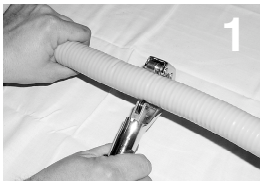


Pro-Flex® CSST

FITTING ASSEMBLY

ASSEMBLY PROCEDURES FOR PRO-FLEX® CSST



STEP #1

Cut-to-Length

Using a standard tube cutter, cut tubing to the desired length leaving approximately one inch for fitting attachment. Clean up any jagged edges burrs.



STEP #2

Strip Yellow Jacket

Using a utility knife, strip yellow jacket back 5-6 convolutions from the tubing end. Note: Do not use tube cutter to make yellow jacket cut, use utility knife.



STEP #3

Assembly of Mechanical Fitting

Slide nut over CSST tubing with threaded end pointing out.



STEP #4

Placement of Retainer Ring

By hand, open ring wide enough to fit in the valley behind the fourth (4th) convolution and hand squeeze ring to close and fit snug. Do not break the retainer ring in half.



STEP #5

Placement of Stainless Steel Slider Ring

Place Slider Ring over the tube end and roll/slide it down to the retainer ring.



STEP #6

Placement of Silicone O-Ring

Roll Silicone O-Ring over tube end and roll/slide it down to meet the slider ring.

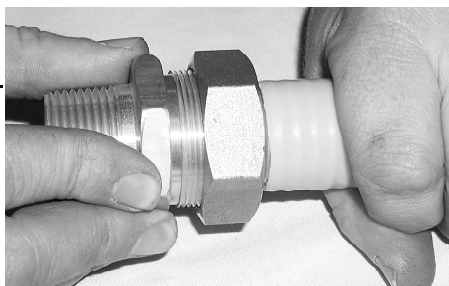


STEP #7

Make sure High-Temperature Sealing Gasket is in base of Fitting

Double check to make sure High-Temperature Sealing Gasket is in base of Fitting and hand-tighten down fitting to nut. NOTE: Before tightening down, check to make sure Retainer Ring, Slider Ring, and Silicone O-Ring are in the proper sequence. After hand tightening fitting to nut, give it one additional 1/4 to 1/2 turn with a crescent wrench. During tightening rotate the nut only, the body should not rotate with respect to the tubing.

ASSEMBLED VIEW



TROUBLE SHOOTING MECHANICAL FITTING

CORRECTING LEAKS

Step 1 - Gradually tighten fitting until leak stops

Step 2 - If tightening does not stop after reaching maximum torque of 35 lbs or 50 lbs (refer to maximum torque for each size listed below),

STOP and open assembly and check

- To see if they are properly assembled. If not correct, go thru assembly steps and test again for leaks.
- Check to see that no foreign material is in assembly. If so, clean out and re-assemble and test again for leaks.
- Check to see that none of the assembly pieces are cracked. If so, replace, re-assemble and test again for leaks.
- Optional: use Pipe tape or Pipe Dope on Threaded Ends.

TORQUING METHOD FOR FIELD ASSEMBLY

To achieve the proper Torque without a torque wrench, first tighten the fitting adapter to the nut until resistance to hand tightening is so that you can no longer continue. Then, using a crescent wrench, tighten to 1/4 to 1/2 turn.

CAUTION: DO NOT OVER TIGHTEN

Size of Fitting	Maximum Allowable Tightening Torque
3/8" (10mm)	35 ft.-lb.
1/2" (15mm)	35 ft.-lb.
3/4" (20mm)	50 ft.-lb.
1" (25mm)	50 ft.-lb.
1 1/4" (31mm)	50 ft.-lb.

Maximum Allowable Nut Tightening Torques for connecting fittings to corrugated stainless steel tubing

WARNING!

Improper installation or operation of the system may result in fire, explosion, or asphyxiation. Only the components provided or specified by Tru-Flex Metal Hose Corp., for the use of Pro-Flex® as part of the fuel gas system are to be used in the installation. Use of components from other flexible gas piping systems other than those specified as part of Pro-Flex® system is prohibited and may result in poor system performance and serious bodily injury or property damage.



