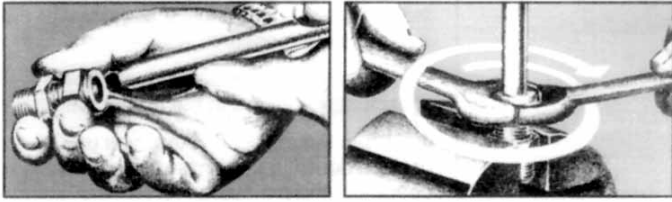


ASSEMBLY INSTRUCTIONS



Initial setting of ferrules onto tubing or tube stub-ended fittings

Sizes 1" (25mm) and Smaller

Manual Assembly

Use the following instructions when initially setting ferrules onto either tubing, or the tube stub end of certain fittings (e.g. adapters, port connectors, and reducers). Note that for tubing sizes above 1/2", or 12mm, the use of a presetting tool, either manual or hydraulic, may apply. See further details in the Section titled, "Presetting Tool Assembly".

1. Loosen the fitting nut.
2. Firmly insert the tubing into the fitting assembly. Proper assembly requires the tubing be fully bottomed in the fitting body. (Note: Use of the Hoke Gyrogage or GMT, explained below, will allow the assembler to confirm proper tube insertion.)
3. Establish a consistent starting point for wrench-tightening. For applications using **Brass, Stainless Steel, or Monel** fittings:
 - For fittings that are under 1/2" (12 mm), finger-tightening of the nut is sufficient.
 - For fittings that are 1/2" (12 mm) and above, tighten the nut until a tube-tight condition is achieved. Tube tight is defined as the point beginning where the tube will no longer rotate and has zero axial movement. If it is not possible to determine if the tube-tight condition has been met then, while supporting the body with a backup wrench, use a wrench to tighten the fitting nut an additional 1/4 turn past finger-tight.
 - **SEVERE APPLICATION WARNING:** For applications requiring high pressure, high safety factor or severe service, a tube tight condition is required irrespective of fitting size.

For applications using superior alloy (**Hastelloy C-276, Duplex 2205, Inconel, Super Duplex 2507, Titanium, 254 SMO**) fittings:

- For fittings that are under 3/8" (10 mm), finger-tightening of the nut is sufficient.
 - For fittings that are 3/8" (10 mm) and above, the fitting nut must be tightened until a tube-tight condition is reached. If it is not possible to determine if the tube-tight condition has been met, then, while supporting the body with a backup wrench, use a wrench to tighten the fitting nut and additional 1/4 turn past finger-tight.
 - **SEVERE APPLICATION WARNING:** For applications requiring high pressure, high safety factor or severe service, a tube tight condition is required irrespective of fitting size.
4. Mark both the fitting body and nut at the 12:00 position with a readily visible marking.
 5. While supporting the body with a backup wrench, tighten the nut with a wrench 1 1/4 turns by going completely around past the 12:00 position to the 3:00 position. Note, when a Gyrogage or GMT is used, completely follow the appropriate usage instructions and then confirm that the mark on the tubing is visible at the back of the nut.

Presetting Tool Assembly

Due to the inherent strength of large diameter heavy wall tubing, Hoke recommends the use of a presetting tool, either manual or hydraulic, for all installations involving tubing sizes from 5/8" or 16mm and above, regardless of application. When the tubing

wall thickness being utilized in sizes less than 0.065" or 2.0mm, a manual presetting tool is sufficient. When the wall thickness is 0.065" or 2.0mm and greater, the use of a hydraulic presetting tool is specifically required. Each hydraulic presetting tool is supplied with its own set of instruction.

The use of manual presetting tools is also suggested for smaller size fittings and tubing when the actual installation is in a hard-to-reach location, making it difficult to count turns. Use manual presetting tools by following the instructions for initially setting ferrules. By presetting the ferrules in the presetting tool, installation in place simply requires following Gyrolok[®] remake instructions.

Remaking a fitting end, or assembling a fitting body to tubing with preset-ferrules

1. Firmly insert the end with the previously set ferrules into the fitting body and tighten the nut to a finger tight condition.
2. While supporting the body with a backup wrench, tighten the nut with a wrench until a sharp rise in torque is felt, then simply snug tight.

Sizes 1 1/4", 28mm and larger

A Hydraulic Presetting Tool *must be used* when assembling 1 1/4", 1 1/2", 2", 28mm, 30mm, 32mm & 38mm Gyrolok[®] Tube Fittings

1. A hydraulic presetting tool is designed to set the ferrules on the tubing prior to installation into a fitting body. Each hydraulic presetting tool is supplied with its own set of instructions.
2. Prior to installation into the fitting body, lubricate the backside of the rear ferrule and threads on the nut with the lubricant supplied.
3. Using the lubricant supplied, periodically lubricate the cone angle and threads of the presetting tool die-set (prior to first fitting make-up and approximately every fifth fitting thereafter).
4. Insert tubing with preset ferrules into Gyrolok[®] body, hand tighten the nut, while supporting the body with a backup wrench, further tighten the nut with a wrench until a sharp rise in torque is felt.

