

Application Instructions R&R® Noble™ investment JANUARY 2008

R&R NOBLE investment is ideal for casting platinum and palladium alloys - providing casters with both excellent surface finish and easy investment removal. While R&R NOBLE investment is processed similar to current 2-part platinum products, it is mixed with water which eliminates the need to ship, store and handle a hazardous acid binder. R&R NOBLE investment vacuums easily, rising and breaking in the bowl in one cycle. The burnout process is also simple - no need to reprogram ovens or include additional process holds. R&R NOBLE investment removes easily from the casting when compared to other high temperature investments.

FLASK PREPARATION

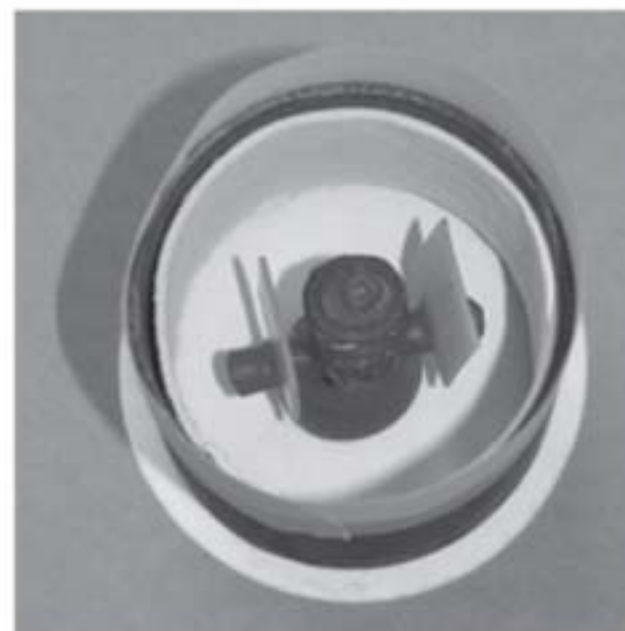
Prepare the flask by cutting a non-asbestos absorbent liner ½" (125 mm) shorter than the height of the flask. Position the liner inside of the flask so ¼" (60 mm) of the flask edge extends beyond the liner at either end.

Prepare a base using non-asbestos paper material which is at least 1" (250 mm) larger in diameter than the flask. Cut a ½" (125 mm) diameter hole in the middle of the base and center the wax tree over hole. The flask should be 1" (250 mm) taller than the tree. Seal the wax tree to the base by using wax or hot glue. Position the flask around the tree and seal against the base with wax or hot glue.

Place a paper or rubber collar around the top of the flask, extending approximately 1" (250 mm) above the top of the flask.

Place the entire setup on a metal plate or wooden board so the flask bottom will be supported when handled.

The photo (right) shows a properly completed flask set up for comparison.



INVESTMENT MIXING

Step 1: To determine the proper amount of water and powder to use per flask, locate the volume of the flask you are using on the chart below.

CUBIC VOLUME BY FLASK SIZE				
Height — Diameter	2.5 inches (6 cm)	3.0 inches (7 cm)	3.5 inches (8 cm)	4.0 inches (10 cm)
2.5 inches (6 cm)	12.3 in³ (201 cm³)	14.7 in³ (241 cm³)	17.2 in³ (281 cm³)	19.6 in³ (321 cm³)
3.0 inches (7 cm)	17.7 in³ (290 cm³)	21.2 in³ (348 cm³)	24.7 in³ (405 cm³)	28.3 in³ (463 cm)
3.5 inches (8 cm)	24.1 in³ (395 cm³)	28.9 in³ (474 cm³)	33.7 in³ (553 cm³)	38.5 in³ (632 cm)
4.0 inches (10 cm)	31.4 in³ (514 cm³)	37.7 in³ (618 cm³)	44.0 in³ (721 cm³)	50.3 in³ (824 cm³)



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Step 2: Using the volume located in the previous step, calculate the weight of powder and the volume of the water for your flask size using the following equations. The general mixing ratio is water (in volume)/powder (in weight) = 25/100. For heavier pieces, use a water/powder ratio of 24/100.

