

Technical Tips for Formula 1

Rapid burnout investments are sensitive to variations in mixing time, speed and temperature. To improve casting results, review instructions and adjust according to the following guidelines.

ALLOY CASTING

Tight Fit

Solution

- Increase liquid concentration. Maximum setting expansion is achieved by using 100% Special Liquid Concentrate Plus or 90% Special Liquid Concentrate Max.
- If still tight at 100% liquid concentration, reduce total liquid by 1-2 ml.
- If using metal rings, use a double liner.
- Warm the powder and/or liquid. **Note:** a water bath can be used to store liquid bottles at a relatively constant temperature.
- Decrease mixing time by 30-second increments to 60 seconds.
- Replace worn mixing bowl.

Rough Casting Surface

Solution

- Avoid overheating the alloy. Refer to the alloy manufacturer's instructions.
- Make sure vacuum mixing unit is pulling 27" Hg or more of vacuum.
- Use water-based debubbler (i.e. Smoothex) and be sure to blow patterns dry.
- Check burnout temperature of oven. Refer to alloy manufacturer's instructions for burnout temperature. Refer to investment manufacturer's instructions for burnout time. **Note:** Holding too long at top temperature can cause investment breakdown.
- Warm liquid slightly; a cool/cold mix temperature can produce a rough surface.
- Increase mixing time in 30 second increments to 180 seconds maximum (this may also decrease expansion and require lowering entry burnout temperature to 650°C/1200°F).
- Hold under vacuum for 30 seconds after mixing.
- Replace worn mixing bowl.

Mold Cracking/ Exploding

Solution

- When using the ringless casting system, users should provide 8-10mm investment support from the edge of the ring to the first unit or edge of runner bar. A minimum of 3-4mm of space should be utilized for investment between units. The size of rings with these parameters will dictate how many units should be placed in any given ring.
- Use rapid burnout method for benchset up to 1 hour. For longer than 1 hour bench set, conventional burnout is recommended.
- If using ringless casting system, remove mold at 15 minutes benchset, then allow the mold to benchset an additional 5 minutes for 100g rings, and an additional 10 minutes for 200g rings after removal.
- If mold dried out, place trimmed mold in a bowl of room temperature water for 2-3 minutes prior to burnout.
- Let mold benchset for a minimum of 15 minutes. **Note:** A cool environment requires a longer set time.
- If using 100% liquid concentration, reduce mix time to 90 seconds. **Note:** This may increase expansion.
- When multiple patterns, complex restorations or plastic components are involved, place in oven at lower temperature (650° C/ 1200°F), hold for 15 minutes, then raise to desired burnout temperature at 10-15°F per minute.
- Multiple patterns should not be put in the same horizontal or vertical plane.

Setting Too Fast

Solution

- Store Investment and liquids at approximate room temperature of 20°C - 24°C (68° - 75°F).
- Cool bowl by running it under cold water.
- Keep temperature of mixed investment under 30°C (86°F).

PRESSABLE CERAMICS

Mold Cracking or Exploding During Burnout

Solution

- If using paper rings, smooth seam in investment mold.
- If mixing 200 grams or more, reduce mix time to 30 seconds.
- Re-wet mold if benchset was longer than 1 hour.
- If using Rapid Burnout Technique, decrease entry temperature approximately 250°F (139°C).
- Remove mold from ring at 15 minutes. Benchset additional 10 minutes.

Mold Splitting during Pressing

Solution

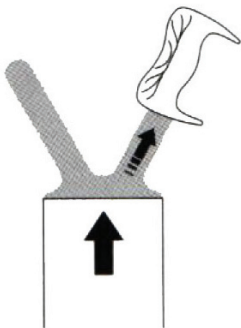
- Increase hold time at high temperature 5-10 minutes before the pressing begins. This will help completely soften the ingot.
- Check for internal and external cracks from burnout oven. Review benchset and burnout procedures.
- Ensure molds sit level and perpendicular to the furnace base.
- Increase heat soak time in burnout furnace, 10 minutes per mold.

Reaction Layer

Solution

- Review glass manufacturer's instructions.
- Decrease your maximum pressing temperature in increments of 5°C, until the reaction layer is minimized. **Note:** Check manufacturer's recommendation.
- Calibrate pressing furnace.
- Decrease press time in increments of 30 seconds.

Sprueing Tips



- Use 6 or 8 gauge direct wax sprues.
- Sprue length should be from 4-6mm.
- Total length of spure/restoration should not exceed 16mm.
- Attach sprue to incisal/occlusal surface. **See diagram.**
- Use smooth connections – avoid sharp angles.
- Place sprues/patterns in line with flow of ceramic material, with a vertical angle of 30°-45°. **See diagram.**
- Weigh wax patterns with sprues attached. **Note:** See glass manufacturer's recommendations.

