

Tools, Installation, Operation, Maintenance

Low Pressure "Speedbite", Cone & Thread:
Manual and Machine, Quick Set (QSS) Tooling



Principle of Operation:

Safe, efficient operation of any product is inherently dependent upon its proper installation. In this section the preparation and assembly of low, medium and high pressure connections is explained. Also covered is the assembly procedure for medium and high pressure Cone & Thread Connections as well as anti-vibration collet gland assemblies.

Correct installation procedures are further promoted by providing dimensional information associated with a variety of Parker Autoclave Engineers tube connections as well as the torque required to properly seat numerous Parker Autoclave Engineers components. Several tools developed by Parker Autoclave Engineers are presented to help accomplish proper valve, fitting and tubing installation and maintenance. Video tutorials are available on our website (www.Autoclave.com) and a Setup & Operational DVD is sent with every Cone and Thread Machine.

When installing or maintaining any pressure component, common practice dictates the use of proper safety equipment at all times.

Inside you will find:

- Installation Instructions for Low Pressure "Speedbite" Single Ferrule Bite-Type Compression Fittings
- Part numbers and Installation Instructions for both Medium and High Pressure Manual Cone & Thread Kits and Accessories
- Assembly and Installation Instructions for Anti-Vibration Gland Assemblies
- Part numbers and Specification detail for Cone & Thread Machine (required for all tubing sizes above 9/16")
- Connection Torque Values (for both Standard and Special Materials)
- Connection and Packing Gland Nut Sizes, Torque Wrenches and Crows Foot Wrench Adapters
- Reamer Part Numbers for cleaning up Connection Sealing Surfaces
- Valve Packing, Running and Seating Torque Values
- Male and Female Connection reference drawings with dimensions with connection names
- Manual Make-up and Installation instructions for Quick Set System (QSS) - only 1/4" and 3/8" tube sizes
- Hydraulic Set Up Tool for Quick Set System (HST) - All Sizes
- Part Numbers and Specifications for the Hydraulic Tube Bender (HTB)
- Maintenance and Lubrication site locations for various Parker Autoclave Engineers valves with recommended Lubricants



ENGINEERING YOUR SUCCESS.

Installation: SpeedBite Connection

Speedbite: Single Ferrule Compression Sealing for Pressures to 15,000 psi (1034 bar)

Parker Autoclave Engineers Low Pressure "Speedbite" connections utilize a "bite-type" single ferrule compression fitting (Fig. 1) that when used with typical annealed instrument tubing (ASTM A269) that does not exceed a hardness of 90 HRB (available from Parker Autoclave) is capable of up to 15,000 psi (1034 bar) MAWP. This "bite" prevents the tubing from ejecting at these higher pressures. Designed to meet the standards of ASME B31.3 Chapter IX this connection picks up where standard single and dual ferrule compression fitting capabilities end. Available in sizes from 1/16" to 1/2" (Note: 1/2" size is restricted to 10,000 psi MAWP). Many different Exotic alloys are available (see product literature).

Installation Instructions:

Determine the length of tubing needed (see Fig. 2 on next page) by measuring the fitting to fitting, face- to-face dimension - adding the extra allowance from Table 1 for proper engagement.

Step 1. Cut tubing to length and deburr. To ensure a good joint, tube must be cut off square using a hacksaw or bandsaw (suggest at least 32 teeth per inch minimum) and sawing vice or guide. Deburr external edge with a flat file and the ID of the tube with either the Parker AE deburr tool (p/n 90257) or even the Cone & Thread Reamer tools shown on page 21.



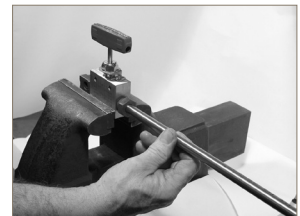
Step 2. Lubricate male threads. (Lubrication not necessary if tube nut has Bonded Dry-Film Lubricant.) Slip gland and sleeve onto tubing.

Note: Be sure to remove gland and sleeve from components and slide them onto the tubing before inserting the tubing into the components. **Make sure larger end of sleeve is toward gland.** Push tubing into valve or fitting until it bottoms out.

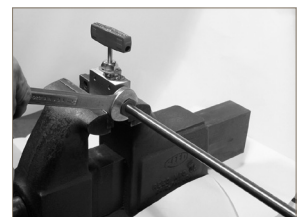
Note: A small amount of process tolerable inert grease on the nose of the compression sleeve will improve sealing process.



Step 3. Turn gland until "finger-tight", THEN, TIGHTEN GLAND UNTIL SLEEVE BEGINS TO GRIP TUBING by using wrench, turning until you feel increased resistance. This is what we call "Wrench-Tight". (this differs from standard compression fitting installation)



Step 4. From this "Wrench Tight" position, note starting position of wrench. Tighten gland approximately 1-1/4 turns for the SW and 1/16" & 1/8" W connections. When installing Male Adapter (preformed ferrule tip) fitting, - only 1/8 turn is necessary.



Installation: SpeedBite Connection

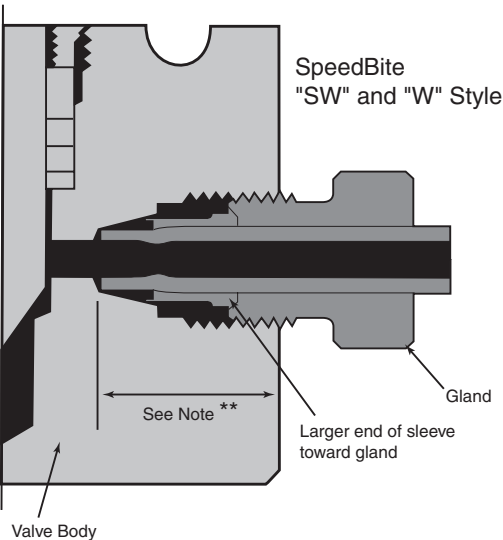
Complete Connection

The illustration below (Fig. 1) shows the condition of sleeve and tubing after completion of “sleeve seating.” The sleeve has cut into the tubing (bite-type) as it moved forward into the tapered seat, upsetting material ahead of it and establishing a shoulder on the tubing to provide positive mechanical support for the tubing end-load. A properly seated sleeve cannot be displaced back and forth along the tubing but may be rotated around the tubing.

Reassembly

To reassemble a connection, insert tubing with sleeve and gland into valve or fitting. Tighten gland “finger-tight”. Tighten gland with a wrench approximately 3/8 of a turn for a gas-tight seal. After frequent reassemblies, it may take less than 3/8 turn to effect a gas-tight seal, and as little as 1/8 of a turn may be sufficient.

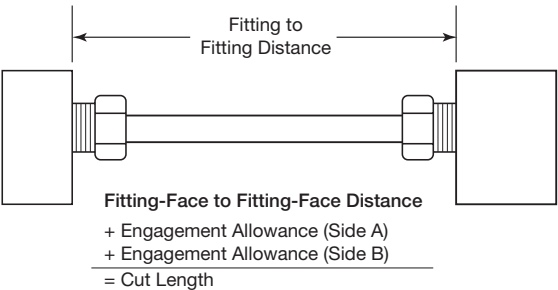
Figure 1



| **Table 1: 10V2/SW Series Engagement Allowance | |
|--|--|
| Nominal Tube OD inches (mm) | Insertion Depth to Shoulder inches (mm) |
| 1/16 (1.59) | 0.47 (12) |
| 1/8 (3.18) | 0.47 (12) |
| 1/4 (6.35) | 0.69 (19) |
| 3/8 (9.53) | 0.69 (19) |
| 1/2 (12.70) | 0.81 (22) |

Note:
* No special torque wrenches or mandrels required.
** Engagement/Insertion Depth; Add this additional length (per tube end) to distance between Fitting-Face & Fitting-Face (see Figure 2 below) Bite into tubing exaggerate for clarity

Figure 2
Determine Tube Length



Fully annealed tubing (hardness max of 90 HRB) with proper outside diameter tolerances is recommended for these connection components.

When installing or maintaining any pressure component, common practice dictates the use of proper safety equipment at all times.

Installation: Coning and Threading Kits



Coning and Threading Kits

Parker Autoclave Engineers manufactures a manual coning and threading tool for optimum performance with tubing sizes up to 9/16" (14.3 mm) outside diameter. These precision quality manual tools permit on-site end preparation for Parker Autoclave Engineers medium and high pressure tubing installations.

Included with all kits:

Coning Tool Assembly:

- Three Collets
- Collet Nut Wrench
- Three sets of Coning Blades (1/4" to 9/16")
- 3/32" Coning Blade Allen Wrench (p/n 90256)
- Four spare Set Screws (p/n 90254)
- De-burring Tool (p/n 90257)
- One quart of Cutting Oil (p/n P-8784)
- Tool Box with tray

Threading Tool parts include:

- 1/8" Die Allen Wrench (p/n P-0285)
- Die Set Screws (p/n P-0281)
- Threading Tool with Handle
- Three Guide Bushings (1/4", 3/8", 9/16")
- Three Threading Dies (1/4", 3/8", 9/16")
- Laminated Instruction Sheet

Parker Autoclave Engineers both Medium and High Pressure coning and threading tool kits. Each kit consists of the required tools and other items necessary for your coning and threading needs. All kit items are placed in a hand-carry tool case with top tray.

Medium Pressure Kit (p/n KMCT-MT)

MCT Coning Tool and:

- 1/4, 3/8 and 9/16" collets
- 1/4, 3/8 and 9/16" blades
- (9/16" blades for 20,000 psi tubing only)

402 Threading Die Holder Tool and:

- 1/4, 3/8 and 9/16" guide bushing
- 1/4, 3/8 and 9/16" dies

Options:

KMCT-MTR Kit includes Reservoir Assembly (see page 4)

KMCT-MTS Kit includes Support Arm Assembly (see page 5)

KMCT-MTRS Kit includes both Reservoir and Support Arm Assemblies

High Pressure Kit (p/n KMCT-HT)

MCT Coning Tool and:

- 1/4, 3/8 and 9/16" collets
- 1/4, 3/8 and 9/16" blades
- (9/16" blades for 60,000 psi tubing only)

402 Threading Die Holder Tool and:

- 1/4, 3/8 and 9/16" guide bushing
- 1/4, 3/8 and 9/16" dies

Options:

KMCT-HTR Kit includes Reservoir Assembly (see page 5)

KMCT-HTS Kit includes Support Arm Assembly (see page 5)

KMCT-HTRS Kit includes both Reservoir and Support Arm Assemblies

Note:

Additional Coning Blades, Collets, and Threading Dies are available for other sizes of tubing. See manual coning and threading tooling chart, Table 1 on page 5 for sizes and part numbers.

Installation: Manual Coning and Threading Tools

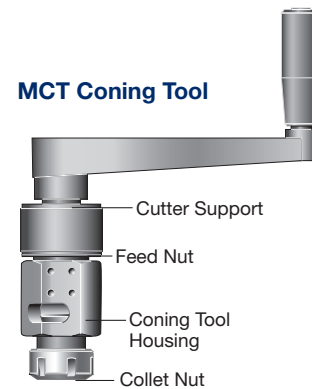
Interchangeable collets for each size tubing provides proper centering of tubing. The cutting feed arrangement permits the operator to control the length of the cut. Interchangeable tool steel cutting blades are used in pairs to assure more accurate and faster coning. They are designed to square-off and finish the tube end as the cone is completed. There is a provision for applying metal cutting lubricants to the cutting zone.

For coning tool with optional support arm (For holding in vise) and chip/oil catch reservoir, add **RS** to suffix of model number. Example: MCTM4-**RS**

For threading operations 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) outside diameter. Interchangeable guide bushings properly guide the tool for accurate thread cutting.



P/N 402: Threading Tool (Threading Dies not included)



Note: Collet nut wrench (not shown) supplied with coning tool.

Table 1

| | Tube Size | | Coning Tools and Components Catalog Number | | | Threading Tools and Components Catalog Number | | | | |
|---------------------------|------------------------------|-----------------------------|--|--------|--------------------------|---|------------|---------------|-----------|---------------|
| | Outside Diameter inches (mm) | Inside Diameter inches (mm) | Tool with Collet and Blades | Collet | Coning Blades (set of 2) | Holder with Die and Bushing | Die Holder | Threading Die | | Bushing Guide |
| Parker AE 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 |
| Parker AE High Pressure | 1/4 (6.35) | .083 (2.11) | MCTH4 | 90248 | 101F-3939 | 402A | 402 | P-0214 | 1/4 - 28 | 1010-0343 |
| | 5/16 (7.92) | .062 (1.57) | MCTH5 | 90249 | 101F-3939 | 402B | 402 | P-0205 | 5/16 - 24 | 1030-0343 |
| | 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 |

Options:

Cutting Oil: **P-8784** (quart)

Laminated Instruction Sheet: **90286**

Coning Tool plus Support Arm Assembly: **MCT-SA**

Coning Tool plus Reservoir Assembly: **MCT-RES**

* All threads for Parker AE medium pressure and high pressure tubing are LH national fine (class 2).

