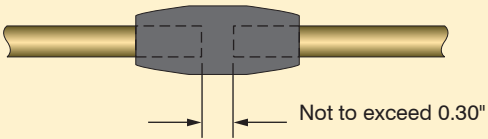
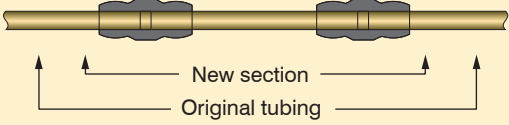
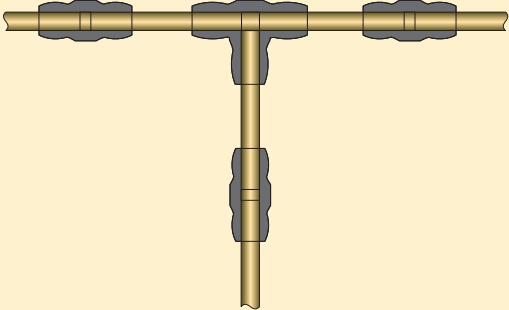
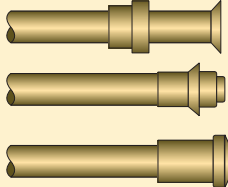


Type of Failure	Repair Method
<p>1. Pin hole leak or circumferential crack in tubing.</p> 	<p>a. Make 1 or 2 cuts, as necessary, to remove damaged section. If 2 cuts are required, the distance between them shall not exceed 0.30". If distance is more than 0.30", go to repair method 2.</p> <p>b. Swage 1 tube-to-tube union in tube section under repair.</p>
<p>2. Longitudinal crack in tubing (crack length in excess of 0.30").</p> 	<p>a. Make 2 cuts to enable removal of damaged section.</p> <p>b. Remove damaged section and duplicate.</p> <p>c. Swage replacement section into tubing under repair using 2 tube-to-tube unions.</p>
<p>3. Leaking tee or elbow (permanent tube connection type).</p> 	<p>a. Cut out defective tee or elbow.</p> <p>b. Duplicate tubing sections for each branch.</p> <p>c. Swage splice sections to tee or elbow.</p> <p>d. Connect each splice section to tubing under repair using a tube-to-tube union.</p>
<p>4. Leaking flared, flareless, or lipseal end fittings.</p> 	<p>a. Cut tubing to remove defective fitting.</p> <p>b. Swage appropriate end fitting to tube end.</p> <p>c. Connect new end fitting to mating connection, torquing nut as required.</p>

**Figure 9-30.** Permaswage™ repair.

pattern. Never select a path that does not require bends in the tubing. A tube cannot be cut or flared accurately enough so that it can be installed without bending and still be free from mechanical strain. Bends are also necessary to permit the tubing to expand or contract under temperature changes and to absorb vibration. If the tube is small (under ¼") and can be hand formed, casual bends may be made to allow for this. If the tube must be machine formed, definite bends must be made to avoid a straight assembly. Start all bends a reasonable distance from the fittings because the sleeves and nuts must be slipped back during the fabrication of flares and during inspections. In all cases, the new tube assembly should be so formed prior to installation that it is not necessary to pull or deflect the assembly into alignment by means of the coupling nuts.

## Flexible Hose Fluid Lines

Flexible hose is used in aircraft fluid systems to connect moving parts with stationary parts in locations subject to vibration or where a great amount of flexibility is needed. It can also serve as a connector in metal tubing systems.

### Hose Materials and Construction

Pure rubber is never used in the construction of flexible fluid lines. To meet the requirements of strength, durability, and workability, among other factors, synthetics are used in place of pure rubber. Synthetic materials most commonly used in the manufacture of flexible hose are Buna-N, neoprene, butyl, ethylene propylene diene rubber (EPDM) and Teflon™. While Teflon™ is in a category of its own, the others are synthetic rubber.