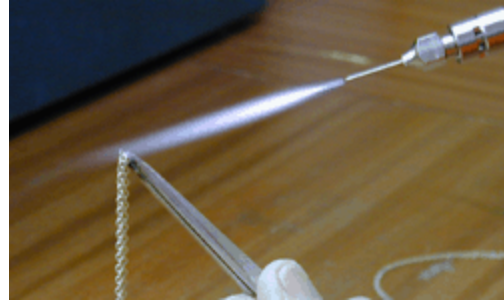


## Soldering Tips

Satisfactory soldered joints in precious metal articles must be strong yet unobtrusive. The basic principles of soldering practice must be applied to ensure strong consistent joints along with the following points:

- (i) The design must lend itself to soldering.
- (ii) The parts to be soldered must fit closely and accurately.
- (iii) The correct solder and flux must be used.



Gas and compressed air mixtures are generally the most satisfactory for torch soldering. Fine adjustment of flame size and temperature are possible. The flame should be kept constantly on the move over the whole joint area or over as wide an area as can be conveniently joined in a single application of solder.

### **Joint Preparation**

The joint areas must be free from dirt and grease and ideally cleaned with a file or emery paper to ensure the solder will wet the parent metal. Flux should be applied to the joint area and solder prior to heating. Fluxes promote wetting of the workpiece by the molten solder. They do this by removing any oxide films present on both the parent metal and solder and prevent further formation of oxides during heating. The flux must be completely fluid and active before solder liquidation and should remain so until after the solder solidification. If the size of the joint or the duration of heating is large further flux additions may be made during the process. It must be noted that warming of the workpiece may be required to ensure full retention of the flux paste over the whole joint area. The torch should initially be held some distance from the workpiece so that the flame heats the work generally. If components of different size are being joined the torch should predominantly heat the heavier item.

## Techniques

There are two general techniques used to apply solid solder:

- (i) Preplacement; small pieces of solder are placed at the joint seam prior to heating. Heat is then applied until the solder flows into the joint.
- (ii) Feeding; the fluxed joint is heated to temperature and tip of the solder wire is fed into the joint and should melt on contact.

Using both these techniques the part of the joint to which the molten solder is required should be heated more strongly than the remainder ensuring the solder will flow towards the hottest section. Continued flame impingement on the molten solder may result in the vaporisation of lower melting point constituents, higher temperatures may then be required to complete the joint. The time and temperature required to complete a joint must be kept to a minimum.

Flux residues may normally be removed by soaking in hot water. Any further residues that persist may then be removed by brushing. In difficult cases the workpiece should be immersed in 5 - 10% sulphuric acid solution for 2 - 5 minutes, rinsed in hot water and brushed again.

For large scale soldering a small furnace may be used to provide sufficient uniform heat to the workpiece. For mass production batch or conveyer type furnaces may be used. However, the quantities of components to be soldered must be large enough to justify the relatively high capital expenditure and development of a method for each particular soldering operation.

All workpieces can be successfully finished by the standard practices and processes currently available.

It must be noted that powdered borax does not always meet the requirements for all applications where the extensive range of solders now available may be used.