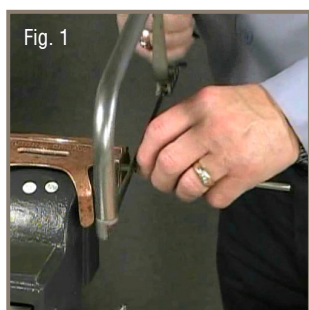
Note: Manual coning and threading tools for 3/4" (19.1 mm) and 1" (25.4 mm) outside diameter tubing are not available. Model AEGCTM-2 Power Coning-and-Threading Machine is recommended for this tubing.

A minimum of 3" (76 mm) straight length is required to perform coning and threading operation with manual coning tool.

Installation: Manual Coning and Threading Procedure

Manual Kit Procedure

1. Cut tubing to length (see Table 2, Dwg. 1 below) and square off the end using hacksaw with at least 32 teeth per inch or abrasive cut-off wheel. (Fig.1)



Allow extra length for proper engagement into the connection as listed in Table 2.

Additional 1/16" should be added to each end to compensate for coning/end facing.

Note: When cutting tubing with abrasive cut off wheel, tubing should not be over heated effecting material properties.

TABLE 2: Engagement Allowance

| | Connection Tubing Size | Type OD x ID | Engagement Allowance in (mm) |
|---|------------------------|--------------|------------------------------|
| Medium Pressure (to 20,000 psi) | SF250CX | 1/4 x .109 | .55 (14.0) |
| | SF375CX | 3/8 X .203 | .69 (17.6) |
| | SF562CX10 | 9/16 x .359 | .81 (21) |
| | SF562CX20 | 9/16 x .312 | .84 (21.3) |
| | SF750CX10 | 3/4 x .516 | 1.00 (25.4) |
| | SF750CX20 | 3/4 x .438 | 1.00 (25.4) |
| | SF1000CX10 | 1 x .688 | 1.38 (35) |
| | SF1000CX20 | 1 x .562 | 1.46 (37) |
| High Pressure (to 60,000 psi) | SF1500CX | 1-1/2 x .937 | 1.88 (47.6) |
| | F250C | 1/4 x .083 | .50 (12.7) |
| | F375C | 3/8 x .125 | .69 (17.5) |
| | F562C | 9/16 x .188 | .87 (22) |
| | F562C40 | 9/16 X .250 | .84 (21) |
| | F562C40-312 | 9/16 x .312 | .80 (20.32) |
| Ultra-High Pressure (to 150,000 psi) | F1000C43 | 1 x .438 | 1.62 (41.1) |
| | F250C100 | 1/4 x .083 | 1.18 (30.0) |
| | F375C100 | 3/8 x .125 | 1.10 (28.0) |
| | F562C100 | 9/16 x .188 | .84 (21.3) |
| | F312C150 | 5/16 x .062 | 1.18 (30.0) |

Manual coning and threading tools are not available for any tubing sizes over 9/16" OD, see Coning and Threading Machine section.
All dimensions for reference only and subject to change.

Drawing 1:

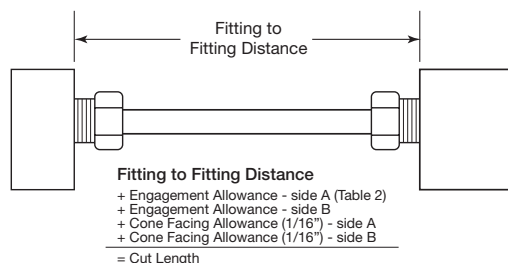


TABLE 3: Tubing Coning

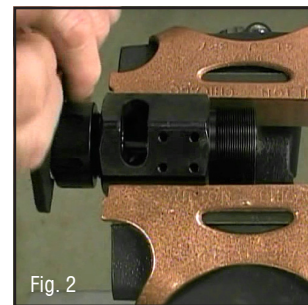
| | Tubing O.D. Inches | Cone Length inches (mm) | Number of Turns |
|---|--------------------|-------------------------|-----------------|
| Medium Pressure (to 20,000 psi) | 1/4" | .11 (2.79) | 2 |
| | 3/8" | .13 (3.30) | 3-1/2 |
| | 9/16" (CX-10) | .13 (3.30) | 2-1/2 |
| | 9/16" (CX-20) | .16 (4.06) | 3 |
| High Pressure (to 60,000 psi) | 1/4" | .13 (3.30) | 3 |
| | 3/8" | .16 (4.06) | 3 |
| | 9/16" (C40) | .28 (7.11) | 5-1/2 |
| | 9/16" (C40-312) | .21 (5.33) | 4-1/2 |
| Ultra-High Pressure (to 150,000 psi) | 9/16" | .21 (5.33) | 4-1/2 |
| | 1/4" (C100) | .13 (3.30) | 3 |
| | 3/8" (C100) | .16 (4.06) | 3 |
| | 9/16" (C100) | .21 (5.33) | 5 1/2 |
| | 5/16" | .19 (4.83) | 3-1/2 |

Manual coning and threading tools are not available any tubing sizes over 9/16" OD, see Coning and Threading Machine section.
All dimensions for reference only and subject to change.

2. Install the collet and collet nut into the bottom of the coning tool housing. Remove the cutter support feed nut from the coning tool housing and install the cutters. This can be done by backing out the four set screws in the cutter support.

Note: When installing new blades, be sure the blades are flat against the holder. There should be no space between the blades and the holder.

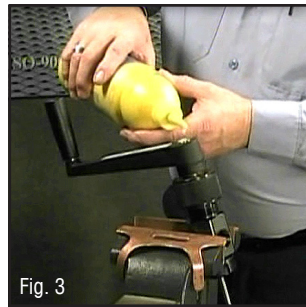
3. Place the coning tool housing (or optional support arm), without the feed nut/ cutter support assembly, in a vise. The vise should be equipped with soft jaws, and the housing should be placed in the vise to allow lubricant to flow to the cutters and cone.



4. Slide the tubing through the collet until the end of the tube appears in the coning tool housing window (see Drawing in Table 3 above). Line the end of the tube with the edge of the window as marked above and tighten the collet nut firmly in place using the collet nut wrench (Fig. 2).

Installation: Manual Coning and Threading Procedure

5. Install the feed nut/cutter support assembly into the coning tool housing. Rotate the feed nut clockwise until the top of the cutters just contact the top of the tube. **Do not** rotate the feed nut any further at this point.

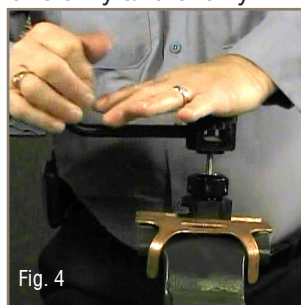


6. Apply cutting oil through the lubricant opening in the end of the cutter holder or directly through the housing window (Fig. 3). A medium weight high sulphur content cutting fluid is recommended. Use the cutting oil freely during the coning operation.

7a. The distance the feed nut travels from its start position can be used to gauge the amount of travel to properly cone the tube. The amount of travel is shown in Table 3, pg 6 and is labeled "Cone Length".

7b. Another method to determine proper cone length is to count the number of turns of the feed nut. The number of turns required is listed in Table 3 under the heading "Number of Turns". This includes enough advancement of the feed nut to face-off the tube and square the edge that forms the seal surface. The feed nut is supplied with a position indicator (drilled hole) to help determine the number of turns.

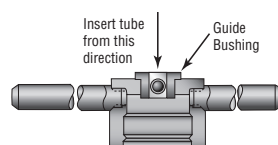
8. Rotate the handle in a clockwise direction while simultaneously **slowly turning** the feed nut in a clockwise direction. Rotate the feed nut slowly and evenly to smoothly cone the tube. Loosen collet nut, remove tubing and visually inspect the cone. Use deburring tool to remove any burr on inside edge of tube after coning.



Manual Threading

9. Using the Coning Tool Body to hold the tubing for threading, clamp in vise, and slide the threading tool over the tube through the guide bushing (Fig. 4).

10. Apply a medium weight, high sulphur cutting oil to threading area (Exception: Hydrogen service - Sulphur not recommended)



11. Apply pressure to the top of the threading tool to start the cutting action. The threads are left handed, so turn

the threader **counterclockwise** to thread the tube. The threading tool may need to be periodically rotated clockwise to break and discharge metal chips. Apply lubricant freely during the threading process.

Note: The lead in chamfer (larger chamfer) on the die flutes toward guide bushing.

12. Continue to rotate die holder counterclockwise while applying cutting oil generously throughout the process until threads of the following lengths have been cut. See number of turns required in Table 5 (page 8), or length in Table 4 below.

13. After tube is coned, threaded and de burred, check for proper thread fit and length with a new collar of the proper size.

Note: Remember to flush all tubing prior to installation with a fluid that is compatible with the process fluid being used.

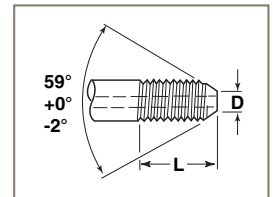


TABLE 4 - Inches (mm)

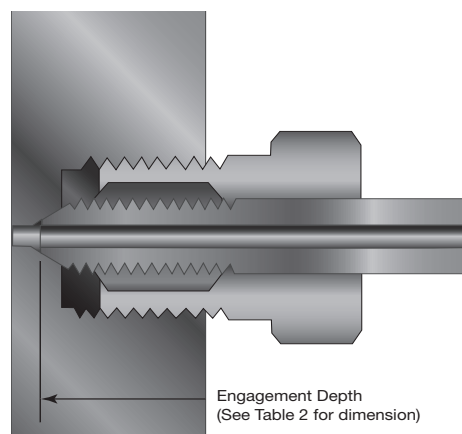
| Male Connection | Tube Size O.D. x I.D. | Dimensions | | Thread Size and Type * |
|-----------------|----------------------------------|------------------|------------------|------------------------|
| | | D | L (max) | |
| SM250CX | 1/4" x .109 (6.35 x 2.77) | .141 (3.58) | .344 (8.74) | 1/4" - 28 |
| SM375CX | 3/8" x .203 (9.53 x 5.16) | .25 (6.35) | .438 (11.13) | 3/8" - 24 |
| SM562CX20 | 9/16" x .312 (14.29 x 7.92) | .406 (10.31) | .500 (12.70) | 9/16" - 18 |
| SM562CX10 | 9/16" x .359 (14.29 x 9.12) | .438 (11.13) | .500 (12.70) | 9/16" - 18 |
| SM750CX20 | 3/4" x .438 (19.05 x 11.13) | .562 (14.27) | .625 (15.88) | 3/4" - 16 |
| SM750CX10 | 3/4" x .516 (19.05 x 13.11) | .578 (14.68) | .625 (15.88) | 3/4" - 16 |
| SM1000CX20 | 1" x .562 (25.4 x 14.27) | .719 (18.26) | .781 (19.84) | 1" - 14 |
| SM1000CX10 | 1" x .688 (25.4 x 17.48) | .812 (20.62) | .781 (19.84) | 1" - 14 |
| SM1500CX | 1-1/2" x .937 (38.10 x 23.78) | 1.062 (26.97) | 1.000 (25.40) | 1-1/2" - 12 |
| M250C | 1/4" x .083 (6.35 x 2.10) | .125 (3.18) | .562 (14.27) | 1/4" - 28 |
| M375C | 3/8" x .125 (9.53 x 3.18) | .219 (5.56) | .75 (19.05) | 3/8" - 24 |
| M562C | 9/16" x .187 (14.29 x 4.78) | .281 (7.14) | .938 (23.83) | 9/16" - 18 |
| M562C40 | 9/16" x .250 (14.29 x 6.35) | .312 (7.92) | .938 (23.83) | 9/16" - 18 |
| M562C40-312 | 9/16" x .312 (14.29 x 7.92) | .406 (10.31) | .940 (23.88) | 9/16" - 18 |
| M1000C43 | 1" x .438 (25.4 x 11.13) | .562 (14.27) | .910 (23.11) | 1" - 14 |
| M250C100 | 1/4" x .083 (6.35 x 2.10) | .125 (3.18) | .625 (15.88) | 1/4" - 28 |
| M375C100 | 3/8" x .125 (9.53 x 3.18) | .219 (5.56) | .625 (15.88) | 3/8" - 24 |
| M562C100 | 9/16" x .187 (14.29 x 4.78) | .281 (7.14) | .938 (23.83) | 9/16" - 18 |
| M312C150 | 5/16" x .062 (7.94 x 1.57) | .125 (3.18) | .687 (17.45) | 5/16" - 24 |

*Thread is left-hand national fine (Class 2). All dimensions for reference only and subject to change.