Remake Instructions:

1. Firmly insert the end with the previously set ferrules into the fitting body and tighten the nut to a finger tight condition.
2. While supporting the body with a backup wrench, tighten the nut with a wrench until a sharp rise in torque is felt, then simply snug tight. When initially assembling the pre-set ferrule end of over 1", 25mm Gyrolok[®] adapters, follow the remake instructions listed above.

All Sizes

Installations that do not involve setting of ferrules

Assembly instructions differ when installing fitting ends that do not involve setting ferrules, such as a plug (P), or the machined ferrule end of a port connector (PC), as well as for threaded ends such as NPT or SAE, for which appropriate standards should be used.

When assembling a Gyrolok[®] plug onto a Gyrolok[®] body:

1. Remove nut and ferrules from fitting body.
2. Place plug assembly onto fitting body. Tighten plug nut to a hand-tight condition.
3. While supporting fitting body with a backup wrench, tighten plug nut with a wrench until a sharp rise in torque is felt, (approximately 1/4 turn on initial makeup, less on re-connections) then simply snug.

When initially assembling the machined ferrule end of a Gyrolok[®] port connector:

1. Remove nut and ferrules from fitting body.
2. Firmly insert machined ferrule end of port connector, into fitting body.
3. Slide nut over tube stub end of port connector and then over machined ferrule. Hand-thread onto fitting body.
4. While supporting fitting body with a backup wrench, tighten nut with a wrench until a sharp rise in torque is felt (approximately 1/4 turn on initial makeup, less on re-connections), then simply snug.

Hoke Gyrogage[®] Assembly and Inspection Tool

Use the Hoke Gyrogage[®] to perform step-by-step inspections during the initial assembly process. Each Gyrogage[®] is supplied with instructions, allowing the user to:

1. Verify all components are present.
2. Ensure proper insertion of the tubing into the fitting.
3. Confirm sufficient tightening of the fitting nut.

Gas Service

Gases (air, hydrogen, nitrogen, etc.) can escape through smaller leak paths than liquids. As such, the reduction of surface defects (scratches) on tubing becomes more important when the system media contains gases. As tubing wall thickness increases, the ability of the ferrules to coin out imperfections increases. The use of heavier wall tubing will help the ferrules to overcome minor surface defects that could contribute to gas leakage. Hoke

recommends the following minimum wall thickness for tubing when system media contains gases.

Tube OD (inches)	Nominal Minimum Wall Thickness (inches)	Tube OD (inches)	Nominal Minimum Wall Thickness (inches)
1/8	0.028	3/4	0.065
3/16	0.028	7/8	0.083
1/4	0.028	1	0.083
5/16	0.035	1 1/4	0.109
3/8	0.035	1 1/2	0.134
1/2	0.049	2	0.180

Ask your Hoke distributor for details regarding Hoke's Valve & Fitting Safety Installation Workshops.



HOKE Cares About Your Safety

WARNING

*Improper selection or use of products described herein can cause
Personal injury or property damage*



Product information described herein is offered for use by the system designer and user.

It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Material compatibility, product ratings, and application details should be considered in the selection.

Always contact your local Hoke Distributor with any questions you may have before pressurizing and operating the product.

SAFETY INSTRUCTIONS

1. Do not tighten or loosen any part of a fitting or valve when the system is pressurized. Make sure the system is un-pressurized when tightening or loosening a fitting or valve connection.
2. Do not loosen Hoke Gyrolok® nut or any product component in order to relieve or bleed down system pressure.
3. Do not exceed pressure-temperature specifications stated in the appropriate catalog.
4. When the application involves use of a toxic or hazardous fluid, exercise extra caution during operation and maintenance.
5. Before assembling new, unused Hoke Gyrolok® tube fitting ends, loosen the Hoke Gyrolok® nut before inserting the tube to allow full insertion of the tube to the base of the body bore.
6. Always use tubing that is compatible with the fitting or valve material. Tubing appropriate for use with Hoke products is described in Tubing Data Charts. For example, use 316 Stainless Steel fittings with 316 Stainless Steel tubing.
7. Always leave a length of straight tube between the tube bend and the fitting. A tube bent too close to the fitting connection may be a source of leakage.
8. During assembly of the Hoke Gyrolok® tube end, always hold the fitting or valve body with one wrench while separately wrench tightening the Hoke Gyrolok® nut. Follow the same precaution when disassembling.
9. Always use a Hoke tube insert (basic part number "TI" when assembling a Hoke Gyrolok® fitting to soft, pliable plastic tubing.
10. Always use proper thread lubricants or sealants on tapered pipe threads. Note that thread sealants may have lower temperature ratings than the basic fitting.
11. NPT threads should be torqued in accordance with an industry standard, such as Underwriter's Laboratory UL842. Note that previously assembled threads may require additional tightening.
12. When installing an NPT ended valve, hold the valve body near the connection with one wrench, while separately wrench tightening the mating pipe. Turn the pipe, not the valve. Follow the same precaution when disconnecting.
13. Do not hold the valve handle when tightening an end connection.
14. Do not use excessive force to open or close a ball valve e.g. do not use a handle extension.
15. On initial installation, valves may require an adjustment of the packing nut due to storage variations, systems parameters, and cold flow properties of TFE.

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