

STEPS IN HOSE ASSEMBLY

Hose Assembly Instructions Ultra-Crimp™ 1-Piece Crimped Fitting

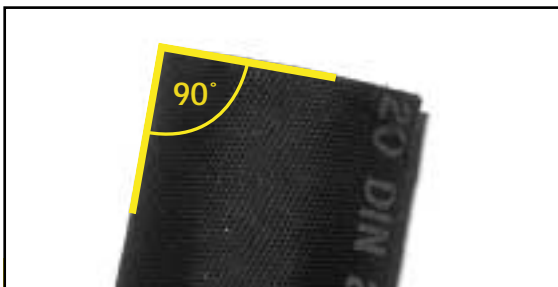


- 1) Determine correct hose length from desired hose assembly length and “C” dimension. The “C” dimension or cut-off factor can be found in the fitting tables. More information on using the “C” dimension can be found in the previous subtopic, “Defining Hose and Assembly Length.”
- 2) Cut hose to required length using a cut-off saw or a circular abrasive cut-off wheel. The preferred choice would be the steel wheel with a cooling agent. Care should be taken in not overheating the hose, which can cause deformation of the hose and create difficulty when inserting the hose fittings. For textile reinforced hose, a guillotine-style cutter may be used.



Cut-off saw. Use caution when operating power equipment. Follow the proper safety measures per manufacturer suggestions.

- 3) Ensure hose is cut square.



Hose with square cut.

- 4) Contaminated hose may reduce the service life of hydraulic systems. Always clean the hose bore after cutting, using air and/or flush with a compatible fluid.

- 5) In certain situations, skiving may be required. Skiving is the process of removing the portion of hose cover that lies directly under the coupling ferrule. This allows the metal fitting to be coupled directly on the hose reinforcement. Skiving is further discussed in the following section under the subtopic of “Skiving.”
- 6) Push and seat hose into the fitting. It is essential that the fitting be mated with a compatible hose style. Check fitting compatibility in hose or fitting product tables. To determine the insertion depth of the hose coupling, first measure the distance from the bottom of the fitting to the end of the ferrule where the hose is to be inserted. Mark a line on the hose cover at the distance from the end of the hose that equals the insertion depth. This becomes the visual check to determine if the hose was fully inserted in the fitting.



Mark insertion depth.

It is sometimes difficult to insert a fitting into hydraulic hose. If necessary, it is recommended using a liquid soap or a water/soap solution as a lubricant. Use the lubricant sparingly. When installing elbow fittings, point elbow towards curvature of the hose, unless specified otherwise. When installing elbow fittings on both ends, see the previous section on “Measuring the Offset Angle.” If the insertion mark was correctly applied, you should now be able to determine if the coupling has been completely inserted. The depth mark will be aligned with the end of the ferrule. In the case of a skived assembly, check that no skive shows and that couplings are on straight.

STEPS IN HOSE ASSEMBLY

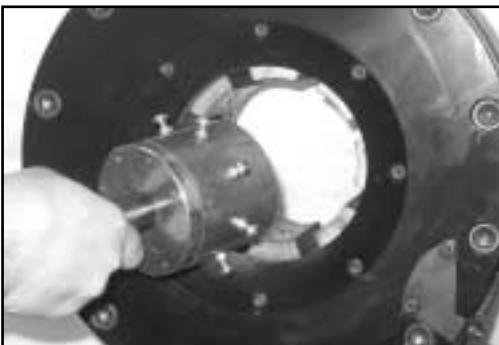


Fitting inserted on hose.

- 7) Before crimping hose fitting, verify the tooling setup and install the proper die set. Read the Crimp Chart, per Goodyear recommendations, and dial in the correct crimp diameter.



Always verify proper die set.



Always verify proper die set.



Set crimp diameter.

- 8) Place hose and fitting into the crimp machine. Crimp ferrule to predetermined diameter. Refer to the Goodyear Crimp Specifications Manual for proper crimp diameters and the crimper operators manual for further instructions on how to properly and safely operate the crimper.



Insert hose assembly into crimper die set.



Insert hose assembly into crimper die set.

- 9) Remove assembled end and check crimp diameter with caliper or micrometer. Crimp diameter should be measured at the center of the ferrule. Measure the smooth portion of the ferrule and not the ridges. Visually check for cracked, cocked, or damaged fittings.



Verify crimp diameter with calipers.