Installation: Cone & Thread Make-up Procedure

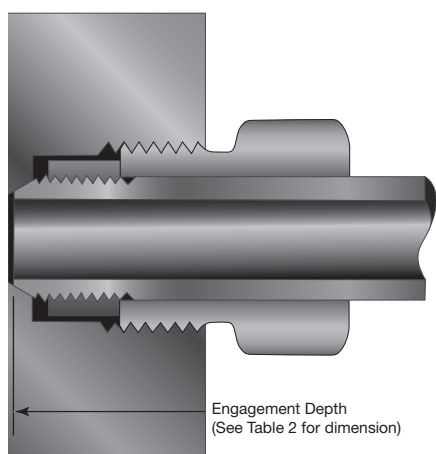
Approximate Number of Turns to Thread Tubing

| TABLE 5 (Manual Threading) | | |
|----------------------------|-----------------|---|
| Male Connection | Number of Turns | Shortest Nipple w/Manual Tool = Length |
| SM250CX | 7-1/2 | 3.5" |
| SM375CX | 8-1/2 | 3.5" |
| SM562CX10/20 | 8 | 3.7" |
| M250C | 13 | 3.75" |
| M375C | 15 | 4.25" |
| M562C | 13 | 4.5" |
| M562C40 | 13 | 4.5" |
| M562C40-312 | 13 | 4.5" |
| M250C100 | 15 | 4.0" |
| M375C100 | 13 | 4.0" |
| M562C100 | 13 | 4.5" |
| M312C150 | 13 | 4.0" |

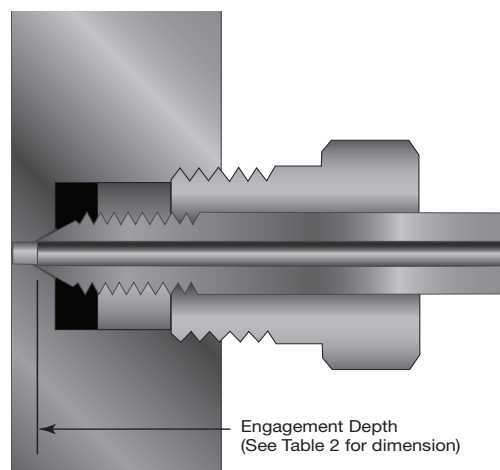


Completed Parker Autoclave Engineers
High Pressure & 9/16" F562C100 Ultra High Pressure
Connections

Engagement Depth Illustrations



Completed Parker Autoclave Engineers
Medium Pressure & 1" F1000C43 Connection



Completed Parker Autoclave Engineers
Ultra High Pressure Connections
1/4", 3/8" and 5/16"

Installation: Cone & Thread Make-up Procedure

Assembly and Makeup of Connection

1. Inspect seat cone and tube cone to verify free of all lines and surface imperfections with tube face and cone edge completely smooth. Lubricate male threads of gland nut and collar/gland contact surface with a metal flake based thread lubricant. (see recommended lubricants on page 25-26 of this catalog)

Slip gland nut on tubing as shown (Fig. 5) and thread collar on tubing (turning counter-clockwise) until 1-1/2 to 2 full threads are exposed between collar and cone (Fig. 6).

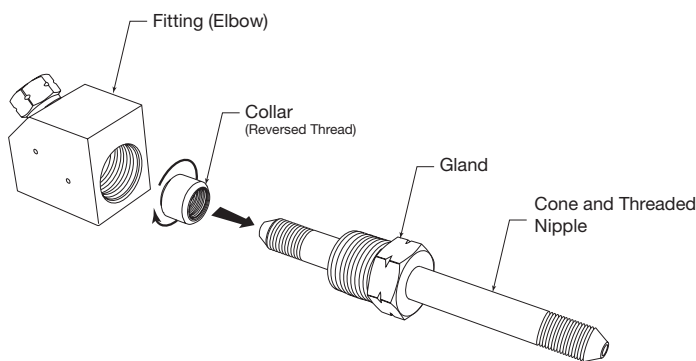


Figure 5

Note: A small amount of process tolerable lubricant, such as silicone grease or any lubricating oil, on the cone tip will help with the sealing process.

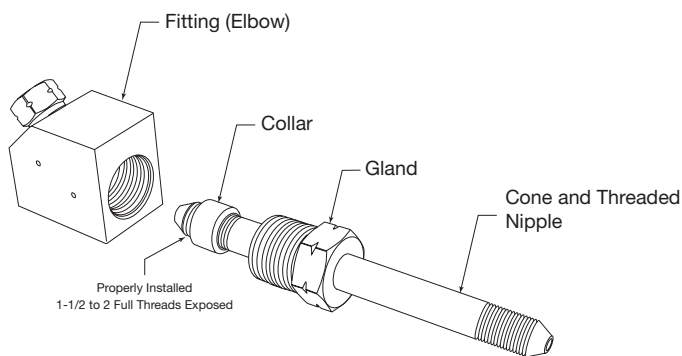


Figure 6

2. Insert tubing in connection, engage gland nut and tighten "finger-tight" at least 4 complete turns (Medium Pressure) and 5-6 Turns (High Pressure) - angular misalignment will not allow rotation with fingers and could cause leakage or gland nut gall - remove and determine cause of misalignment and correct.

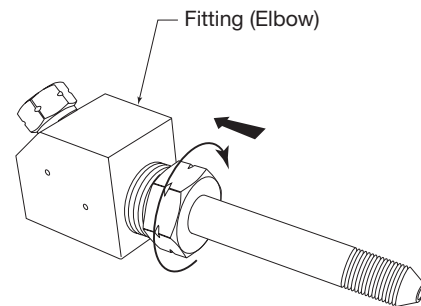


Figure 7

3. Tighten gland nut with torque wrench (REQUIRED) to specified values on page 16 or 17. When tightening, the use of an additional wrench is recommended to hold the fitting or valve body if not otherwise anchored.

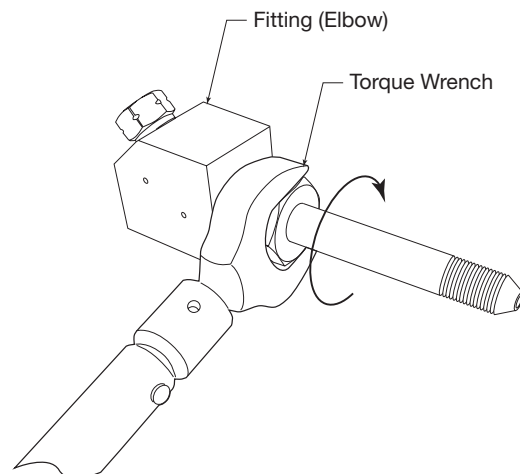


Figure 8

Cautionary Note: The torque used to seal Cone and Thread Connections is typically much less than used on compression fittings (1/8 to 1/4 turn of gland nut from finger-tight)

Recommended Thread Anti-Seize (Not for use on coned surfaces)

Copper Anti-Seize Lubricant:

P-3580 (16 oz. can)

P-3580-8 (8 oz. can)

Moly Paste (50-70%) Anti-Seize Lubricant:

P-9766 (16 oz. can)

(See recommended lubrication sites on pages 23-24)

Specifications: Coning & Threading Machine Ordering



Benefits

- Coning and Threading of Parker Autoclave Engineers Medium and High Pressure Tubing.
- Separate heads for coning and threading are powered by a single motor and drive system.
- New design collet / support system allows for easier coning and threading of long tube lengths.
- New design tube depth gauge eliminates movement of tubing during the threading operation.

Features

- 1/2-HP TEFC motor, capacitor start
- Pop-Open die prevents thread damage; no reversing necessary on threading
- Complete tooling available; order separately
- Supplied with oil pump and reservoir
- Optional oil reservoir heater for operation below 65° F (18.3°C)
- CE marked on 220 VAC units standard
- Unit mounted on stand with locking casters for ease of mobility and stability
- Guard option - see next page

Ordering Procedure

Tooling must be ordered separately see Table 2 listing

TABLE 1: Ordering Part Numbers

| Model | Description |
|-----------------|--------------------------------|
| AEGCTM-2 | 115 VAC 60Hz |
| AEGCTM-2E-CE | 220 VAC 50hz - CE Marked |
| AEGCTM-2WOH | Standard units with Oil Heater |
| AEGCTM-2EWOH-CE | |

Approximate Dimensions:

56" Height x 28" Width x 20" Depth
(142cm x 71cm x 51 cm)

Shipping Weight:

350 pounds (158.7 Kg)

Cutting Oil:

Part Number: P-8699, 3-1/2 Gallon (11.36 liter) equals Reservoir Capacity

Note 1: A minimum of 5 inches (127mm) straight length of tubing is required to perform coning and threading operations.

Video Aids Available (Coning and Threading DVD):

Part Number: P-9930-D

TABLE 2: Tooling

| Tube Size Inches (mm) | Collet Only (set) | Cutters Only (set) | Die Chasers (set) | Complete Set |
|--------------------------------|-----------------------------------|--------------------------|----------------------|-----------------|
| 1/4" x .109 (6.35 x 2.77) | Not Recommended - Contact Factory | | | |
| 1/4" x .083 (6.35 x 2.10) | Not Recommended - Contact Factory | | | |
| 5/16" x .062 (7.94 x 1.57) | CTM5C-2 | CTM5B | AEGCTM5D | AEGCTM5-2 |
| 3/8" x .203 (9.53 x 5.16) | CTM6C-2 | CTM6BX | AEGCTM6D | AEGCTM6X-2 |
| 3/8" x .125 (9.53 x 3.18) | CTM6C-2 | CTM6B | AEGCTM6D | AEGCTM6-2 |
| 9/16" x .359 (14.29 x 9.12) | CTM9C-2 | CTM9BXX | AEGCTM9D | AEGCTM9XX-2 |
| 9/16" x .312 (14.29 x 7.92) | CTM9C-2 | CTM9BX | AEGCTM9D | AEGCTM9X-2 |
| 9/16" x .187 (14.29 x 4.78) | CTM9C-2 | CTM9B | AEGCTM9D | AEGCTM9-2 |
| 9/16" x .250 (14.29 x 6.35) | CTM9C-2 | CTM9B40 | AEGCTM9D | AEGCTM40-2 |
| 3/4" x .516 (19.05 x 13.11) | CTM12C-2 | CTM12BX | AEGCTM12D | AEGCTM12X-2 |
| 3/4" x .438 (19.05 x 11.13) | CTM12C-2 | CTM12B | AEGCTM12D | AEGCTM12-2 |
| 1" x .688 (25.4 x 17.48) | CTM16C-2 | CTM16BX | AEGCTM16D | AEGCTM16X-2 |
| 1" x .562 (25.4 x 14.27) | CTM16C-2 | CTM16B | AEGCTM16D | AEGCTM16-2 |
| 1" x .438 (25.4 x 11.13) | CTM16C-2 | CTM16BXX | AEGCTM16D | AEGCTM16XX-2 |

Optional Oil / Chip Guard

A threading die oil/chip guard is available as an option on our AEGCTM machines. This guard prevents oil and metal chips from being ejected onto the operator.

The guard is a swing away Plexiglass design providing protection from splashing oil or thrown chips while allowing full access to the die head.

A retrofit guard option is available to upgrade machines already in operation (-2 models). The kit will contain all required items along with instructions.

To order a guard with any model, just add a "-G" suffix to the catalog number.

Example:

AEGCTM-2G

AEGCTM-2E-CEG

AEGCTM-2GK (Retrofit kit catalog number)

Coning & Threading Machine Operation

Note:

Detailed Operational Instructions are supplied with the machine in two forms, printed and DVD. Refer to these instructions for tooling installation, machine adjustment, and maintenance instructions. Download from our website at www.Autoclave.com.



Installation: QSS Manual/Wrench Assembly Instructions (Sizes: 1/4" to 3/8" only)

Step 1:

Cut tubing to length and deburr. Allow extra length for proper engagement (per table below).

| Outside Diameter Tube Size inches (mm) | Extra Allowance for Engagement** inches (mm) |
|---|---|
| 1/4" (6.35) | 0.75 (19.05) |
| 3/8" (9.53) | 0.81 (20.64) |

Step 2:

Slip gland nut and sleeve onto tubing.

