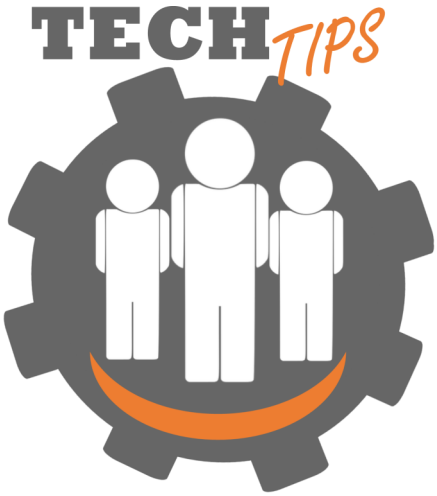
Potential Causes of Jewelry Casting Defects



Porosity

- Pattern is improperly sprued (sprues may be too thin, too long or not attached in the proper location; causing shrinkage porosity)
- Not enough metal reservoir to eliminate shrinkage porosity
- Metal contains gas
- Mold is too hot
- Too much moisture in the flux
- Metal insufficiently fluxed
- Too much flux added to metal
- Too much remelt being used (always use at least 50% new metal)
- Metal is overheated
- Incomplete pattern burnout

Fins or Flash on Castings

- Flask was disturbed while investment was setting
- Base was removed too soon
- Flask was allowed to partially dry before dewaxing
- Incorrect dewaxing or a furnace malfunction
- Flask burned out and was allowed to cool below 500°F (260°C) before casting or reheating; or flask was allowed to cool between dewax and placement in preheated oven
- Flask was improperly handled or dropped
- Speed was set too high on centrifugal casting machine
- Patterns were placed on one plane (they should be staggered on the top row)
- Incorrect water/powder ratio was used
- Not enough investment was placed over the patterns
- Flask was placed too close to the heat source in the burnout oven
- Flasks were not held at a low burnout temperature long enough

Inclusion (Foreign Particles) in Castings

- Patterns were improperly sprued to the wax base or tree, or not filleted; causing investment to break at sharp corners during casting
- Flask was not sufficiently cured before placing into the burnout oven
- Improper dewaxing cycle was used
- Flask was not cleaned from prior cast
- Loose investment in sprue hole
- Molten metal contains excess flux or foreign oxides
- Crucible disintegrating or poorly fluxed
- Investment was not mixed properly or long enough
- Contaminants in the wax pattern
- Flask was not held at a low burnout temperature long enough
- Flask was placed too close to the heat source in the burnout oven

Rough Castings

- Poor pattern quality
- Flask was not sufficiently cured before placing into the burnout oven
- Flask was held in steam dewax too long
- Metal, flask, or both, were too hot

Ransom & Randolph

3535 Briarfield Boulevard | Maumee, OH 43537 USA
800.800.7496 | 419.865.9497 | 419.865.9997 (FAX)
www.ransom-randolph.com

Ransom & Randolph GmbH
Leipziger Straße 40 | 04571 Rötha Germany
+49 342 06373999

Investing with Innovation™

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Rough Castings *(continued)*
- Patterns were improperly sprued
- Flask was placed too close to the heat source in the burnout oven
- Incorrect water/powder ratio

Bubbles or Nodules on Casting
- Vacuum pump is leaking air
- Vacuum pump has water in the oil
- Vacuum pump is low on oil
- Investment not mixed properly or long enough
- Vacuum extended past working time
- Slurry not sufficiently mixed

Spalling (An Area of the Mold Wall Flakes into the Cavity)
- Flask was placed into a furnace at low temperature (below 300°F [150°C]) for an extended period
- Flask was placed too close to the heat source in the burnout oven
- Sharp corners in sprue system are struck by metal at high centrifugal velocities
- Improper burnout cycle was used

Non-Fill or Incomplete Castings
- Metal was too cold when cast
- Mold was too cold when cast
- The burnout was not complete
- Pattern was improperly sprued, creating turbulence when casting in a centrifugal casting machine
- Insufficient gating/sprue system
- Centrifugal casting machine had too high revolution per minute
- Insufficient metal by weight

Growth-Like Rough Casting That Resists Removal in Pickling Solution
- Burnout temperature was too high
- Mold temperature was too high when casting
- Metal temperature was too high when casting

Shiny Castings
- Carbon residue was left in the mold, creating a reducing condition on the mold surface

Watermarks
- Incorrect water/powder ratio
- Undermixed investment

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