STEPS IN HOSE ASSEMBLY

- 10) Some applications require the addition of a protective outer sleeving or strain reliefs. If this is a requirement, the most appropriate time to assemble is before the second end fitting is applied. Choose the appropriate product for the specific application. When cutting product to length, allow for flexing and bending of the hose.
- 11) Even if not required, it is a good practice to examine and audit the assembly before delivery or use. Records should be maintained. The level of inspection should be in compliance with the quality plan.
 - a) Inspection—Visual, dimensional, and proof pressure testing in accordance with SAE J517 or SAE J343.
 - b) Clean or flush of the assembly to remove plating dust, rubber chips, etc.
 - c) Apply caps, if required, to protect fitting threads and keep out contamination.
 - d) Apply labels or specific markings, if required.
 - e) Package the assembly properly.

Final Inspection Checklist

- Bulge behind the fitting
- Cocked fittings
- Cracked fittings
- Rusted fittings
- Exposed reinforcement
- Freedom of swivels
- General appearance of the assembly
- Internal contaminants
- Restriction of the tube

Recommended Inspection Equipment

- Worktable suitable for inspection
- Tape measure to measure overall length
- Calipers for measuring crimp diameter
- Pi tape to measure outside diameter
- Plug gauges for measuring inside diameter
- Protractor device for measuring angle orientation of bent tube fittings
- Magnifying glass and light to view inside of assemblies
- Burst and proof pressure tester

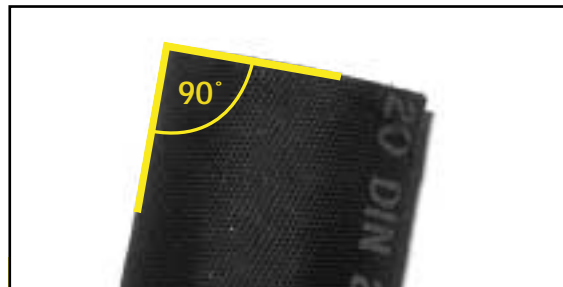
Hose Assembly Instructions Uni-Crimp™ 2-Piece Crimped Fitting

- 1) Determine correct hose length from desired hose assembly length and “C” dimension. The “C” dimension or cut-off factor can be found in the fitting tables. More information on using the “C” dimension can be found in the previous subtopic, “Defining Hose and Assembly Length.”
- 2) Cut hose to required length using a cut-off saw or a circular abrasive cut-off wheel. The preferred choice would be the steel wheel with a cooling agent. Care should be taken in not overheating the hose, which can cause deformation of the hose and create difficulty when inserting the hose fittings. For textile reinforced hose, a guillotine-style cutter may be used.



Cut-off saw. Use caution when operating power equipment. Follow the proper safety measures per manufacturer suggestions.

- 3) Ensure hose is cut square.



Hose with square cut.

STEPS IN HOSE ASSEMBLY

- 4) Contaminated hose may reduce the service life of hydraulic systems. Always clean the hose bore after cutting, using air and/or flush with a compatible fluid
- 5) In certain situations, skiving may be required. Skiving is the process of removing the portion of hose cover that lies directly under the coupling ferrule. This allows the metal fitting to be coupled directly on the hose reinforcement. Skiving is further discussed in the following section under the subtopic of "Skiving."
- 6) The 2-piece crimped fitting consists of a ferrule and a stem insert. It is essential that the fitting be mated with a compatible hose style. Check fitting compatibility in hose or fitting product tables. Screw and/or push ferrule onto the hose until hose bottoms into the ferrule.



Push ferrule onto hose.

- 7) Push the stem insert into the hose I.D. Shoulder of the stem should make contact with ferrule. It is sometimes difficult to insert the stem into hydraulic hose. If necessary, it is recommended using a liquid soap or a water/soap solution as a lubricant. Use the lubricant sparingly. When installing elbow fittings, point elbow towards curvature of the hose, unless specified otherwise. When installing elbow fittings on both ends, see the previous subtopic on "Measuring the Offset Angle."

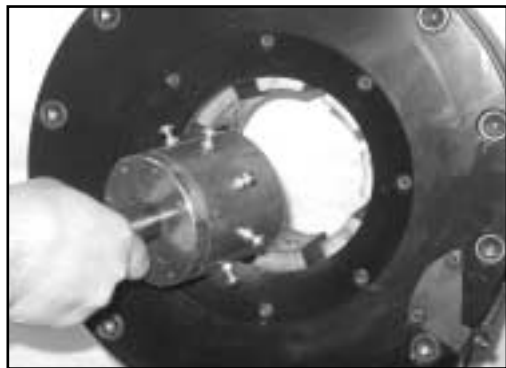


Push stem into hose ID.

- 8) Before crimping hose fitting, verify the tooling setup and install the proper die set. Read the Crimp Chart, per Goodyear recommendations, and dial in the correct crimp diameter.