Note: Be sure to remove gland and sleeve from components and slide them onto the tubing before inserting the tubing into the components.

Make sure larger end of sleeve is toward gland.

Push tubing into valve or fitting until it bottoms.

If process tolerable, a slight amount of inert grease on the nose of the compression sleeve is recommended to improve sealability. Lubrication of the gland threads will also aid in assembly.

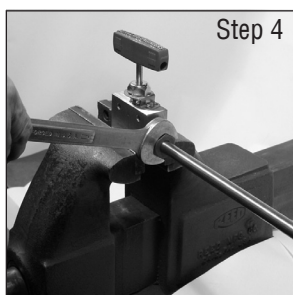
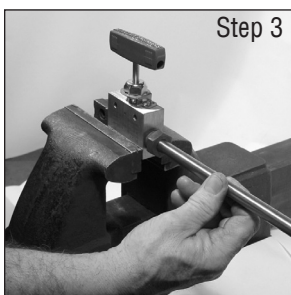
Step 3:

Rotate Gland Nut "finger-tight" and then a bit more with wrench until Sleeve begins to Grip Tubing (wrench-tight).

Step 4:

Note starting position of wrench.[†]

Starting now at the "wrench-tight" position, turn 1-1/4 turns to complete the QSS connection.*



Completed Connection

The illustration below shows the condition of sleeve and tubing after completion of "sleeve setting." The sleeve has cut into the tubing as it moved forward into the tapered seat, upsetting material ahead of it and establishing a shoulder on the tubing to provide positive mechanical support for the tubing end-load. A properly set sleeve cannot be displaced back and forth along the tubing but may be rotated around the tubing.

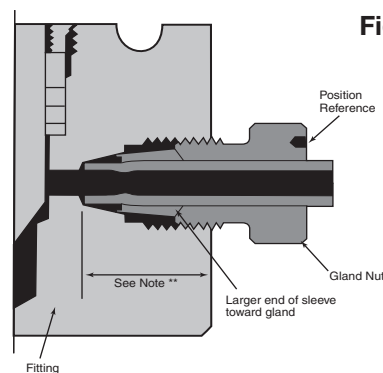


Figure 1

Bite into tubing exaggerated for clarity

Reassembly and Adapter/Plug Connection

To reassemble a connection, insert tubing with sleeve and gland nut into valve or fitting, finger tight. Rotate to "wrench-tight" position and then 1/4 turn more for gas-tight seal or use Torque Chart in Step 6 on next page. Male Adapters and Plugs do not require same torque to seal, see chart below:

| QSS Male Adapter or Plug Torque | |
|---------------------------------|------------|
| Size | Torque |
| 1/4" | 10 ft-lbs |
| 3/8" | 20 ft-lbs |
| 9/16" | 45 ft-lbs |
| 3/4" | 100 ft-lbs |
| 1" | 225 ft-lbs |

Notes:

** Distance tubing protrudes into connection from face of fitting.

[†] A small blind hole on the face of the gland is provided for a starting position reference.

Parker Autoclave Engineers Medium Pressure tubing is required for these connection components.

When assembling tubing into fittings such as in rack systems, alignment of tubing is critical in connection port make up. Do not force tubing into alignment with connections as bending stress will effect the sealing capability of the connections.

Installation: QSS Hydraulic Preset Instructions (Sizes: 1/4" to 3/4")

Step 1:

Cut tubing to length and deburr. Allow extra length for proper engagement (per table below).

| Outside Diameter Tube Size inches (mm) | Extra Allowance for Engagement** inches (mm) |
|---|---|
| 1/4" (6.35) | 0.75 (19.05) |
| 3/8" (9.53) | 0.81 (20.64) |
| 9/16" (14.27) | 1.25 (31.75) |
| 3/4" (19.04) | 1.63 (41.28) |
| *1" (25.40) | 1.75 (44.455) |

** Distance tubing protrudes into connection from face of fitting.

Step 2:

Slip gland nut and sleeve onto tubing. Lubricate the nose of the compression sleeve or the tapered die surface with a moly-based metal to metal lubricant. We recommend Jetlube MP-50. Make sure larger end of sleeve is toward gland nut. Push tubing into hydraulic set tool until it bottoms into the setting die.

Step 3:

Thread gland nut into cap until the hex touches the top surface.

Step 4:

Pressurize cylinder up to the set pressure (per table below.)

DO NOT EXCEED THE SET PRESSURE IN CHART BELOW.

AS WITH ALL HIGH PRESSURE EQUIPMENT, USE CAUTION DURING OPERATION. SET TOOL MAWP IS 10,000 PSI (690 BAR)

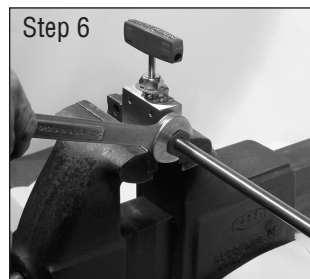
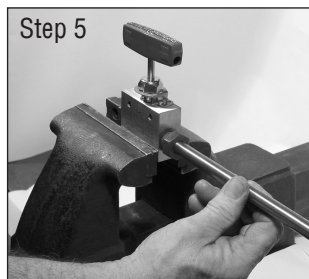
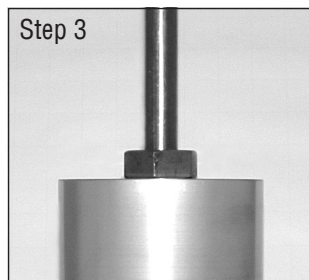
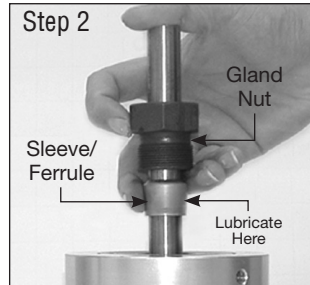
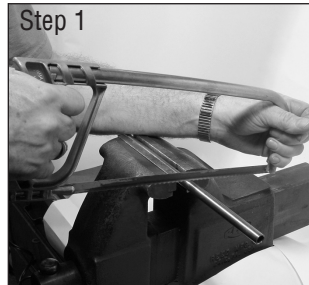
| Outside Diameter Tube Size inches (mm) | Set Pressure for Full Tubing Bite inches (mm) |
|---|--|
| 1/4" (6.4) and 3/8" (9.5) | 4500 (310) to 5000 (344) |
| 9/16" (14.3) | 9000 (620) to 10000 (690) |
| 3/4" (19.0) | 8000 (552) to 10000 (690) |
| *1" (25.4) | 9000 (620) to 9500 (655) |

Vent all pressure from hydraulic cylinder. Remove gland assembly from preset tool and inspect biting end of sleeve. Looking inside the biting end of the sleeve you should see a shoulder pushed up from the tubing material. A properly set sleeve must spin freely to achieve a seal. If the sleeve is seized in place after setting, discard and make another.

Do not set a sleeve more than once.

Step 5:

Install gland assembly into valve/fitting. If process tolerable, a slight amount of inert grease on the nose of the compression sleeve should be used to aid sealing. Lubrication of gland threads will also aid in assembly. Turn to "Wrench-Tight" position where torque to turn increases dramatically.



Step 6:

Note starting position of wrench.† Tighten gland nut 1/4 turn to complete the QSS connection. Since the mechanical bite has already been completed with the hydraulic set tool, it is permissible to vary the torque to achieve sealing.

| Size (in) | Required Torque ft.-lbs. (Nm) | Max. Torque ft.-lbs. (Nm) | Torque Wrench Adapter Size | Wrench Adapter Part # |
|--------------|----------------------------------|------------------------------|-------------------------------|--------------------------|
| 1/4" | 30 (40) | 50 (70) | 5/8" | AE003321 |
| 3/8" | 35 (50) | 75 (100) | 3/4" | AE003322 |
| 9/16" | 90 (120) | 175 (240) | 1-3/16" | AE003324 |
| 3/4" | 175 (240) | 325 (440) | 1-1/2" | AE000170 |
| *1" | 375 (500) | 635 (860) | 1-3/4" | AE001067 |

Not for use with Male Adapters or Plugs (see chart on previous page)

† A small blind hole on the face of the gland is provided for a starting position reference.

Completed Connection

The hydraulically set sleeve has cut into the tubing as it moved forward into the tapered seat, upsetting material ahead of it and establishing a shoulder on the tubing to provide positive mechanical support for the tubing end-load. A properly set sleeve cannot be displaced back and forth along the tubing but may be rotated around the tubing.

Installation: QSS Hydraulic Preset (HST-912) Instructions & Overview

Reassembly & Adapter/Plug Connection

To reassemble a connection, insert tubing with sleeve and gland nut into valve or fitting, finger tight. Rotate to “wrench-tight” position, then 1/4 turn more for gas-tight seal or use torque chart shown in Step 6 on page 13. Male Adapters and Plugs do not require same torque to seal, see chart on page 12.

Parker Autoclave Engineers Medium Pressure tubing is required for these connection components.

When assembling tubing into fittings such as in rack systems, alignment of tubing is critical in connection make up.

Do not force into alignment with connections as bending stress will effect the sealing capability of the connections.

Hydraulic Sleeve Set Tool (HST-912)

The hydraulic set tool requires minimal assembly and is easy to use. There are three models available; a manual hydraulic pump, an air operated hydraulic pump and a complete stand mounted system with air pumps and tooling for all five connection sizes.

The HST-912 Parker Autoclave hydraulic sleeve set tool is designed for use with the QS Series glands, sleeves and Parker Autoclave tubing. This tool is required to set the sleeve for the 9/16" and 3/4" sizes and recommended for the 1/4" and 3/8" sizes. It not only produces the required bite into the tubing, it is much easier than trying to set the sleeve the conventional method. The tool comes in a self contained portable, lockable case complete with hand or air pump, cap and dies for all sizes up to 3/4".

HST-912 Specifications

Hand Pump: Single stage hydraulic (standard)

Hydraulic Cylinder: 10,000 psi, 2.5" 25 ton

Base & Housing: Aluminum anodized

Die and Cap: Precision hardened steel

Gauge: 15,000 psi (1034 bar)

Operating Pressure: 0 to 10,000 psi (0 to 690 bar).

Required Air Pressure: 30 psi (2.1 bar) minimum 120 psi (8.3 bar) maximum

Reservoir Capacity: 24 cu. in. (393cm³)

Air lubricator/air separator is recommended for air operated units.

| HST-912 Bill of Materials | Part Number |
|---|-------------|
| Hydraulic Cylinder | 90588 |
| Gauge | 90594 |
| Adapter | 90593 |
| Housing | 101F-3408 |
| Hydraulic Pump | P-1893 |
| Hose | P-1894 |
| 1/4" Die | HSTD4 |
| 3/8" Die | HSTD6 |
| 9/16" Die | HSTD9 |
| 3/4" Die | HSTD12 |
| 1/4" Cap | HSTC4 |
| 3/8" Cap | HSTC6 |
| 9/16" Cap | HSTC9 |
| 3/4" Cap | HSTC12 |
| Moly Paste, 1 lb. Can | P-9766 |
| 10 to 150 ft-lbs, Torque Wrench, 1/2" Drive | AE003325 |
| 50 to 250 ft-lbs, Torque Wrench, 1/2" Drive | AE003326 |
| 5/8" Crows Foot Wrench Adpt, 1/2" Drive | AE003321 |
| 3/4" Crows Foot Wrench Adpt, 1/2" Drive | AE003322 |
| 1-3/16" Crows Foot Wrench Adpt, 1/2" Drive | AE003324 |
| 1-1/2" Crows Foot Wrench Adpt, 3/4" Drive | AE000170 |
| 1-3/4" Crows Foot Wrench Adpt, 3/4" Drive | AE001067 |
| Adjustable Spanner Wrench | P-1970 |

Ordering Information

HST-912:

Complete tool kit with hand pump (shown in photo)
(Sizes 1/4" to 3/4")

HST-912TW:

Complete tool kit as above with torque wrench
and adapters

HST-912A:

Complete tool kit as above with air-operated, foot activated
pump (Air Operated Pump #P-1948)

HST-912ATW:

HST-912A tool kit with torque wrench and adapters

HST-S:

(Not Shown) Complete Double Air-Drive Press Stand
System with dies, torque wrenches and tooling for all
tubing sizes including 1".

! CAUTION !

