = NPS Male Tap

\* Connection used in fittings rated for 20,000 psi (1379)

## P-AE High Pressure FC

| Tube<br>O.D.<br>in (mm) | Connection<br>Type | Dimensions inches (mm) |           |               |                |               |                |
|-------------------------|--------------------|------------------------|-----------|---------------|----------------|---------------|----------------|
|                         |                    | A                      | B         | C             | D              | F             | H              |
| 1/4<br>(6.35)           | F250C              | 33/64                  | 9/16 -18  | .38<br>(9.65) | .44<br>(11.2)  | .17<br>(4.32) | .094<br>(2.39) |
| 3/8<br>(9.53)           | F375C              | 11/16                  | 3/4 -16   | .53<br>(13.5) | .62<br>(15.7)  | .26<br>(6.60) | .125<br>(3.18) |
| 9/16<br>(14.3)          | F562C              | 1-3/64                 | 1-1/8 -12 | .62<br>(15.7) | .75<br>(19.1)  | .38<br>(9.65) | .188<br>(4.78) |
| 3/4<br>(19.1)           | F562C40            | 1-3/64                 | 1-1/8 -12 | .62<br>(15.7) | .75<br>(19.1)  | .38<br>(9.65) | .250<br>(6.35) |
| 1<br>(25.4)             | F1000C43           | 1-19/64                | 1-3/8 -12 | .81<br>(20.6) | 1.31<br>(33.3) | .88<br>(22.4) | .438<br>(11.1) |



**Note:** All dimensions are shown for reference only and should not be considered as actual machining dimensions.

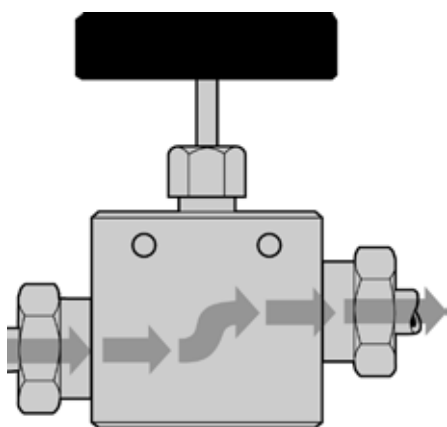
For port Diameter please see orifice sizes for specific valves and fittings. All threads are manufactured to a class 2A or 2B fit.



# Flow Calculations

Coefficient of flow ( $C_v$ ) for a valve is the volume of water in U.S. gallons per minute at room temperature...which will flow through the valve with the stem fully open...with a pressure drop of 1 psi across the valve.  $C_v$  is the valve sizing factor that permits selection of the appropriate valve to meet the flow requirements of a given fluid system.

The  $C_v$  values shown on the valve ordering pages represent the full-open  $C_v$  for that valve. In determining estimated capacity, this  $C_v$  value should be used in the formulas which follow.



## Flow Formulas

### Liquids

- Flow, U.S. gal./min.
- Flow, lb./hr.

$$V = \frac{C_v \sqrt{P_1 - P_2}}{\sqrt{S_{GF}}}$$

$$W = 500 C_v \sqrt{(P_1 - P_2) / S_{GF}}$$

### Gases

- Flow, SCFH
- Flow, SCFH (temperature corrected)
- Flow, lb./hr.

$$Q = \frac{42.2 C_v \sqrt{(P_1 - P_2) (P_1 + P_2)}}{\sqrt{S_{GF}}}^{**}$$

$$Q = \frac{963 C_v \sqrt{(P_1 - P_2) (P_1 + P_2)}}{\sqrt{S_{GF} T_F}}^*$$

### Saturated Steam

- Flow, lb./hr.

$$W = 3.22 C_v \sqrt{(P_1 - P_2) (P_1 + P_2) / S_G}^*$$

### Super Heated Steam

- Flow, lb./hr.

$$W = 2.1 C_v \sqrt{(P_1 - P_2) (P_1 + P_2)}^*$$

$$W = \frac{2.1 C_v \sqrt{(P_1 - P_2) (P_1 + P_2)}}{(1 + 0.0007 T_S)}^*$$

## Specific gravity ( $S_g$ ) typical Gases

| Gases           | $S_g$ @ RT<br>Relative<br>to Air |
|-----------------|----------------------------------|
| Acetylene       | 0.897                            |
| Air             | 1.000                            |
| Ammonia         | 0.587                            |
| Argon           | 1.377                            |
| Butane          | 2.070                            |
| Carbon Dioxide  | 1.516                            |
| Ethylene        | 0.967                            |
| Helium          | 0.138                            |
| Hydrogen        | 0.0695                           |
| Methane         | 0.553                            |
| Nitrogen        | 0.966                            |
| Oxygen          | 1.103                            |
| Propane         | 1.562                            |
| Sulphur Dioxide | 2.208                            |

## Specific gravity ( $S_{GF}$ ) typical Liquids

| Liquids        | $S_{GF}$ @ RT<br>Relative<br>to Water |
|----------------|---------------------------------------|
| Acetone        | 0.792                                 |
| Alcohol        | 0.792                                 |
| Benzene        | 0.902                                 |
| Gasoline       | 0.751                                 |
| Gasoline, nat. | 0.680                                 |
| Kerosene       | 0.815                                 |
| Pentane        | 0.624                                 |
| Water          | 1.000                                 |

## Formula Nomenclature

- $V$  = Flow, U.S. gallons per minute (GPM)  
 $Q$  = Flow, standard cu. ft. per hr. (SCFH)  
 $W$  = Flow, pounds per hour (lb./hr.)  
 $P_1$  = Inlet pressure, psia (14.7 + psig)  
 $P_2$  = Outlet pressure, psia (14.7 + psig)  
 $S_{GF}$  = Liquid specific gravity (water = 1.0)  
 $S_G$  = Gas specific gravity (air = 1.0)  
 $T_F$  = Flowing temp., °R absolute (460 + °F)  
 $T_S$  = Superheat in °F  
 $C_v$  = Valve coefficient of flow, full open

\* Effect of flowing temperatures on gas flow are minimal for temperatures between 30°F and 150°F. Correction should be included if temperatures are higher or lower.

\*\* Where outlet pressure  $P_2$  is less than  $1/2$  inlet pressure  $P_1$ , the term:  $\sqrt{(P_1 - P_2) (P_1 + P_2)}$  becomes  $0.87 \times P_1$ .

**Note:** Maximum  $C_v$  values in this catalog have been determined in accordance with the Fluid Controls Institute report FCI 58-2. "Recommended Voluntary Standards for Measurement Procedure for Determining Control Valve Flow Capacity," including procedure, design of the test stand and evaluation of the data.



# Sour Service Products

Parker Autoclave Engineers designs and builds high pressure valves, fittings, and tubing specifically for use with Sour Oil and Gas (H<sub>2</sub>S) and meet or exceed all requirements of NACE MRO175-2002 (NACE to current revisions available). Our SOG line of products are manufactured with materials and procedures specified to meet the NACE requirements. Valves and Fittings for standard service are rated for working pressures up to 60,000 psi (4140 bar) at 100°F (38°C). Type SOG components are rated up to 30,000 psi (2068 bar) at 100°F (38°C). Valves are furnished without collars and glands unless otherwise specified.

**Note:** Refer to main catalog for full product information.



## WARNING

**FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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

**Caution!** Parker Autoclave Engineers Valves, Fittings and Tools are not designed to work with common commercial instrument tubing and will only work with tubing built to Parker Autoclave Engineers AES Specifications. Failure to do so will void warranty.



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