Always Verify Proper Die Set



Always Verify Proper Die Set



Set Crimp Diameter

STEPS IN HOSE ASSEMBLY

HOSE

FITTINGS

EQUIPMENT & ACCESSORIES

ASSEMBLIES

INSTALLATION & MAINTENANCE

APPENDIX

- 9) Place hose and fitting into the crimp machine. Refer to the Goodyear Crimp Specifications Manual for proper crimp diameters and the crimper operators manual for further instructions on how to properly and safely operate the crimper.



Insert hose assembly into crimper die set.



Insert hose assembly into crimper die set.

- 10) Remove assembled end and check crimp diameter with caliper or micrometer. Crimp diameter should be measured at the center of the ferrule. Measure the smooth portion of the ferrule and not the ridges. Visually check for cracked, cocked, or damaged fittings.



Verify crimp diameter with calipers.

- 11) Even if not required, it is a good practice to examine and audit the assembly before delivery or use. Records should be maintained. The level of inspection should be in compliance with the quality plan.
- a) Inspection—Visual, dimensional, and proof pressure testing in accordance with SAE J517 or SAE J343.
 - b) Clean or flush of the assembly to remove plating dust, rubber chips, etc.
 - c) Apply caps, if required, to protect fitting threads and keep out contamination.
 - d) Apply labels or specific markings, if required.
 - e) Package the assembly properly.

Refer to the Final Inspection Checklist and Recommended Inspection Equipment previously listed in Hose Assembly Instructions Using a 1-Piece Crimped Fitting

Hose Assembly Instructions Field-Grip™ Fittings

Goodyear Field-Grip reusable hose fittings must be carefully matched to Goodyear hose. Use Field-Grip fittings only designed specifically for Goodyear hose. Use the correct Goodyear socket with a given Goodyear hose. Specific fittings and their hose application can be found in the fitting tables.

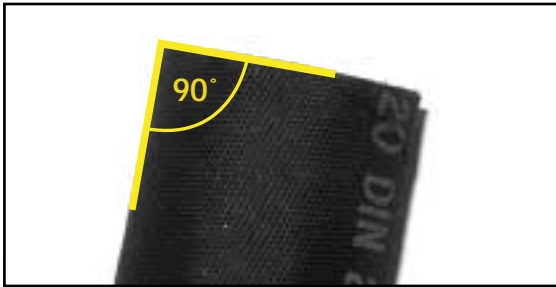
- 1) Determine correct hose length from desired hose assembly length and “C” dimension. The “C” dimension, or cut-off factor, can be found in the fitting tables. More information on using the “C” dimension can be found in the previous subtopic, “Defining Hose and Assembly Length.”
- 2) Cut hose to the required length using a cut-off saw or a circular abrasive cut-off wheel. The preferred choice would be a steel wheel with a cooling agent. Care should be taken in not overheating the hose, which can cause deformation of the hose, creating difficulty when inserting the hose fittings.



Cut off saw. Use caution when operating power equipment. Follow the proper safety measures per manufacturer suggestions.

STEPS IN HOSE ASSEMBLY

- 3) Ensure hose is cut square.



Hose with square cut.

- 4) Contaminated hose may reduce service life in hydraulic systems. Always clean the hose bore after cutting, using air and/or flush with a compatible fluid.
- 5) A Field-Grip™ fitting consists of a socket and stem assembly. It is essential the fitting be mated with a compatible hose style. Check fitting compatibility in hose or fitting product tables. Place the socket in a vice. The socket will fit over the hose cover. To determine the insertion depth for the hose, first measure the distance from the bottom of the socket to the end of the socket where the hose is to be inserted. Transfer this insertion depth to the hose cover by measuring from the end of the hose. Mark a line on the hose cover at the distance from the end of the hose that equals the insertion depth. This becomes the visual check to determine if the hose was fully inserted in the socket.



Field-Grip fitting consists of a stem and a socket.



Socket positioned in vice.

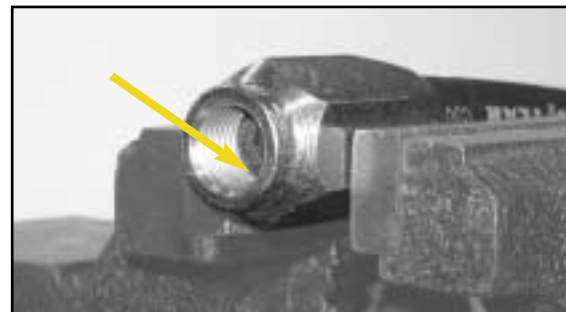


Mark insertion depth.

- 6) Lightly lubricate hose cover with a mild soap solution. Screw end of hose counterclockwise until hose reaches the marked insertion depth and then back off 1/2 turn. If the insertion mark was correctly applied to the hose, you should now be able to determine if the socket has been correctly applied to the hose by using the insertion depth mark on the hose cover as a reference along with a visual check inside the socket.