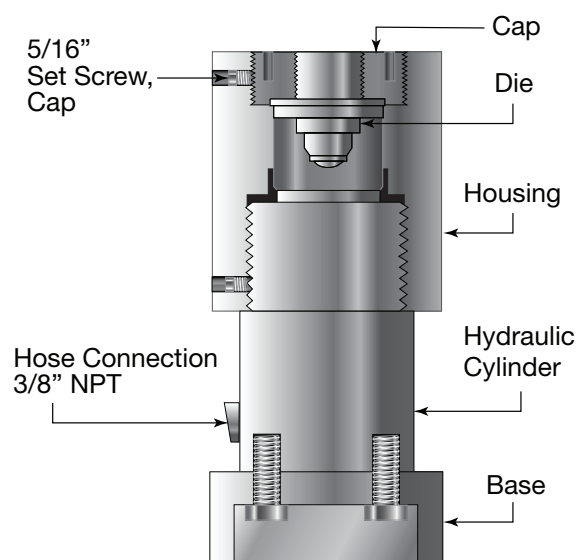
**Do not operate Hydraulic Cylinder without setting
sleeve and tube as this may result in damage to the die
housing!**

Installation: QSS Hydraulic Preset (HST-912) Instructions

HST-912 Cap and Die Changeout Instructions

To switch tooling to another size only requires interchanging two (2) parts.

1. Using a 5/32" Allen Wrench, loosen the 5/16" set screw that locks the threaded cap from rotating.
2. Use the included spanner wrench to rotate and remove the threaded steel cap from aluminum housing.
3. Turn the tool assembly upside down to remove the die from inside the housing.
4. Install the die of the appropriate connection size you wish to use. The solid side of the die should be facing down towards the hydraulic cylinder.
5. Install the appropriate size cap to match the size of the die. Insert cap with the spanner holes facing up. Rotate the cap with the spanner wrench until it bottoms out on the shoulder side of the housing.
6. Thread in the 5/16" set screw until it bottoms out on the cap threads. Tighten set screw to prevent movement during use.



Heavy Duty Torque Wrenches and Heavy Duty Crows Foot Wrench Adapters

Recommended for use with Parker Autoclave Quick Set System (QSS) and Flared Cone Connection (FCC) Fittings and Valves. (will work with standard products)

| Torque Wrench | Torque Range |
|---------------|--|
| AE003325 | 10 to 150 ft. lbs (10 to 203 Nm), 1/2" Drive |
| AE003326 | 75 to 250 ft. lbs (102 to 339 Nm), 1/2" Drive |
| AE003327 | 100 to 600 ft. lbs (136 to 814 Nm), 3/4" Drive |

Heavy Duty Torque Wrench Adapters

| Wrench Adapter Number | Packing Gland or Tube Nut Hex Size (inches) |
|-----------------------|---|
| AE005904 | 1/2" x 1/2" |
| AE005905 | 9/16" x 1/2" |
| AE003321 | 5/8" x 1/2" |
| AE003322 | 3/4" x 1/2" |
| AE005906 | 13/16" x 1/2" |
| AE005907 | 7/8" x 1/2" |
| AE003323 | 15/16" x 1/2" |
| AE005908 | 1" x 1/2" |
| AE005909 | 1-1/16" x 1/2" |
| AE003324 | 1-3/16" x 1/2" |
| AE005910 | 1-3/8" x 1/2" |
| AE000170 | 1-1/2" x 3/4" |
| AE001067 | 1-3/4" x 3/4" |
| AE005911 | 1-7/8" x 3/4" |
| AE003826 | 2" x 3/4" |
| AE000171 | 2-3/4" x 3/4" |
| AE005590 | 1/2" Drive to 3/4" Drive Adapter |



Standard Duty Torque Wrenches (old style) can be found on page 16

Operation/Maintenance: Torque Values

Medium & High Pressure Connection, Valve Packing, Running and Seating

Parker Autoclave Engineers Micrometer Adjustable Torque Wrenches

| Torque Wrench | Torque Range |
|---|------------------------------------|
| P-1680 | 20 to 150 ft. lbs (27 to 203 Nm) |
| 91020 | 75 to 250 ft. lbs (102 to 339 Nm) |
| See Heavy Duty Torque Wrenches on Page 15 | 100 to 600 ft. lbs (136 to 814 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 above and is used with interchangeable wrench adapters for hex sizes from 1/2" through 1-7/8". Part numbers for wrench adapters are listed below.

Wrench adapters sold separately.

| Standard Wrench Adapters | | |
|--------------------------|---|--|
| Wrench Adapter Number | Packing Gland or Tube Nut Hex Size (inches) |  |
| P-1681 | 1/2 | |
| P-1682 | 9/16 | |
| P-1683 | 5/8 | |
| P-9813 | 3/4 | |
| P-1685 | 13/16 | |
| P-1686 | 7/8 | |
| P-1687 | 15/16 | |
| P-9901 | 1 | |
| P-1688 | 1-1/16 | |
| P-1689 | 1-3/16 | |
| P-1690 | 1-3/8 | |
| P-6040 | 1-1/2 | |
| 91269 † | 1-3/4 | |
| P-10076 † | 1-7/8 | |

† Part numbers shown for replacement requirements only. For new orders use Heavy Duty wrench adapters and Wrench found on page 15.

Heavy Duty Torque Wrenches and Open Face Wrench Adapters are available.

Please see page 15 for product detail and part numbers

Full Pressure Connection Gland Torque

(For CW 316 Stainless Steel & Medium Pressure 2507 Super Duplex Materials)

| | Connection Type | Gland Nut Hex Size (inches) | Required Torque ¹ | Required Torque Dry-Moly Coated | Pressure MAWP PSI (Bar) |
|-----------------|----------------------|-----------------------------|------------------------------|---------------------------------|-------------------------|
| | | | ft.-lbs. (N.m) | | |
| Medium Pressure | SF250CX (1/4" MP) | 1/2 | 20 (27) | 15 (21) | 20,000 |
| | SF375CX (3/8" MP) | 5/8 | 30 (41) | 20 (27) | 20,000 |
| | SF562CX10 (9/16" MP) | 15/16 | 55 (75) | 40 (55) | 15,000 |
| | SF562CX20 (9/16" MP) | 15/16 | 55 (75) | 40 (55) | 20,000 |
| | SF750CX10 (3/4" MP) | 1-3/16 | 75 (102) | 55 (75) | 15,000 |
| | SF750CX20 (3/4" MP) | 1-3/16 | 90 (122) | 70 (95) | 20,000 |
| | SF1000CX10 (1" MP) | 1-3/8 | 135 (187) | 100 (136) | 15,000 |
| | SF1000CX20 (1" MP) | 1-3/8 | 135 (187) | 100 (136) | 20,000 |
| | SF1500CX (1-1/2" MP) | 1-7/8 | 200 (272) | 160 (217) | 15,000 |

| | | | | | |
|---------------|------------------------|--------|-----------|---|--------|
| High Pressure | F250C (1/4" HP) | 5/8 | 25 (34) | - | 60,000 |
| | F375C (3/8" HP) | 13/16 | 50 (68) | - | 60,000 |
| | F562C (9/16" HP) | 1-3/16 | 75 (102) | - | 60,000 |
| | F562C40 (9/16" HP-40K) | 1-3/16 | 60 (82) | - | 40,000 |
| | F1000C43 (1" HP-43K) | 1-3/8 | 180 (244) | - | 43,000 |

| | | | | | |
|---------------------|--------------------------|--------|-----------|---|---------|
| Ultra High Pressure | F250C100 (1/4" UHP-100K) | 3/4 | 50 (68) | - | 100,000 |
| | F375C (3/8" UHP-100K) | 3/4 | 105 (143) | - | 100,000 |
| | F562C (9/16" UHP-100K) | 1-3/16 | 125 (170) | - | 100,000 |
| | F375C (5/16" UHP-150K) | 3/4 | 70 (95) | - | 150,000 |

¹ Required torque shown is for manually lubricated (liquid or paste anti-seize) glands. For torque reduction when using glands supplied with Dry-Moly coating see "Reduced Pressure/Special Material" Chart on next page.

For torques at lower working pressures (specialty materials) see "Special Material" Torque Chart on next page.

Operation/Maintenance: Torque Values

Reduced Pressure/Special Material Torque Table: Pressure psi (bar) vs. Torque ft.-lbs. (N.m)

Note: ALL Parker Autoclave Engineers Pressure Containing products will have Maximum Allowable Working Pressure (@ Room Temperature) indelibly marked at an easy to read location. Most "Special Materials" are rated to a pressure less than our standard Cold Worked UNS S31600/S31603 316/316L Stainless Steel Material and use of the chart below is necessary for proper installation of Cone & Thread Connections at these lower pressures.

Use of this chart is also recommended when application pressure is less than the MAWP rating on the part. This will create a seal circle in the connection at a point before max insertion depth is reached - enhancing the lifetime of the product.

| Connection | Pressure psi (bar) | | | | | | | | | | ** Dry-Moly Coat Torque Reduction |
|---|--------------------|----------------|-----------------|------------------|------------------|------------------|------------------|------------------|-------------------|--------------------|--------------------------------------|
| | Minimum | 5,000 (345) | 10,000 (690) | 15,000 (1034) | 20,000 (1379) | 25,000 (1724) | 30,000 (2068) | 40,000 (2758) | 50,000 (3447) | 60,000 (4137) | |
| SF250CX (1/4" MP) | 10 (13.6) | 10 (13.6) | 10 (13.6) | 15 (20.3) | 20 (27.1) | - | - | - | - | - | 25% |
| SF375CX (3/8" MP) | 10 (13.6) | 10 (13.6) | 15 (20.3) | 25 (33.9) | 30 (40.7) | - | - | - | - | - | 30% |
| SF562CX10 (9/16" MP) | 20 (27.1) | 30 (40.7) | 45 (61) | 55 (74.6) | - | - | - | - | - | - | 30% |
| SF562CX20 (9/16" MP) | 15 (20.3) | 15 (20.3) | 30 (40.7) | 40 (54.2) | 55 (74.6) | - | - | - | - | - | |
| SF750CX10 (3/4" MP) | 25 (33.9) | 40 (54.2) | 60 (81.3) | 75 (101.7) | - | - | - | - | - | - | 30% |
| SF750CX20 (3/4" MP) | 20 (27.1) | 25 (33.9) | 45 (61) | 70 (94.9) | 90 (122) | - | - | - | - | - | |
| SF1000CX10 (1" MP) | 40 (54.2) | 65 (88.1) | 115 (156) | 135 (183) | - | - | - | - | - | - | 25% |
| SF1000CX20 (1" MP) | 35 (47.5) | 50 (67.8) | 100 (136) | 115 (156) | 135 (183) | - | - | - | - | - | |
| SF1500CX (1-1/2" MP) | 110 (149) | 110 (149) | 160 (217) | 200 (271) | - | - | - | - | - | - | 20% |
| | | | | | | | | | | | |
| F250C (1/4" HP) | 10 (13.6) | 10 (13.6) | 10 (13.6) | 10 (13.6) | 10 (13.6) | 15 (20.3) | 15 (20.3) | 20 (27.1) | 25 (33.9) | 25 (33.9) | N/A |
| F375C (3/8" HP) | 10 (13.6) | 10 (13.6) | 10 (13.6) | 15 (20.3) | 20 (27.1) | 25 (33.9) | 25 (33.9) | 35 (47.5) | 45 (61) | 50 (67.8) | N/A |
| F562C (9/16" HP) | 15 (20.3) | 15 (20.3) | 15 (20.3) | 20 (27.1) | 25 (33.9) | 35 (47.5) | 40 (54.2) | 50 (67.8) | 65 (88.1) | 75 (102) | N/A |
| F562C40 (9/16" HP) | 15 (20.3) | 15 (20.3) | 15 (20.3) | 25 (33.9) | 30 (40.7) | 40 (54.2) | 45 (61) | 60 (81.3) | - | - | N/A |
| F562C40-312 (9/16" HP-40K) | 25 (34) | 25 (34) | 25 (34) | 35 (47.5) | 45 (61) | 55 (74.6) | 65 (88.1) | 85 (115) | - | - | N/A |
| F1000C43 (1" HP 43K) | 30 (40.7) | 50 (67.8) | 65 (88.1) | 75 (101.7) | 100 (136) | 125 (170) | 150 (203) | 180 (244) | - | - | 25% |
| | | | | | | | | | | | |
| | - | - | - | - | - | 60,000 (4137) | 70,000 (4825) | 80,000 (5515) | 100,000 (6895) | 150,000 (10340) | |
| F250C100 (1/4" UHP) | - | - | - | - | - | 20 (27) | 30 (41) | 35 (48) | 50 (68) | - | N/A |
| F375C100 (3/8" UHP) | - | - | - | - | - | 40 (54) | 60 (81) | 75 (102) | 105 (143) | - | N/A |
| F562C100 (9/16" UHP) | - | - | - | - | - | 75 (102) | 90 (122) | 100 (136) | 125 (170) | - | N/A |
| F312C150 (5/16" UHP) | - | - | - | - | - | 35 (48) | 35 (48) | 35 (48) | 45 (61) | 70 (95) | N/A |
| **All special material glands dry moly coated will have lower set torques. Reduce the torque found or computed from chart above percentages shown in this column. | | | | | | | | | | | |

