

### GENERAL

Heat shrink sleeves form a water tight seal between the sleeve and the surface(s) it is applied to. Heating causes the adhesive backing to soften and the sleeve to shrink, compressing the adhesive and forming a seal.

Heat shrink sleeves are field installed on insulated and jacketed piping systems to seal the insulation jacket at field joint and jacket repair locations and on conduit / containment systems to seal the coating system at field joint and coating repair locations.

Proper installation of heat shrink sleeves is critical to maintaining the insulation or conduit / containment pipe surface dry. Wet insulation or bare metal will degrade and corrode resulting in reduced service life, costly repairs or irreparable damage to the piping system.

When cold or wet weather conditions are present, tenting and / or heating may be required to enable the proper installation of the heat shrink sleeves. Refer to the Installation Manual Supplement for Cold / Wet Weather Conditions.

Refer to the appropriate PERMA-PIPE product Installation Manual for complete installation recommendations. This Installation Manual Supplement addresses the installation of heat shrink sleeves only.

### INSTALLATION

#### HEAT SHRINK SLEEVE – MANUFACTURER & MODEL

Heat shrink sleeves must be installed in accordance with PERMA-PIPE's recommendations described below and the manufacturer's recommendations included in this Installation Manual Supplement. PERMA-PIPE's recommendations take into consideration special requirements for insulated and jacketed piping and coated conduit / containment systems.

PERMA-PIPE supplies different types of heat shrink sleeves for different types of PERMA-PIPE products and depending on customer specifications. The standard heat shrink sleeves supplied, unless otherwise specified, are Canusa WLO for coated conduit / containment systems and Canusa WTC for insulated and jacketed systems.

**CAUTION:** Be careful to use the correct type of heat shrink sleeve on the type of product it is being applied onto. It is common for more than one type of heat shrink sleeve to be supplied on projects that utilize more than one type of PERMA-PIPE product. Using the incorrect type of heat shrink sleeve can result in reduced service life, costly repairs or irreparable damage to the piping system.

Manufacturer's Installation Instructions for the most common types of heat shrink sleeves are included with this Installation Manual Supplement. These are;

- Canusa Wrap (WL & WT Products)
- Canusa High Shrink WLOX
- Raychem WPCT
- Raychem WPC50
- Raychem WPC65
- Raychem WPC 100M

Check the manufacturer and type of heat shrink sleeve you are installing and refer to the correct manufacturer's Installation Instruction for that heat shrink sleeve. Contact PERMA-PIPE if the heat shrink sleeve is not one of the above.

#### HEAT SHRINK SLEEVES – PREPARATION

All materials, equipment, and tools should be readily available before starting.

**Do Not** attempt to apply heat shrink sleeves in wet bell holes. If the bell hole is wet, dewater it before installing the heat shrink sleeve.

PERMA-PIPE provides the following materials for heat shrink sleeve application;

- Heat shrink sleeve bulk roll material
- Propane torch head - high capacity flame nozzle (For outside diameters less than 18 inches, one (1) 150,000 Btu/hr torch. For outside diameters greater than 18 inches, two (2) 150,000 Btu/hr torches.) Use the torch(es) provided or ones that are equivalent.

The installer will need to furnish the following items;

- Propane tank, hose, fittings, valves, and regulators.
- Hand rollers
- Heat resistant gloves

### HEAT SHRINK SLEEVE - SIZING

PERMA-PIPE provides heat shrink sleeve material in bulk roll. For each field joint, measure the field joint and cut the heat shrink sleeve length in the following manner;

- Measure the circumference of the largest outside diameter of the insulation jacket or conduit / containment pipe in the area the heat shrink sleeve will cover. It is not uncommon for there to be differences in insulation jacket outside diameters at fittings and special components. A slight taper in the field joint will compensate for this.
- Depending on the maximum circumference measured, add the following for heat shrink sleeve overlap and slack;

	<u>Overlap</u>	<u>Slack</u>
Max. Circ $\leq$ 27"	4"	2"
27" < Max. Circ $\leq$ 57"	4"	3"
Max. Circ. > 57"	6"	3"

- Cut the heat shrink sleeve length to the dimension determined above.
- Cut a 1/2 inch triangle from each corner to prevent the corners from peeling up after application.

### HEAT SHRINK SLEEVE-HEAT SHRINKING TECHNIQUE

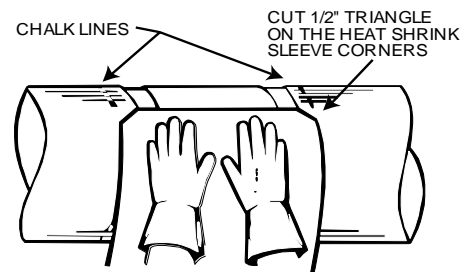
Before starting the heat shrink sleeve application, become familiar with the following;

- Wear heat resistant gloves whenever working with the propane torch and hot surfaces.
- Use two (2) people and two (2) torches for outside diameters larger than 18 inches.
- The propane torch flame should be kept at least 6 inches away from the heat shrink sleeve and at an angle to the surface. Holding the propane torch at an angle allows the flame to bounce off the heat shrink sleeve and decreases the local intensity of the heat. If the flame is held too close to the surface, the heat shrink sleeve will burn and may tear around the burned areas.
- Use your body as a shield to protect the flame from the wind. Keep the propane torch at an angle to the sleeve and pointed in the direction the wind is blowing to maintain a fairly even flame. **Do Not** increase the size of the flame, this could overheat and burn the heat shrink sleeve.
- Keep the propane torch in constant motion. **Do Not** burn any surfaces.