Apply lubricant to hose cover.



Visually check hose position inside socket.

STEPS IN HOSE ASSEMBLY

HOSE

FITTINGS

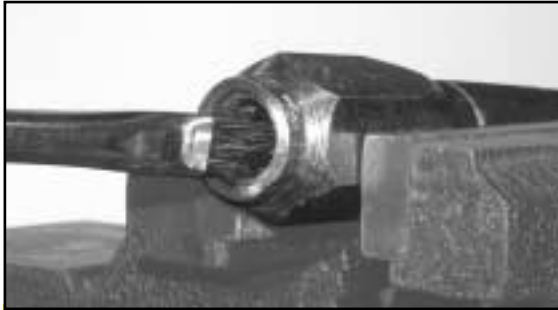
EQUIPMENT & ACCESSORIES

ASSEMBLIES

INSTALLATION & MAINTENANCE

APPENDIX

- 7) Lightly lubricate the inside of the hose and stem threads with a mild soap solution. Using a wrench, screw the stem assembly into the socket until the stem hex shoulders against the socket.



Apply lubricant to stem and hose tube.



Screw stem into socket.



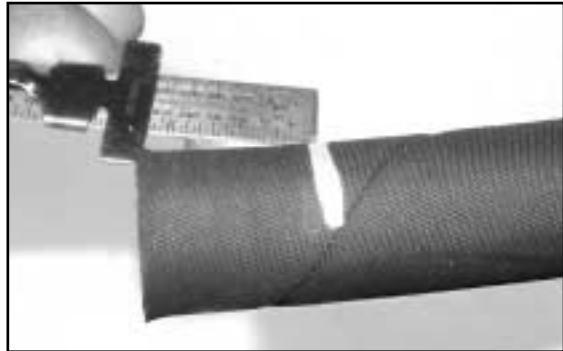
Stem properly seated against socket.

- 8) If disassembly is necessary, reverse the process.

Internal and External Skiving

Skiving is the process of stripping and removing the hose cover to allow the proper installation of crimped hose ends and to assure the best possible hose assembly.

- 1) At the point of skiving, the hose has been cut to the proper length. See Steps 1 and 2 in the previous Hose Assembly Instructions.
- 2) Obtain length of skive per Goodyear specifications. Mark hose with skive length.



Mark skive on hose cover.

- 3) Remove the hose cover to the wire, using care not to burn, fray, or damage reinforcement wires. The cover of wire braided hoses can be removed with a buffing wheel or a hand skiver. A manual, external skiving tool that uses a knife, must be used with spiral hose. Mark the length of the cover to be removed, as noted in the Goodyear Crimp Specifications Manual, and set skiving depth on the manual skiving tool. Make sure the manual skiver is rotated in the counter-clockwise direction for external skiving. Follow specific instructions on external skiving that would accompany the manual skiver.



Cutting skive with buffing wheel. Follow Manufacturer's Recommendation for the Safe and Proper Use of the Skiver.

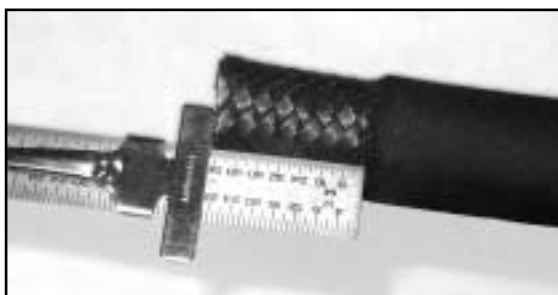
STEPS IN HOSE ASSEMBLY

- 4) With the hose cover removed, check that the wire braid or spiral reinforcement has not been displaced, damaged, or cut in the skiving process.



Check skived hose.

- 5) Check for the proper skive length.



Measure skive.

- 6) Hoses should be checked for 100% of cover removal. If necessary, rebuff skived area to clean and remove hose cover.
- 7) A manual, internal skiving tool that uses a knife is to be used to remove the tube material of spiral hose for installation of the Dual-Grip™ fittings. Note the correct length of tube material to be removed from the Goodyear Crimp Specification Manual. Set the desired skiving depth on the internal skiving tool. Make sure the tool rotates in the clockwise direction for internal skiving. Verify that the correct length of tube material has been removed. Follow specific instructions on internal skiving that would accompany the manual skiver.
- 8) It is important to clean hose I.D. by brushing, blowing compressed air, or flushing to remove any contaminants.

Warning: Failure to completely remove the cover may result in serious personal injury or property damage due to hose ends blowing off, leakage, or other failures.