# Instructions

## Formula 1® investment

### Properties*

| Liquid/Powder Ratio | Recommended Liquid | Working Time | Set Expansion | Thermal Expansion | Compressive Strength |
|---|---|---|---|---|---|
| 22/100 | Special Liquid Concentrate PLUS | 6-8 minutes | 1.60% | 0.65% | 1350 psi (9.2 MPa) |

**These results are based on the testing methods, frequency and procedures of Ransom & Randolph or its approved suppliers. The levels referenced herein are only for general guidance and do not constitute a firm specification.*

### Step 1: Preparation

**Pattern Preparation**

1. Attach sprue to the wax pattern using pliable sticky wax.
2. Mount patterns on crucible former base.

**Removable Ring Preparation**

3. Line casting ring with liner positioned ¼ inch (6 mm) short on each end.
4. Tack down in place with pliable sticky wax.
5. Soak lined ring in water for a minimum of one minute, then shake excess from ring before investing.
6. Place ring onto former base.

**Metal Ring Preparation (For Ramped Burnout Only)**

3. Line casting ring with liner positioned ¼ inch (6 mm) on each end.
4. Tack down in place with pliable sticky wax.
5. Place ring onto former base.

### Step 2: Mixing/Investing

**Mixing**

1. Prepare liquids by diluting Special Liquid Concentrate PLUS with deionized water at the concentration that meets the expansion rate desired. Concentrations can be adjusted to optimize fit. More expansion is realized with a higher liquid/water ratio. Less expansion is realized with a lower liquid/water ratio.
2. Using a mixing ratio of 22 mL liquid to 100 g investment, add measured liquids to the mixing vessel first, then add weighed powder.
3. Hand spatulate for approximately 10-15 seconds to wet-out the powder.
4. Mechanical mix under vacuum at slow speed (350–600 rpm) for 120 seconds (2 minutes).

**Investing**

5. Pour the mixed investment into the ring no more than ¼ inch (6 mm) over the top of the ring using the normal techniques to avoid trapping air (i.e., vibration, rolling, brushing, etc.).
6. Once the ring is filled, a pressure vessel can be employed for 15 minutes, if desired.

### Step 3a: Flash-Fire Burnout

**Bench Set**

1. Allow the ring to set for for a minimum of 15 minutes, but no longer than 1 hour, in a vibration free area.
2. For best results, place in preheated oven within 30 minutes of investing.

**Burnout**

3. Remove the base and flask before trimming the glaze off the top of the mold.
4. Place the mold in a preheated oven at the alloy manufacturer's recommended temperature, up to 1700°F (925° C). For higher temperatures, place molds in oven at 1700°F (925° C) then heat to final temperature at 25°-35°F (14°-20°C) per minute.
5. Allow the oven to hold at the temperature for 30 minutes, adding 10 minutes per additional ring.

### Step 3b: Ramped Burnout

**Bench Set**

1. Allow the ring to set for for a minimum of 15 minutes in a vibration free area.

**Burnout**

2. Remove the base and flask (if applicable) before trimming the glaze off the top of the mold.
3. Place the mold in a room temperature oven.
4. Ramp the oven temperature at a rate of 25-35°F (14-20°C) per minute to the alloy manufacturer's recommended temperature.
5. Allow the oven to hold at the target temperature for at least 30 minutes prior to casting, adding 10 minutes per additional ring.

## Step 4a: Casting

1. Cast alloy with oxygen/propane torch or casting machine according to the manufacturer's instructions.
2. Allow casting to cool according to the alloy manufacturer's instructions.

## Step 4b: Pressing Ceramics

1. Press according to ceramic manufacturer's recommendations. Use a 200 gram mold for restorations requiring two ingots.
2. Allow ceramic pressings to cool completely.

## Step 5: Divesting

1. Carefully break apart the mold using tools, such as a hammer, while using the proper personal protective equipment to avoid inhaling dust particles.
2. Remove any residual investment by cleaning the casting with blasting media before polishing.

## Tips

- If using a metal ring, do not use the flash-fire burnout method. Maximum preheat entry temperature for a metal ring is 1700°F (925°C).
- To correct tight fits: Increase liquid concentration. If using metal rings, you may also use a double liner. To correct loose fits: Decrease liquid concentration. Refer to Expansion Ratio chart.
- For large molds containing complex restorations or plastic sprues, runner bars, or copings, the standard burnout technique is recommended.
- To avoid cross-contamination, use separate mixing bowls for phosphate and gypsum investments.
- Higher RPM mixers may require decreased mix time (30-60 seconds).
- 12 hours after investing, re-wet the mold prior to burnout by soaking in water for 1–3 minutes.
- Supporting the mold above the oven floor is helpful for clean burnouts.
- Running the oven with open vents aids in combusting all the pattern materials.

## Storage

Keep container tightly closed when not in use. Store investment in a dry area at room temperature. Shelf life is 2 years from the date of manufacture found in the first six digits of the lot number on the label in MMDDYY format.

Keep Special Liquid Concentrate PLUS from freezing.

## Safety

Danger. Contains crystalline silica. Causes damage to lungs through prolonged or repeated exposure by inhalation. Avoid skin or eye contact. Avoid breathing dust. Wear protective equipment when handling. Wash hands thoroughly after handling. See SDS for more information.

North America: May cause cancer by inhalation.



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