While every effort has been made to prepare this document in accordance with all regional model codes in effect at its printing, Tru-Flex Metal Hose cannot guarantee that the local administrative authority will accept the most recent version of these codes. It is the ultimate responsibility of the qualified installer to determine suitability and acceptance of any building component including gas piping. Tru-Flex Metal Hose Corp. manufactures of Pro-Flex® CSST assumes no responsibility for labor or material for installations made without prior determination of local code authority acceptance.

Pro-Flex® CSST

INSTALLATION • PRACTICES GUIDELINES

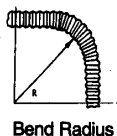
1. **Pro-Flex®** flexible gas piping (CSST) may only be installed by a Qualified/Trained Installer who has been trained in the use of **Pro-Flex®**. A Qualified/Trained Installer card is required to purchase and install **Pro-Flex®** (CSST) Flexible Gas Piping.
2. Only the components provided or specified by Tru-Flex Metal Hose Corp., (including Pro-Flex's striker plates and Floppy Flex™ armor conduit) as part of the piping system are to be used in the installation.
3. Never use **Pro-Flex®** flexible gas piping or system components as a ground electrode or as a grounding path for appliances or electrical systems.
4. **Pro-Flex®** (CSST) flexible gas piping routed in a location which is concealed, constrained and within 3 inches of a potential threat will be protected against damage by protection devices listed in the **Pro-Flex®** Installation/Training Guide. Contact with sharp objects or harmful substances should be avoided.
5. Concealed tubing shall be protected from puncture threats, using the striker plates provided, at all points of penetration through studs, joists, plates or similar structures. The extend of protection is defined as follows:
 - All points of penetration less than 2 inches (50.8mm) from any edge of a stud, joist, plate etc., a striker plate is required to provide protection at the area of support and within 5 inches (127mm) of each side (if appropriate) of the support.
 - At points of penetration 2 to 3 inches (50.8 to 76.2mm) from any edge of a stud, joist, plate, etc., a striker plate is required to provide protection throughout the area of support.
 - At points of penetration greater than 3 inches (76.2mm) from any edge of a stud, joist, plate etc., no protection is required.
 - Tubing routed horizontally through studs shall be protected from puncture threats between the studs using shielding devices provided.
6. CSST greater than 1-in (25.4 mm) inside diameter installed within hollow cavity walls of 2 x 4 construction shall be protected along the entire concealed length in the manner and using the shielding devices specified by the manufacturer.
7. The width of the installed striker plate, at the points of penetration through wall studs, floor joists, plates, sills, etc., shall be out at least 1.5 times the outside diameter of the tubing.
8. Open ends of the tubing are to be temporarily plugged or taped closed prior to installation to prevent entrance of dirt, dust or other debris.
9. The protective yellow jacketing should be kept in place as much as possible to protect the tubing from corrosive threats. Contact with chemicals containing chlorides must be followed by thorough rinse and wipe dry. This includes fluxes used to solder copper tubing and acid base cleaners used to wash masonry.
10. Installation clearance holes for routing CSST are to be approximately 1/2 inch greater than the O.D. of the CSST. Drilling of any structural member must be in conformance with the local building codes. Refer to the table for the recommended drill hole sizing.
11. Supporting CSST. Tubing shall be supported with pipe straps, bands or hangers suitable for the size and weight of the tubing, at intervals not to exceed those shown in the table. Tru-Flex™ Metal Hose Corp., recommends the use of metal pipe straps because some plastic clips are susceptible to breakage upon subsequent handling

Recommended Installation for Clearance Holes for Routing CSST.	
Tubing Size	Drill Hole Size
3/8" (10mm)	1-1/8"
1/2" (15mm)	1-3/8"
3/4" (20mm)	1-1/2"
1" (25mm)	1 -3/4"
1 1/4" (31mm)	2 -1/4"

Recommended Horizontal and Vertical Support Spacing for PRO-FLEX CSST		
CSST Pipe Size	Horizontal Support Spacing	Vertical Support Spacing
3/8" (10mm)	4 ft.	10 ft
1/2" (15mm)	6 ft.	10 ft
3/4" (20mm)	8 ft. (USA) 6 ft. (CANADA)	10 ft
1" (25mm)	8 ft. (USA) 6 ft. (CANADA)	10 ft
1 1/4" (31mm)	8 ft. (USA) 6 ft. (CANADA)	10 ft

