

Technical Procedures

Delta

WAXING AND SPRUING

Direct Spruing: The direct technique may be used for spruing single units. Use a 10 gauge (2.6mm Ø) sprue.

Indirect Spruing: The indirect technique is always preferred for spruing bridges, multiple units, and single units. With bridges use 10 gauge (2.6mm Ø) feed sprues 1/16 inch (1.6mm) long. For multiple units use the same size feed sprue. Attach the feed sprues along the length of an 8 gauge (3.3mm Ø) runner bar and connect the runner bar by two 6 gauge (4.1mm Ø) indirect sprues to the crucible former.

INVESTING

Only use suitable high temperature, phosphate bonded investments that are described as graphite or carbon free. Invest the wax pattern according to the manufacturer's instructions.

BURNOUT

Place the ring in a cold furnace and run it directly up to 1600°F (870°C). Heat soak the ring for one and a half hours. Allow additional time for large rings, multiple rings, and very thin patterns.

If there is any plastic in the mold, a two-stage burnout is required. Place the ring in a cold furnace and raise the temperature at a rate of 10°F (6°C)/minute to 600°F (315°C). Heat soak at this temperature for 30 minutes. Raise the temperature to the normal burnout temperature at a normal rate and heat soak.

CASTING

Always melt alloy in ceramic crucibles. Depending on the type of casting machine, you may need to wind the casting machine one or two extra turns. Place the ingots side by side (not on top of one another) in the crucible. Clean scrap may be reused provided a minimum of 50% new metal is added. NEVER reuse metal if contaminated with carbon or other alloys. Non-precious alloys do not pool and turn shiny like gold. When the alloy slumps, tap the back of the crucible with the tongs to collapse the metal. Continue to heat for 5 seconds or more, and then cast. Use oxygen, at 10-20 psi, with natural gas, propane, or butane. Melting should take 45-60 seconds. Overheating the metal results in miscasts and porosity. If using an oxypropane torch to melt the metal, the flame must be correctly adjusted to avoid contamination by carbon. Allow the castings to bench cool.

Induction Casting: It is best to preheat crucible in oven for 15 minutes or more. Place ingots and buttons on top of each other so they contact. When the ingots slump, heat soak for 10 seconds and cast. Allow the arm to spin to a stop. Bench cool.

METAL PREPARATION

Grind and contour the surfaces of the casting, which are to receive porcelain. Use aluminum oxide stones or carbide burs dedicated only for use with a particular alloy.

Sandblast the casting with 50 micron, virgin aluminum oxide abrasive at an air pressure of 75-80 psi. Clean the casting in an ultrasonic bath for 5 minutes using a general purpose cleaner, then rinse thoroughly under running water.

DEGASSING

Degassing creates an oxide layer for bonding porcelain. Place the casting in a porcelain furnace at 1200°F (649°C) and raise the temperature to 1800°F (980°C) under vacuum. No hold time. To remove excess oxide, sandblast the casting with 50 micron, virgin aluminum oxide abrasive. From this point on, the castings must not be touched with fingers. Clean the casting well before opaquing using your method of choice – steam cleaner, ultrasonic bath, alcohol, etc. Blot dry with a clean tissue (do not use compressed air). Apply porcelain according to the manufacturer's instructions.

SOLDERING

Pre-Soldering

Soldering prior to applying porcelain can be completed using MFY solder and Sigma-High Flux. Be sure to remove any flux residue by sandblasting and / or grinding. Any flux residue will contaminate the porcelain.

Post-Soldering

Chrome 2 solder is recommended for all ceramic alloys. Use Sigma Low Flux. Use very little flux to avoid contamination of the porcelain. You may want to dip the solder into the flux and not apply the flux to the casting units to avoid porcelain contamination.