

PRE-SOLDERING TECHNICAL GUIDE

FLUX:

Use Brown Fluoride Flux for all alloys. A fluoride based flux does an excellent job of preventing the growth of oxides which inhibit solder flow.

SOLDER SELECTION:

Use the solder recommended on the technical guide or package. The solder's liquidus temperature must be lower than the alloy's solidus temperature.

WAX DESIGN:

A successful solder connection starts in the design of the wax-up. Surfaces to be joined must be flat and parallel. Prepare the surfaces to be soldered with aluminum oxide stones, sandpaper disks, or rubber wheels, and clean the framework in an ultrasonic for 5 minutes in distilled water. Lute the bridge together using wax or pattern resin leaving a gap of about 0.3mm. Holes to be soldered should be backed with platinum foil and fluxed.

INVESTING & FLUXING:

Invest in high heat soldering or casting investment mixed with water only. Mix the investment as thick as possible. Create a base about ½" thick and place the framework on top of it. Do not cover it with the investment. Trim and allow investment to bench set 30 minutes. If possible, flux all surfaces to receive solder. (Note: Stir flux before each use. Add water to dilute to creamy consistency).

DRYING & PREHEATING:

Place invested and fluxed case in a burnout furnace at room temperature. Gradually raise temperature to 1300°F for precious alloys and 1500°F for non-precious alloys. Heat soak at temperature for 10 minutes.

SOLDERING:

Remove the preheated case from the furnace and re-flux surfaces to receive solder. Dip the solder in flux. Use a single-orifice soldering tip with natural gas/oxygen or propane/oxygen mixture. Keep pressure settings very low (2 lbs. fuel/4 lbs. oxygen). With a soft, quiet flame heat the investment block until it is red. The brown flux will melt, flow and turn clear. Direct flame over metal until units are heated to bright red. Place fluxed solder edgewise into the joint. Heat units on both sides of joint back to bright red. Avoid melting the solder before the units are hot enough to receive solder. Feather the flame over the solder several times to cause the solder to melt and flow. If more solder is needed to fill a joint area, add another fluxed piece and repeat.

DEVESTING & FINISHING:

Allow the soldered case to bench cool. Devest and blast with white aluminum oxide to remove investment and/or flux from surface of metal. Shape and contour soldered areas and follow instructions for metal finishing and conditioning found on the alloy's Technical Guide.

PROBLEMS:

Porcelain bubbling in soldered areas is most often caused by overheating during soldering. This can cause the parent alloy to soften and cross-melt with the molten solder. Prevent this by following the correct procedure and using enough flux.

Weak, porous joints can fracture. Prevent this problem by following the procedure to obtain a good, solid joint.

Most solders have a coefficient of thermal expansion that is significantly higher than the parent alloy. This difference can cause porcelain to crack especially when the soldered area becomes large. Remove excess solder, keep joints narrow, and consider using a lower expanding solder (such as Jensen's LX) when appropriate.