Valve Stem Maximum Running and Seating Torques * (Typical Values)

| Valve Series | Tube Size (inches) | Running Torque | Seating Torque | Pressure psi (bar) |
|---|--------------------|-----------------|----------------|--------------------|
| | | inch-lbs. (N.m) | | |
| 10V <small>(1/4" to 1/2" For Reference Only)</small> | 1/8 | 25 (3) | 35 (4) | 15,000 (1034) |
| | 1/4 | 40 (5) | 50 (6) | 15,000 (1034) |
| | 3/8 | 40 (5) | 50 (6) | 15,000 (1034) |
| | 1/2 | 60 (7) | 80 (9) | 10,000 (690) |
| SW | 1/4 | 25 (3) | 35 (4) | 15,000 (1034) |
| | 3/8 | 40 (5) | 50 (6) | 15,000 (1034) |
| | 1/2 | 70 (8) | 90 (10) | 10,000 (690) |
| 15SM 10P12-16 15QS12 & 16 | 9/16 | 60 (7) | 105 (12) | 15,000 (1034) |
| | 3/4 | 210 (24) | 290 (34) | 15,000 (1034) |
| | 1 | 180 (20) | 580 (64) | 15,000 (1034) |
| | 1-1/2 | 1100 (124) | 1560 (176) | 15,000 (1030) |
| 20SM 15P4-9 15QS4-9 20DBNV12 | 1/4, 3/8 | 40 (5) | 55 (6) | 20,000 (1379) |
| | 9/16 | 60 (67) | 110 (12) | 20,000 (1379) |
| | 3/4 | 300 (34) | 360 (41) | 20,000 (1379) |
| | 1 | 360 (41) | 600 (68) | 20,000 (1379) |
| 15Y | Various | 65 (7) | 144 (16) | 15,000 (1034) |
| 43Y | 1 | 25 (3) | 45 (5) | 43,000 (2965) |
| 50Y | 9/16 | 85 (10) | 180 (20) | 50,000 (3450) |
| 20GV | Various | 50 (6) | 55 (6) | 20,000 (1379) |
| 30GV | Various | 50 (6) | 55 (6) | 30,000 (2068) |
| 30SC | 1 | 360 (41) | 600 (68) | 30,000 (2068) |
| 43SC | 1 | 720 (82) | 800 (90) | 43,000 (2965) |
| 40SC | 9/16 | 360 (41) | 445 (50) | 40,000 (2758) |
| 30VM 20DBNV | 1/4 | 40 (5) | 55 (6) | 30,000 (2068) |
| | 3/8 | 45 (5) | 55 (6) | 30,000 (2068) |
| | 9/16 | 50 (6) | 55 (6) | 30,000 (2068) |
| 40VM | 9/16 | 40 (5) | 55 (6) | 40,000 (2758) |
| 60VM | 1/4, 3/8, 9/16 | 65 (7) | 70 (8) | 60,000 (4137) |
| 100VM | 1/4, 5/16, 3/8 | 100 (11) | 120 (14) | 100,000 (6895) |
| | 9/16 | 460 (52) | 520 (59) | 100,000 (6895) |
| 150V | 5/16 | 312 (35) | 384 (43) | 150,000 (10340) |

* These are not specifications.

Note: All valve stem torques are based on standard PTFE packing.
For valves with option "TG" (PTFE Glass) or "GY" (graphite, yarn packing), the following equations should be used to estimate torques.

Option "TG"

Running Torque = Running Torque (x 1.2)

Seating Torque = Running Torque (x 1.1) + Seating Torque - Running Torque

Option "GY"

Running Torque = Running Torque (x 2)

Seating Torque = Running Torque (x 2) + Seating Torque - Running Torque

Parker AE Flat Top/Bottom Adapters

| | Size (inches) | Maximum Working Pressure psi (bar) | Connection | Required Torque ft. - lbs. (N.m) |
|--------------------|---------------|------------------------------------|------------|----------------------------------|
| Flat Top Gasket | 9/16 | 10,000 (690) | F562FT | 60 (81.3) |
| Flat Bottom Gasket | 7/16 | 10,000 (690) | F437FB | 25 (33.9) |
| | 9/16 | 10,000 (690) | F562FB | 40 (54.2) |
| | 3/4 | 5,000 (345) | F750FB | 60 (81.3) |

Parker AE Packing Glands

| | Tube/Pipe O.D. Size (inches) | Packing Gland Hex (inches) | Required Torque ¹ ft. - lbs. (N.m) |
|--|------------------------------|----------------------------|---|
| 10V (1/4" to 1/2" For Reference Only) | 1/8 | 1/2 | 12 (16) |
| | 1/4 | 13/16 | 40 (54) |
| | 3/8 | 13/16 | 40 (54) |
| | 1/2 | 13/16 | 30 (41) |
| SW | 1/4 | 5/8 | 30 (41) |
| | 3/8 | 5/8 | 40 (54) |
| | 1/2 | 13/16 | 50 (68) |
| 15P 10P 15SM 20SM 15QS | 1/4, 3/8 | 5/8 | 40 (54) |
| | 9/16 | 13/16 | 80 (109) |
| | 3/4 | 13/16 | Note 2 |
| | 1 | 1-3/8 | 20 (27) |
| | 1-1/2 | 1-5/16 | 550 (745) |
| 20DBNV | 3/8, 9/16 | 13/16 | 40 (54) |
| | 3/4 | 15/16 | Note |
| 15Y | 3/4 | 15/16 | 130 (176) |
| | 1 | 1-1/16 | 150 (203) |
| 43Y | 1 | 1 | 150 (203) |
| 50Y | 9/16 | 15/16 | 85 (115.2) |
| 20GV | Various | 13/16 | 40 (54) |
| 30GV | Various | 13/16 | 40 (54) |
| 30SC/43SC | 1 | 1-3/8 | 230 (312) |
| 40SC | 9/16 | 15/16 | 140 (190) |
| 30VM | 1/4, 3/8, 9/16 | 13/16 | 40 (54) |
| 40VM | 9/16 | 13/16 | 40 (54) |
| 60VM | 1/4, 3/8, 9/16 | 13/16 | 60 (81) |
| 100VM | 1/4, 3/8 | 15/16 | 60 (81) |
| | 9/16 | 15/16 | 150 (203) |
| 150V | 5/16 | 1-3/8 | 150 (203) |
| 10VRMM | 9/16 | 9/16 | 20 (27) |
| 30VRMM | 3/4 | 13/16 | 50 (68) |
| 60VRMM | 1/4, 3/8 | 13/16 | 50 (68) |
| 15PVRMM | 1/2 NPT | 13/16 | 40 (54) |

Note 1: Torque may vary $\pm 10\%$. Torque values apply to standard PTFE packing.
For graphite yarn packing, add 25% to the above values.

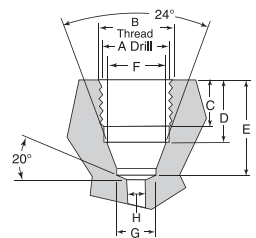
Note 2: 3/4 turn past finger tight with hex wrench.

Operation: Female Port Connection Dimensions

Parker Autoclave SpeedBite SW* (SW Series Valves)

15,000 psi (1/2" = 10,00 psi) Maximum Pressure

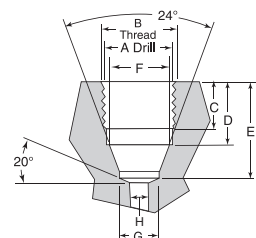
| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | | | |
|--------------------------------|-----------------|--------------------------|-----------|-----------|------------|------------|-------------|----------------|--------------|
| | | A | B | C | D | E | F | G | H |
| 1/4 | SW250 | 29/64 (11.5) | 1/2 -20 | .34 (8.6) | .44 (11.1) | .69 (17.5) | .35 (8.9) | "F" .257 (6.5) | .128 (3.3) |
| 3/8 | SW375 | 37/64 (14.7) | 5/8 -18 | .38 (9.6) | .47 (11.9) | .75 (19.1) | .48 (12.1) | "W" .386 (9.8) | .250 (6.4) |
| 1/2 | SW500 | 3/4 (19.1) | 13/16 -16 | .38 (9.6) | .50 (12.7) | .81 (20.6) | .60 (15.21) | .516 (13.11) | .375 (15.21) |



Parker Autoclave SpeedBite W* (10V2 Valve only - other sizes reference only)

15,000 psi Maximum Pressure

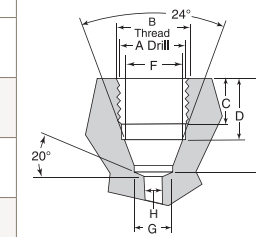
| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | | | |
|--------------------------------|-----------------|--------------------------|---------|-----------|------------|-------------|------------|----------------|-------------|
| | | A | B | C | D | E | F | G | H |
| 1/16 | W062 | "Q" .332 (8.4) | 3/8 -24 | .22 (5.6) | .31 (7.9) | .47 (11.9) | .19 (4.8) | #30 .129 (3.3) | .055 (0.94) |
| 1/8 | W125 | | | | | | | | |
| 1/4 | W250 | 11/16 (17.4) | 3/4 -16 | .38 (9.6) | .44 (11.1) | .69 (17.7) | .35 (8.9) | "F" .257 (6.5) | .188 |
| Reference only | | | | | | | | | |
| 3/8 | W375 | 11/16 (17.4) | 3/4 -16 | .38 (9.6) | .44 (11.1) | .69 (17.76) | .48 (12.1) | "W" .386 (9.8) | .250 |
| Reference only | | | | | | | | | |



Parker Autoclave QSS (QS Series Valves)

15,000 psi Maximum Pressure

| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | | | |
|--------------------------------|-----------------|--------------------------|-----------|-------------|-------------|-------------|-------------|----------------|-------------|
| | | A | B | C | D | E | F | G | H |
| 1/4 | QSF250 | 29/64 (11.5) | 1/2 -20 | .34 (8.6) | .44 (11.1) | .69 (17.5) | .34 (8.6) | "F" .257 (6.5) | .157 (4.0) |
| 3/8 | QSF375 | 37/64 (14.7) | 5/8 -18 | .38 (8.6) | .47 (11.9) | .75 (19.1) | .48 (12.1) | .038 (9.7) | .250 (6.4) |
| 9/16 | QSF562 | 7/8 (22.2) | 15/16 -16 | .57 (14.5) | .704 (17.9) | 1.25 (31.8) | .712 (18.1) | .57 (19.3) | .359 (9.1) |
| 3/4 | QSF750 | 1-3/16 (30.2) | 1-1/4 -18 | .83 (21.08) | 1.00 (25.4) | 1.56 (39.6) | 0.95 (24.1) | .76 (19.3) | .516 (14.6) |
| 1 | QSF1000 | 1-9/16 (39.7) | 1-5/8 -16 | .75 (19.1) | .88 (22.2) | 1.56 (39.6) | 1.24 (31.5) | 1.02 (26.0) | .688 (17.5) |



Note:

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

* Port ("H") sizes may vary in certain adapters in catalog and over-ride dimension given above.

All threads are manufactured to a class 2A or 2B fit.

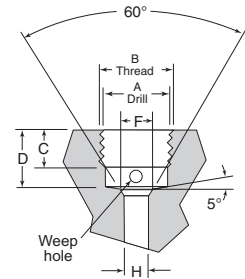
For prompt service. Parker Autoclave Engineers stocks select products. Consult factory. All general terms and conditions of sale, including limitations of our liability, apply to all products and service sold.