12. Recommended MINIMUM BEND RADIUS FOR CSST:

Recommended Minimum Bend Radius for PRO-FLEX® CSST		
CSST Pipe Size	Absolute Min. Bend Radius	Recommended Min. Bend Radius
3/8" (10mm)	9/16 inch	3 inches
1/2" (15mm)	3/4 inch	3 inches
3/4" (20mm)	1.0 inch	3 inches
1" (25mm)	3.0 inches	5 inches
1 1/4" (31mm)	3.0 inches	5 inches



13. Undue stress or strain on the tubing and fittings should be avoided. Also avoid sharp bends, stretching, kinking or twisting of the CSST tubing.
14. Sizing of **Pro-Flex®** CSST must be performed using the capacity tables found in this **Pro-Flex®** Installation/Training Guide.
15. **Pro-Flex®** (CSST) flexible gas piping should not be connected to moveable appliances. Connections to moveable appliances such as ranges and clothes dryers should be accomplished with a "flexible gas appliance connector."
16. Regulators are suitable for multi-poise mounting. When using a vent limiting device, the regulator must be mounted in a horizontal upright position. For outdoor venting, the vent line must be at least the same size as the vent connection and no longer than 30 feet before upsizing. When mounting a regulator outdoors, remove vent limiting device and position regulator inverted with open port down.
17. A manifold assembly utilizing a pounds-to-inches regulator shall include a shut-off valve ahead of the regulator and installed in an accessible location so that the regulator can be inspected, maintained and serviced if necessary.
18. Buried or Embedded: CSST shall not be buried directly in the ground or directly embedded in concrete (i.e.: patio slabs, foundations and walkways) When it is necessary to bury or embed CSST, the tubing shall be routed inside a non-metallic, watertight conduit that has an inside diameter at least 1/2 inch greater than the O.D. of the CSST Tubing For ends of conduit installed outdoors, the conduit shall be sealed at any exposed end to prevent water form entering. No mechanical joint fittings are permitted within the conduit. *Note: CSST must be buried in accordance with all local building codes.*
19. **Pro-Flex®** (CSST) flexible gas piping system must be pressure tested for leaks during rough construction in accordance with all local codes. In the absence of local requirements, test in accordance with Part 4 of the NFPA 54, National Fuel Gas Code ANSI Z223.1 and/or CSA B149.1 Installation Codes or in accordance with the requirements of the applicable local codes. For a 'one-part' pressure-test, the regulator should be removed from the system. For a 'two-part' test, the regulator should be isolated from downstream test pressures.
20. Along Side of a structure: When installed along the outside of a structure (between the ground and height of 6 ft) in an exposed condition, the CSST shall be protected from mechanical damage inside a conduit or chase. A conduit or chase is not required if the tubing is installed in a location that will not subject the CSST to mechanical damage.
21. Meter Hook-Ups. Refer to the **Pro-Flex®** installations and illustrations shown in this training guide. CSST shall not be used as a means of support for the gas meter. Also check with your local code official or authority having jurisdiction on meter hook-ups. Some restrictions may apply. Local code requirements will always take precedence.
22. For a Piping system which includes manual gas valves listed as complying with IAS U.S. Requirement 3-88 and/or CR91-002, and not listed as complying with ASME B 16.33 and/or CGA 3.11, the instructions shall state that these valves shall not be installed outdoors.
23. When using **Pro-Flex®** Flexible Gas Piping (CSST) then Metal Enclosures the CSST tubing must be protected by grommets, bushing or armor (Floppy-Flex™), PVC tape, shrink sleeve material or a minimum of four (4) wraps of #10 Mil Duct-Tape. This is to ensure that no physical contact will be made between the metal and the CSST tubing that would cause mechanical wear.
24. In accordance with the NFPA 54 Section 7.13, Tru-Flex Metal Hose Corp., requires proper bonding of the Pro-Flex® gas-piping systems in a structure to the structure's electrical grounding system. This must be performed by a qualified person recognized by the local jurisdiction as capable of performing such work. These requirements are for all Pro-Flex® CSST installed from this date forward.