### HEAT SHRINK SLEEVE – APPLICATION

Apply the heat shrink sleeve in the following manner;

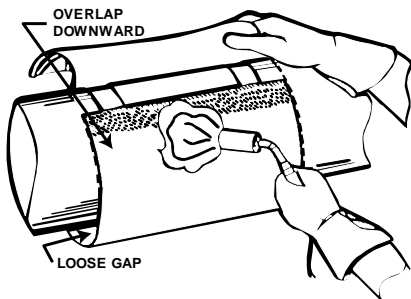
- Roughen the surface of the insulation jacket or conduit / containment coating and metal surface with sandpaper in the areas when the heat shrink sleeve will cover.
- Wipe the field joint area clean and dry with a clean cloth. Use solvent or detergent if needed.
- Measure the width of the field joint area and the heat shrink sleeve. Use chalk to mark guidelines on the insulation jacket or conduit / containment pipe for the edges of the heat shrink sleeve. The heat shrink sleeve should be centered on the field joint area with a minimum 4 inch overlap on each end onto the insulation jacket or conduit / containment pipe coating.
- Preheat the field joint area. **Do Not** burn any surfaces.
  - For insulated and jacketed systems **Do Not** preheat the insulation, only preheat the insulation jacket. Preheat the jacket to 120°F to 130°F.
  - For coated conduit / containment systems preheat the coating and bare conduit / containment to 140°F to 150°F.
- Remove the first 6-10 inches of backing material from the heat shrink sleeve.
- Hold the heat shrink sleeve up. Press the top edge of the heat shrink sleeve just below the top of the field joint and centered between the chalk lines.
- Heat the top 2 inches of the heat shrink sleeve with the propane torch until it becomes soft and adheres to the insulation and insulation jacket or conduit / containment pipe coating.



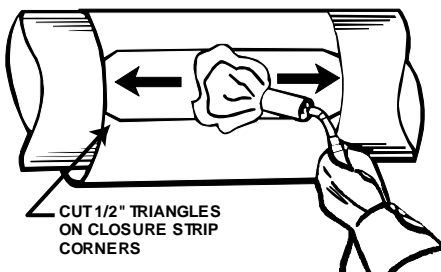
- Wrap the heat shrink sleeve around the field joint area so the lower portion forms a loose gap that hangs about 1 inch from the bottom of the insulation jacket or conduit / containment pipe. This gives the heat shrink sleeve room to shrink properly. If the heat shrink sleeve is wrapped snugly, without a gap, it may pull apart or tear during heating.

### HEAT SHRINK SLEEVE – APPLICATION (continued)

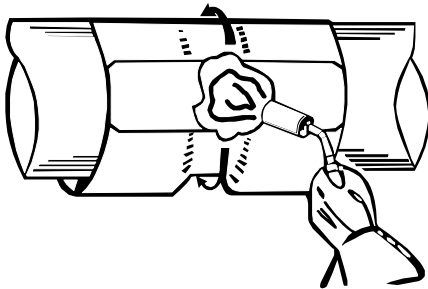
- Stay within the chalk guidelines. Reheat the top 2 inches of the heat shrink sleeve before overlapping. Be sure to overlap downward.



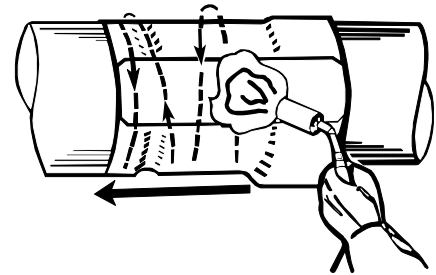
- Cut a ½ inch triangle from each corner of the closure strip to prevent the corners from peeling up after application.
- Peel the backing strip off the closure strip and preheat the closure strip for approximately 5 seconds until it becomes soft.
- Attach the closure strip directly over the seam of the heat shrink sleeve. Overlap and press down firmly. Do not try to smooth the closure strip at this time.



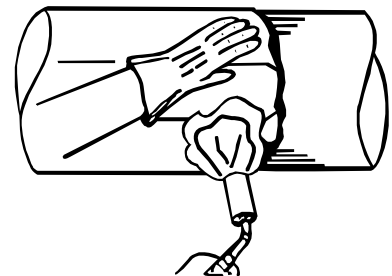
- Heat the center section of the heat shrink sleeve all the way around until it shrinks.



- When the center of the heat shrink sleeve has shrunk, begin to move the propane torch with an up and down spiral motion around the shrink sleeve toward the left edge.



- When the left side has shrunk, heat the right side with the same up-and-down spiral motion.
- Reduce the flame slightly and shrink the edges of the heat shrink sleeve onto the insulation jacket or conduit / containment pipe. Black adhesive escaping at the edges of the heat shrink sleeve indicates a good bond and shrinkage.
- Heat the closure strip until it sticks to the heat shrink sleeve. Use a wooden wallpaper roller to apply pressure to the closure strip. Sufficient heat and pressure is required to completely fuse the closure strip to the heat shrink sleeve seam.
- If the heat shrink sleeve edge rises up, reheat and press down firmly.
- While the heat shrink sleeve is still hot and soft, use a hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve. Reheat, if necessary.



### FINAL INSPECTION

After installation, visually inspect the heat shrink sleeve to verify it has been properly installed and is completely sealed onto the insulation jacket or conduit / containment pipe coating.

There should be a visible indication of mastic extruding out from under the heat shrink sleeve along the circumferential seams of the heat shrink sleeve. There should be no bubbles or air pockets under the heat shrink sleeve.

Re-heat and re-shrink the heat shrink sleeve if there are any signs the heat shrink sleeve is not completely sealed to the insulation jacket or conduit / containment pipe coating.