Operation: Female Port Connection Dimensions

Parker Autoclave Medium Pressure SF** (SM Series Valves)

20,000 psi Maximum Pressure

| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | |
|-----------------------------------|---------------------------|--------------------------|-----------------------|----------------|-----------------|-----------------|----------------------------|
| | | A | B | C | D | F | H |
| 1/4 | SF250CX | 25/64 (9.9) | 7/16 -20 | .28 (7.1) | .50 (12.7) | .19 (4.8) | .109 (2.8) |
| 3/8 | SF375CX | 33/64 (13.1) | 9/16 -18 | .38 (9.6) | .63 (16.0) | .31 (7.9) | .203 (5.2) |
| 9/16 | SF562CX10* SF562CX20 | 3/4 (19.1) | 13/16 -16 | .44 (11.1) | .75 (19.1) | .50 (12.7) | .359 (9.1) .312 (7.9) |
| 3/4 | SF750CX10* SF750CX20 | 61/64 (24.2) | 3/4 -14 see Note 1 | .50 (12.7) | .94 (23.9) | .63 (16.0) | .516 (13.1) .438 (11.1) |
| 1 | SF1000CX10* SF1000CX20 | 1-19/64 (32.9) | 1-3/8 -12 | .81 (20.6) | 1.31 (33.3) | .88 (22.4) | .688 (17.5) .562 (14.3) |
| 1-1/2 | SF1500CX | 1.790 (45.47) | 1-7/8 -12 | 1.00 (25.4) | 1.59 (40.38) | 1.38 (35.05) | .937 (23.80) |



Note 1 = NPS Male Tap

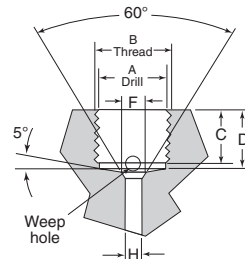
* Connection used in fittings but rated for 20,000 psi (1379 bar). CX10 connection versions are typically rated to 15,000 psi

Note 1: 3/4-14 is a straight pipe thread.

Parker Autoclave High Pressure F** (30, 43 SC and 30, 40, 60VM Valves)

60,000 psi Maximum Pressure

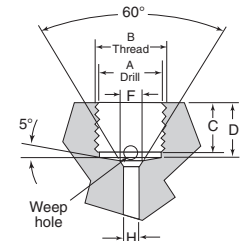
| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | |
|-----------------------------------|-----------------|--------------------------|-----------|---------------|----------------|---------------|----------------|
| | | A | B | C | D | F | H |
| 1/4 | F250C | 33/64 (13.1) | 9/16 -18 | .38 (9.7) | .44 (11.1) | .17 (4.3) | .094 (2.4) |
| 3/8 | F375C | 11/16 (17.4) | 3/4 -16 | .53 (13.5) | .62 (15.7) | .26 (6.6) | .125 (3.2) |
| 9/16 | F562C | 1-3/64 (26.6) | 1-1/8 -12 | .63 (16.0) | .75 (19.1) | .38 (9.7) | .188 (4.8) |
| 9/16 | F562C40 | 1-3/64 (26.6) | 1-1/8 -12 | .63 (16.0) | .75 (19.1) | .38 (9.7) | .250 (6.4) |
| 9/16 | F562C40-312 | 1-3/64 (26.6) | 1-1/8 -12 | .63 (16.0) | .75 (19.1) | .47 (12) | .312 (7.9) |
| 1 | F1000C43 | 1-19/64 (32.9) | 1-3/8 -12 | .81 (20.6) | 1.31 (33.3) | .88 (22.4) | .438 (11.1) |



Parker Autoclave Ultra High Pressure F**C100 & F**C150 (100VM and 150V Valves)

100,000 and 150,000 psi Maximum Pressure

| Tube Outside Diameter (Inches) | Connection Type | Dimensions - inches (mm) | | | | | |
|-----------------------------------|-----------------|--------------------------|-----------|---------------|----------------|--------------|---------------|
| | | A | B | C | D | F | H |
| 1/4 | F250C100 | 37/64 (14.7) | 5/8 -18 | .63 (16.0) | 1.06 (26.9) | .25 (6.4) | .094 (2.4) |
| 3/8 | F375C100 | 37/64 (14.7) | 5/8 -18 | .63 (16.0) | 1.06 (26.9) | .25 (6.4) | .125 (3.2) |
| 9/16 | F562C100 | 1-3/64 (26.6) | 1-1/8 -12 | .63 (16.0) | 1.06 (26.9) | .38 (9.7) | .188 (4.8) |
| 5/16 | F312C150 | 37/64 (14.7) | 5/8 -18 | .63 (16.0) | 1.06 (26.9) | .25 (6.4) | .094 (2.4) |



Note:

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

All threads are manufactured to a class 2A or 2B fit.

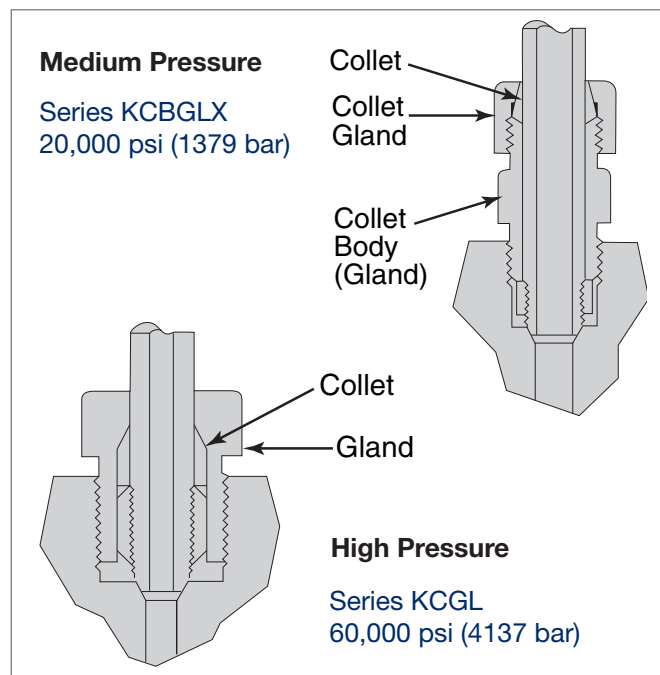
Installation: Anti-Vibration Collet Gland/Reseating Tools & Instructions

Assembly Procedures

Anti-vibration collet gland assembly replaces the standard gland nut.

1. Cone and thread tubing as defined on pages 6-9.
2. Slide collet assembly onto tube and install collar as described in the assembly and makeup of connections on page 8. One or two threads should be exposed between the collar and cone.
3. Lubricate male threads on glands (medium pressure anti-vibration assemblies supplied with a baked on dry film lubricant. Lubrication not required.)
4. Tighten collet body (elongated gland) to specified torque on page 16-17. The high pressure collet will grip the tube when the connection gland is tightened.
5. For the medium pressure collet gland assembly, hand tighten the collet gland in place and further tighten 1-1/4 turns with a wrench. When tightening the medium pressure anti-vibe collet nut, hold the collet body with a wrench to prevent the body from turning and over tightening. This will lock the collet against the tube. For subsequent retightening of the medium pressure anti-vibration collet gland, use 3/4 turns past finger tight.

Medium & High Pressure Antivibration Gland Assemblies



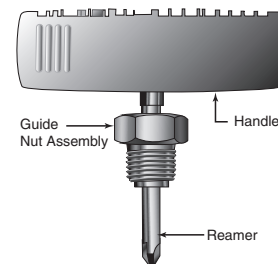
Note: Always use a back-up wrench on collet body to prevent over tightening of collet body into connection.

See individual Cone & Thread Fitting Brochures for additional information and ordering details.

Reseating Tool

For female TUBING CONNECTION cone seat

1. Clamp fitting in soft-jawed vise.
2. Thread gland nut into connection and tighten to 10 ft. lbs. (13.6 N.m).
3. Apply a medium weight high sulfur cutting oil generously through opening in nut. Cutting oil P-8784.
4. Insert reamer through guide bushing and press down firmly while rotating clockwise approximately two full turns, relieving pressure gradually toward end of second turn.
5. Remove reamer, guide nut and bushing and inspect cone seat.
6. Repeat steps 2,3,4 and 5, if necessary, until cone surface has been restored and finish is smooth.
7. Clean fitting thoroughly to remove all chips and residue.



| Connection Type | Reamer Complete | Guide Nut Assembly | Reamer | Handle |
|-----------------|-----------------|--------------------|---------|-----------|
| SF250CX | P-0270CX | A101A-2005 | P-0270 | 202D-0596 |
| SF375CX | P-0271CX | A202A-7310 | P-0271 | 202D-0596 |
| SF562CX | P-0272CX | A2030-7310 | P-0896 | 202D-0596 |
| SF750CX | P-1726CX | A102A-3376 | P-1726 | 201D-0595 |
| SF1000CX | P-1727CX | A102A-3375 | P-1727 | 201D-0595 |
| SF1500CX | 91409 | - | 91409-R | - |
| F250C | P-0270C | A1010-0453 | P-0270 | 202D-0596 |
| F375C | P-0271C | A1020-0453 | P-0271 | 202D-0596 |
| F562C | P-0272C | A1030-0453 | P-0272 | 202D-0596 |
| F562C/C40 | P-0272C | A1030-0453 | P-0272 | 202D-0596 |
| F562C40-312 | P-0272C | A1030-0453 | P-0272 | 202D-0596 |
| F1000C43 | P-1727CX | A102A-3375 | P-1727 | 201D-0595 |
| F250C100 | P-02710C150 | A2040-7310 | P-0271 | 202D-0596 |
| F375C100 | P-02710C150 | A2040-7310 | P-0271 | 202D-0596 |
| F562C100 | P-0272C | A1030-0453 | P-0272 | 202D-0596 |
| F312C150 | P-02710C150 | A2040-7310 | P-0271 | 202D-0596 |

Note: Connection type F250C100 and F375C100 use Reamer P-0271C150

Operation: Hydraulic Tube Bender (HTB)



Required Air Pressure: 30 psi (2.1 bar) minimum 120 psi (8.3 bar) maximum.

Reservoir Capacity: 24 cu. in. (393cm³).

Available with optional hydraulic pressure gauge and gauge adapter. A lubricator/air separator is recommended for air operated units.

HTB Bend (Mandrel) Radius

| Shoe Catalog Number | Tube Size Inches (mm) | | †† Rated Pressure (bar) | †† Bend Inside Radius inches (mm) | Minimum Length Required 90° Bend inches (cm) |
|---------------------|-----------------------|-----------------|-------------------------|-----------------------------------|--|
| | Outside Diameter | Inside Diameter | | | |
| 201A-6014 | 1/4 (6.35) | .083 (2.10) | 60,000 (4137) | 1.75 (44.5) | 8 (20.3) |
| 201A-6014 | 1/4 (6.35) | .109 (2.77) | 20,000 (13794) | 1.75 (44.5) | 8 (20.3) |
| 201A-6014 | 3/8 (9.53) | .125 (3.18) | 60,000 (4137) | 1.75 (44.5) | 8 (20.3) |
| 201A-6014 | 3/8 (9.53) | .203 (5.16) | 20,000 (13794) | 1.75 (44.5) | 8 (20.3) |
| N/A ** | 5/16 (7.94) | .062 (1.57) | 150,000 (10342) | 6.00 (152.4) | 8 (20.3) |
| 201A-6016 | 9/16 (14.29) | .188 (4.78) | 60,000 (4137) | 2.62 (66.5) | 14 (35.6) |
| 201A-6016 | 9/16 (14.29) | .250 (6.35) | 40,000 (2758) | 2.62 (66.5) | 14 (35.6) |
| 201A-6016 | 9/16 (14.29) | .312 (7.92) | 20,000 (13794) | 2.62 (66.5) | 14 (35.6) |
| 201A-6016 | 9/16 (14.29) | .359 (9.12) | 15,000 (1034) | 2.62 (66.5) | 14 (35.6) |
| 201A-6018 | 3/4 (19.05) | .438 (11.13) | 20,000 (13794) | 3.50 (88.9) | 16 (405.6) |
| 201A-6018 | 3/4 (19.05) | .516 (13.11) | 15,000 (1034) | 3.50 (88.9) | 16 (40.6) |
| 201A-6020 | 1 (25.4) | .438 (11.13) | 43,000 (2965) | 4.62 (117.3) | 22 (55.8) |
| 201A-6020 | 1 (25.4) | .562 (14.27) | 20,000 (13794) | 4.62 (117.3) | 22 (55.8) |
| 201A-6020 | 1 (25.4) | .688 (17.48) | 15,000 (1034) | 4.62 (117.3) | 22 (55.8) |

Annealed Parker Autoclave Engineers pressure tubing may also be bent on HTB tube bender using bending shoe sizes specified above.

* HTB bending shoes are constructed of heat-treated aluminum alloy and designed specifically for use with Parker Autoclave Engineers' heavy wall stainless tubing. They are not intended for bending such components as commercial pipe. Because of diameter differences, such misuse could fracture the bending shoe.

** Information on bending 150,000 psi (10342 bar) tubing is included here for reference only. This tubing should not be bent on HTB hydraulic tube bender because of the 6" required minimum radius.