English Measure:

Small/Medium Pieces (25/100)

Flask volume (in³) x 0.0517 = _____ lbs. powder

Flask volume (in³) x 0.1984 = _____ fl. oz. water

Heavy Pieces (24/100)

Flask volume (in³) x 0.0517 = _____ lbs. powder

Flask volume (in³) x 0.1904 = _____ fl. oz. water

Metric Measure:

Small/Medium Pieces (25/100)

Flask volume (cm³) x 1.432 = _____ grams powder

Flask volume (cm³) x 0.358 = _____ ml water

Heavy Pieces (24/100)

Flask volume (cm³) x 1.432 = _____ grams powder

Flask volume (cm³) x 0.344 = _____ ml water

INVESTING

At the beginning of the mixing cycle the investment is very thick and will put a lot of stress on a kitchen type mixer. Therefore, a planetary type mixer (Hobart) is required for mixing. As mixing continues, the investment will thin out and become very fluid. NOTE: It is important to avoid shearing the investment.

Place the water in the mixing bowl. Do not add all the powder initially. Add the powder slowly while mixing. Once all the powder has been added, mix for a total of 10-15 minutes to optimize casting surfaces. As material thins during mixing a smooth, creamy slurry will result. Do not vacuum while mixing.

Place the mixing bowl on a vacuum table and apply full vacuum until the slurry rapidly boils. Do not exceed 2 minutes. If a longer time is required to produce a rapid boil, the vacuum pump is undersized, is in need of repair, or there is an air leak in the vacuum system.

Pour the investment slurry down the side of the flask, allowing it to flow around and through the patterns. Completely cover the wax patterns, filling to the top of the flask at minimum. Place the invested flask on a vacuum table and apply full vacuum 1 to 2 minutes.

Set the flask aside, undisturbed, for a minimum of 2 hours and a maximum of 4 hours. The flask is now ready for burnout. You may burnout the same day or overnight.

SAME DAY BURNOUT

Place the flask in a furnace at room temperature. Raise the temperature to 200°F (93°C) over 15 minutes and hold temperature for 1 hour. Raise the temperature to 350°F (175°C) during the next hour and hold at 350°F (175°C) for 30 minutes. Raise the temperature to 1600°F (871°C) over the next 2½ to hours. Hold at this temperature.

The holding time at 1600°F (871°C) will depend on the size and number of flasks in the oven, as well as the type of pattern material being melted. Longer burnout times may be required with non-wax patterns. A proper pattern burnout is confirmed by a pure white flask surface when you look down the sprue cavity. The flask is ready to cast when a proper burnout has been confirmed.



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OVERNIGHT BURNOUT

Place the flask in a furnace at room temperature. Raise the temperature to 200°F (93°C) over a period of 30 minutes, then hold at this temperature for 2 hours. Raise the temperature to 350°F (175°C) during the next hour and hold at this temperature for another hour. Raise the temperature to 1600°F (871°C) over the next 5 hours. Hold at this temperature.

The holding time at 1600°F (871°C) will depend on the size and number of flasks in the oven, as well as the type of pattern material being melted. A proper pattern burnout is confirmed by a pure white flask surface when you look down the sprue cavity. The flask is ready to cast when a proper burnout has been confirmed.

TIPS & TECHNIQUES

BENCH CURE

1. Bench cure times longer than 4 hours are not recommended.
2. If there is still water present on mold tops at 4 hours, this is an indication that more absorbent material is needed. The flask and its absorbent base may be placed onto newspaper or dry investment powder to increase the absorption rate of the water.
3. Flasks can be cured inside an oven on a time delay.

BURNOUT

1. At burnout, do not strip the absorbent base off of the flask. Process the entire set up through the burnout cycle.