

## Polyvest refractory die material

This investment is designed for use with compatible porcelain systems that match its coefficient of thermal expansion. For best results, consult with your porcelain manufacturers technical data to ensure coefficient of thermal expansion alignment with the investment.

Use Polyvest with medium CTEs. Using a porcelain that does not match the investments expansion rate can cause issues like cracking, debonding, or poor marginal fit.

### Properties\*

| Liquid/Powder Ratio | Recommended Liquid              | Working Time | Set Expansion | Thermal Expansion | Compressive Strength |
|---------------------|---------------------------------|--------------|---------------|-------------------|----------------------|
| 22/100              | Special Liquid Concentrate PLUS | 4–6 minutes  | 0.60%         | 0.50–0.65%        | 5000 psi (34.5 MPa)  |

*\*Tested at 100% liquid concentration. 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: Duplication

#### Duplication

1. Duplicate master stone cast with a non-aqueous impression material.
2. Separate stone cast from impression material mold after 30 minutes and rinse with cold water
3. Lightly blow excess water from inside the mold.

### Step 2: Creating the Refractory Model

#### 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. Add measured liquids to the mixing vessel first, then add weighed powder.
3. Hand spatulate for 15 seconds to wet-out the powder.
4. Mechanically mix under vacuum at slow speed (350–600 rpm) for 20 seconds.

#### Pouring

5. Pour the mixture into the impression material mold using vibration to avoid trapping air.

6. Allow the mold to set for 45–60 minutes in a vibration-free area.

#### Trimming

7. Separate the refractory model from duplicating material and allow it to air dry for 45–60 minutes.
8. Trim refractory cast with model trimmer removing any sharp angles from cast and taper base of cast to allow outer mold to lock with refractory cast.
9. Rinse refractory cast with water to remove any investment particles on surface.

#### Drying

10. Place the refractory mold in a room temperature oven.
11. Raise the oven temperature to 110°C (230°F).
12. Allow the oven to hold at the target temperature for at least 1 hour.
13. Apply desired surface treatment to refractory cast.
14. Drain excess surface treatment if necessary.

### Step 3a: Porcelain Application

#### Refractory Die Preparation

1. Soak the refractory model in distilled water for 3–4 minutes, or until bubbles dissipate.

#### Porcelain Build-Up

2. Mix body (dentin) porcelain with distilled water to a thin slurry consistency to prepare a sealing application.

3. Apply mixture to the refractory model at a thickness of no more than 0.2 mm.
4. Fire under vacuum in a porcelain furnace using the porcelain manufacturer's recommended times and temperatures.
5. Remove the model and allow to cool.
6. Mix body and incisal porcelain separately to a normal consistency and proceed with the porcelain buildup. Use a soft brush to remove excess moisture. Contour to desired shape.
7. Fire under vacuum in a porcelain furnace using the porcelain manufacturer's recommended times and temperatures.
8. Remove the model and allow to cool. Shape the fired porcelain as necessary with mounted stones or diamond burs.
9. Clean surface before adding the final buildup of porcelain, as necessary.
1. Proceed with the glaze firing and any stain firings in air using the porcelain manufacturer's recommended times and temperatures.
2. Remove the model and allow to cool. Skip to Step 7: Divesting.

## Step 3b: Wax-Up & Preparation

### Pattern Preparation/Wax-Up

1. Attach sprue to the wax pattern using pliable sticky wax.
2. Mount patterns on crucible former base.
3. Clean wax-up with wax pattern cleaner.
4. Lightly blow excess cleaner from wax pattern.

### Removable Ring Preparation

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

### Metal Ring Preparation

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

## Step 4: Mixing/Investing

### Mixing

1. Prepare the deionized water at the suggested ratio for expansion desired. More expansion is realized

with a lower water/powder ratio. Less expansion is realized with a higher water/powder ratio.

2. Add measured liquids to the mixing vessel first, then add weighed powder.
3. Hand spatulate for 15 seconds to wet-out the powder.
4. Mechanically mix under vacuum at slow speed (350–600 rpm) for 20 seconds.

### Investing

5. Pour the mixed investment into the ring up to ¼ inch (6 mm) over the top of the ring using the normal techniques to avoid trapping air (i.e., vibration, rolling, brushing, etc.).

## Step 5: Bench Set/Burnout

### Bench Set

1. Allow the ring to set for at least 1 hour, in a vibration-free area.
2. Remove the base and flask before trimming the glaze off the top of the mold and rinsing under tap water.

### Burnout

3. Place the mold in a room temperature oven.
4. Ramp the oven temperature at a rate of 20–25°F (10–14°C) per minute to the alloy/porcelain manufacturer's recommended temperature.
5. Allow the oven to hold at the target temperature for 30 minutes, adding 10 minutes per additional ring.

## Step 6: 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 7: Divesting

1. Carefully break apart the mold using tools, such as a hammer, while using proper Personal Protective Equipment (PPE) to avoid inhaling dust particles.
2. Remove any residual investment by cleaning the casting with blasting media before polishing.

## Tips

- Alginate and most hydrocolloids should be avoided during duplication due to the chalky surfaces that may result.

- To avoid cross-contamination, use separate mixing bowls for phosphate and gypsum investments.
- Higher RPM mixers may require decreased mix time (30–60 seconds).
- 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).

## 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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