†† Pressure rating of the bent tube will be reduced. Consult the Technical Application section for pressure rating at various bend radii, or contact Technical Help department with tube OD, ID, and Bend Radius for assistance (IPDAETech-nical@parker.com)

All dimensions for reference only and subject to change.

Single Pass Bending: High Pressure Tubing

The Parker Autoclave Engineers hydraulic tube bender is designed for 1/4" to 1" heavy wall tubing and provide fast, accurate and reliable bending 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**)

HTB Features:

Dimensions: 27.5"W x 14.0"H x 14.0"D
69.9cm x 35.6cm x 35.6cm).

Weight: 55 lbs. (29.9 Kg)

Single-stage hydraulic hand pump (standard)

Ram retractor valve relieves system pressure after bending. The spring loaded ram retracts for easy removal of tubing after bending is completed.

Quick release pivot pins lock and unlock easily for tube removal.

One-piece shoe locking pin locks bending shoe securely but allows for quick release to interchange shoes.

Rugged bending frame is lightweight, aircraft quality, aluminum alloy.

Precision one-piece bending shoes are permanent mold, heat-treated, aircraft quality, aluminum alloy.

Air-operated hydraulic pump option can be furnished in place of standard hand pump. (Add "-A" to order number) Operating pressure 0 to 10,000 psi (0 to 690 bar).

Maintenance: Lubrication Guide

General Information

For reliable operation and long life of hand valves, air valves, relief valves, check valves and safety heads, Parker Autoclave Engineers strongly recommends proper lubrication of all components that are subject to friction during assembly and /or operation. This is especially important where metal to metal contact occurs such as on connection gland threads, packing gland threads and stem threads. Without proper lubrication, the high loads imposed on these threads may cause the parts to weld (or gall) together from the high metal to metal contact forces and friction heat. Lubrication is also essential for the effective sealing and long life of o-rings, especially those that are used in dynamic sealing applications. The performance of metal to metal seals will be improved with lubrication but, they do not absolutely require it.

Lubricant selection is strongly dependent on the application of the given component. Process fluids, fluid temperature, ambient environment temperature, materials and other factors are important in selecting a lubricant. This manual gives some basic guidelines in the proper selection and application of lubricants. The end user must ultimately determine the suitability of a lubricant based on process requirements.

Note: Parker Autoclave Engineers assumes no liability in selecting lubricant for customer applications.

Lubrication Sites

1. Speedbite, Medium Pressure and High Pressure Connections in all valves and fittings - Prior to assembly, the connection gland should be lubricated on the threads and on the area that is in contact with the sleeve or collar. Parker AE provides as standard a dry molybdenum disulfide lubricant on Speedbite glands unless specified otherwise. If process tolerable, a small amount of any lubricant (or process fluid) on the end of the tube cone or connection sleeve will help to maximize the metal-to-metal sealing process. This inherently provides for better sealing of gases.

2. Hand Valves - Ideally, the non-rotating stem should be lubricated along the shank that fits into the threaded stem sleeve as well as on the surfaces that are in contact with the stem washers. The threaded stem sleeve should be lubricated on the stem threads and at the ends (see Figure 1). The packing gland should be lubricated on the external threads and on the end that is in contact with the packing washer. For valves with replaceable seats,

the external threads on the seat retainer and the portion of the seat retainer in contact with the seat should be lubricated.

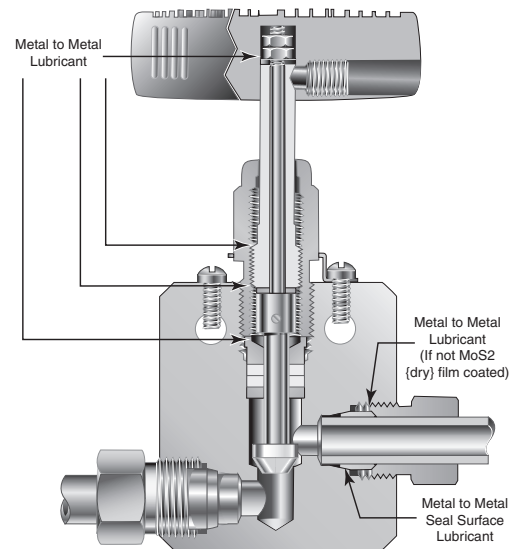


Figure 1
Hand Valve Lubrication Sites

3. Air Valves - The packing gland and seat retainer (if the valve has a replaceable seat) should be lubricated in the same manner as the hand valve. Threads should also be lubricated on all of the yoke screws (for yoke style valves) and on the retainer insert (on other air operated valves).

For piston type air operators, o-ring lubricant should be applied to the inside of the operator housing, on the center rod and on all the o-rings, on the pistons and divide plates.

4. Check Valves - The gland nut should be lubricated on the external threads and at the end where it contacts the cover. The cover should be lubricated at the sealing surface where it contacts the body. For o-ring check valves, a small amount of o-ring lubricant on the o-ring will help swell the elastomer and aid sealing. Refer to Figure 3 for lubrication sites on check valves.

Maintenance: Lubrication Guide

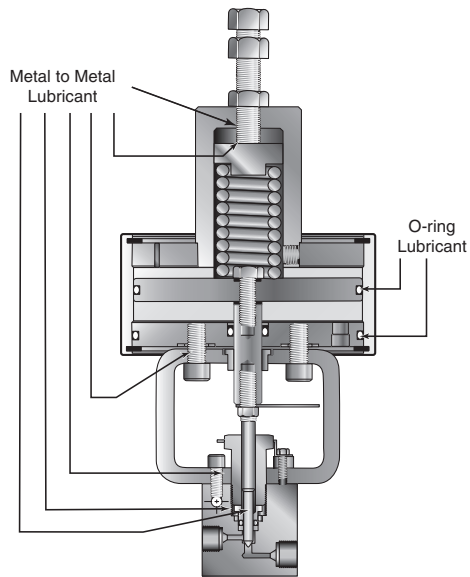


Figure 2
Air Valve Lubrication Sites

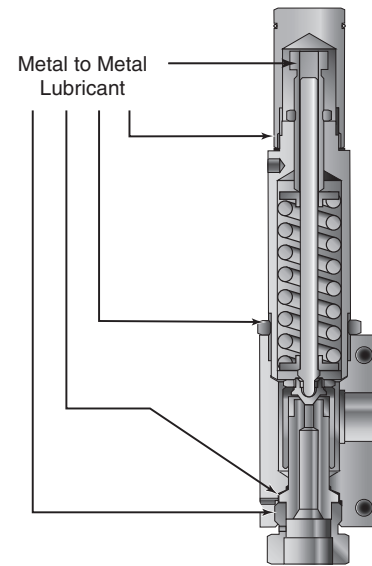


Figure 4
Relief Valve Lubrication Sites

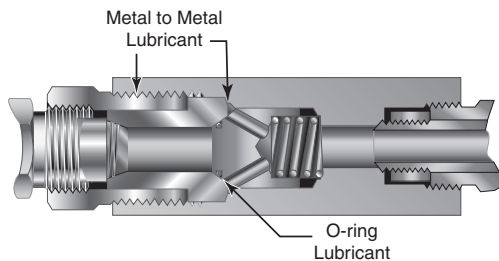


Figure 3
Check Valve Lubrication Sites

5. **Relief Valves** - Threads should be lubricated on the cap, spring cylinder, adjustment bolt and on the seat gland. Refer to Figure 4 for lubrication sites on the relief valve.

6. **Safety Heads** - The threads and end of the hold down nut should be lubricated. Refer to Figure 5 for lubrication sites on the safety head.

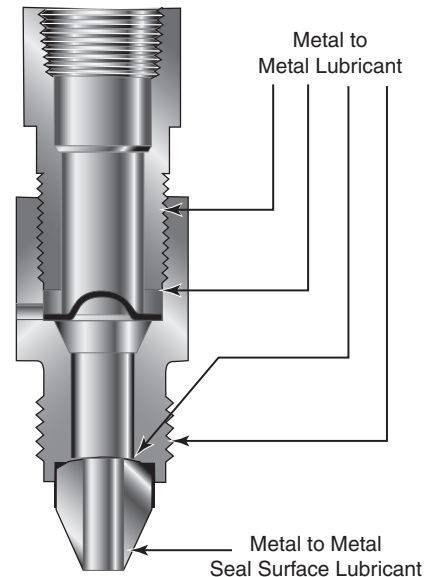


Figure 5
Safety Head and 2-piece Male/Female Adapter
Lubrication Sites

Maintenance: Lubrication Guide

Parts that will move against each other during assembly or operation should be lubricated at the points/areas of contact.

Recommended Lubricants

Note: This information is provided for reference only. The manufacture of the lubricant should be contacted for specific information based on your application. Refer to the material safety data sheets for information on safe usage and storage methods for these lubricants.

1. Jet Lube SS-30™ - This lubricant consists of pure copper flakes that are homogenized into a non-melting, nonvolatile viscous carrier. It is fortified with anti-oxidants, rust and corrosion inhibitors. Jet Lube SS-30 is the standard lubricant for Parker Autoclave VFT components with sliding metal to metal contact surfaces. The surfaces are copper coated and prevents seizure, galling and heat freeze. SS-30 comes in the form of a thick oil that can be easily brushed on the surfaces to be lubricated. The absolute service temperature range is from -65° to 1800°F (-55 to 982°C). Jet Lube SS-30 is not recommended for extreme low temperature applications or processes that will not tolerate the presence of copper.

2. Jet Lube MP-50 Moly Paste - This is a thick paste that contains molybdenum disulfide (MoS₂). This lubricant is suitable for preventing seizure and galling of parts at absolute temperatures of -300 to 750°F (-184 to 399°C). It is recommended for metal to metal components that are exposed to temperatures of less than 0°F. Other lubricants may solidify under these conditions and prevent the effective operation of dynamic components.

3. DuPont Krytox 240AC - Krytox is a non-flammable fluorinated grease used for metal to metal lubrication in valves that are cleaned and designated for oxygen service. It comes in the form of a white grease and has a recommended absolute service temperature range of -15 to 500°F (-26.1 to 260°C).

4. Molykote® 55 O-ring Grease (See also DC 111) (Dow Corning) - This grease is used for static lubrication between rubber and metal parts in actuators, ball valves and o-ring check valves. It is a silicone based lubricant and meets Military Specifications MIL-G-4343. It is not recommended for use on silicone rubber o-rings and seals. It has a recommended absolute service temperature range of -85 to 350°F (-65 to 177°C).

5. Neolube DAG 156 - This is a dry film lubricant for valves used in Navy Nuclear service. It consists of graphite particles in a thermoplastic resin and isopropanol and meets Military Specification MIL-L-24131B. The dry film form allows tight control of impurities that are required for these applications. It has an absolute service temperature of -100 to 400°F.

6. Lubriplate Pure Tac, NSF H-1 Registered, Extremely Tacky, Food Grade Greases - This grease is used for dynamic lubrication between rubber and metal parts in pneumatic systems such as piston style air operators. A tacky, adhesive, highly water resistant grease for medium to slow dynamic speeds. It has a recommended absolute service temperature range of 0 to 350°F (-17.8 to 177°C).

Maintenance: Lubrication Guide

Lubrication Selection Guide

| Lubrication | Part Number | Application | Absolute Service Temperature Range |
|---------------------------|------------------------------------|---|------------------------------------|
| Jet-Lube SS-30 | P-3580 (1 lb.) P-3580-8 (8 oz.) | Metal to Metal, Standard | -65°F to 1800°F (-18°C to 982°C) |
| Jet-Lube Moly Paste MP-50 | 1lb = P-9766 | Metal to Metal, Low Temperature | -300°F to 750°F (-185°C to 398°C) |
| Krytox 240 AC | 53893 | Metal to Metal, Oxygen Clean Components | -15°F to 500°F (-26°C to 260°C) |
| MolyKote 55 Dow Corning | 90085 | O-ring and Packing Lubricant | -85°F to 350°F (-65°C to 177°C) |
| Neotube DAG 156 | 90406 | Metal to Metal, Nuclear Service | -100°F to 400°F (-73°C to 204°C) |
| LubriPlate Pure Tac | P-9981 | Food Service O-ring Lubricant | 0°F to 350°F (-18°C to 177°C) |

Notes:

Specific applications may require other service temperature ranges.

¹SS-30 and MP-50 Moly Paste are registered trademarks of Jet Lube Inc.

²Krytox is a registered trademark of E.I. duPont de Nemours & Co., Inc.

³DAG is a registered trademark of Acheson Industries, Inc.

⁴Molykote and Dow Corning are registered trademarks of Dow Corning Corp

Parker's Motion & Control Technologies

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

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

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! CAUTION !

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

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