



Figure 9-15. To use the hand beading tool, cut with tube cutter (1), deburr (2), oil (3), and revolve tool around tube while tightening handle (4).

Fluid Line End Fittings

Depending on the type and use, fittings have either pipe threads or machine threads. Pipe threads are similar to those used in ordinary plumbing and are tapered, both internal and external. External threads are referred to as male threads and internal threads are female threads.

When two fittings are joined, a male into a female, the thread taper forms a seal. Some form of pipe thread lubricant approved for particular fluid application should be used when joining pipe threads to prevent seizing and high-pressure leakage. Use care when applying thread lubricant so that the lubricant does not enter and contaminate the system. Do not use lubricants on oxygen lines. Oxygen reacts with petroleum products and can ignite (special lubricants are available for oxygen systems).

Machine threads have no sealing capability and are similar to those used on common nuts and bolts. This type of fitting is used only to draw connections together or for attachment through bulkheads. A flared tube connection, a crush washer, or a synthetic seal is used to make the connection fluid tight. Machine threads have no taper and do not form a fluid-tight seal. The size of these fittings is given in dash numbers, which equal the nominal outside diameter in sixteenths of an inch.

Universal Bulkhead Fittings

When a fluid line passes through a bulkhead, and it is desired to secure the line to the bulkhead, a bulkhead fitting should be used. The end of the fitting that passes through the bulkhead is longer than the other end(s), which allows a locknut to be installed, securing the fitting to the bulkhead.

Fittings attach one piece of tubing to another or to system units. There are four types: (1) bead and clamp, (2) flared fittings, (3) flareless fittings, and (4) permanent fittings (Permaswage™, Permalite™, and Cyrofit™). The amount of pressure that the system carries and the material used are usually the deciding factors in selecting a connector.

The beaded type of fitting, which requires a bead and a section of hose and hose clamps, is used only in low- or medium-pressure systems, such as vacuum and coolant systems. The flared, flareless, or permanent-type fittings may be used as connectors in all systems, regardless of the pressure.

AN Flared Fittings

A flared tube fitting consists of a sleeve and a nut. [Figure 9-18] The nut fits over the sleeve and, when tightened, draws the sleeve and tubing flare tightly against