



# CASTING CONNECTION



## Flask Calibration & Use

Analyzing binder density in a ceramic slurry is essential in order to control the concentration of particles (i.e., SiO<sub>2</sub>, polymers, surfactants) in the binder. If the concentration increases too much, it can promote particle collisions, which can lead to instability of the colloidal silica. Or, it can result in agglomeration or gelation of the SiO<sub>2</sub>, which causes irreversible damage to the binder.

In any case, if the binder density is not held within the recommended specification, it will result in shells that are either too weak or too strong. For these reasons, it is very important to measure binder density in a repeatable, reliable and consistent manner.

In this article, we will describe the calibration and use of volumetric and pycnometer flasks, both commonly used to measure binder density.



Volumetric

Pycnometer

### Equipment

#### Volumetric Flask

These affordable flasks are commonly used for density analysis in combination with a scale (up to 0.01 gram accurate). This method is sensitive to human error due to the visual interpretation of the liquid face (meniscus) against the fine reference line in the flask.

#### Pycnometer Flask

A pycnometer flask works similarly to the volumetric flask, but the visual interpretation is taken out of the equation due to the use of a

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# Jewelry Injection Wax Guidelines: Filling the Wax Pot

Jewelry casters use specially formulated injection waxes to produce high quality wax patterns.

To make the most of the inherent features and benefits in your jewelry injection wax, R&R recommends following these simple guidelines for filling the wax pot.

Periodically, all wax pots should be fully drained and cleaned. Wax left idle for an extended period should be gently stirred.

R&R recommends wax pots be filled at the end of each day, allowing the wax to slowly attain and stabilize to desired injection temperature.

If you need to refill the wax pot during a production run, and you don't have a separate wax melter, you can fast-melt the wax at 200° F (93° C). Be sure to take wax temperature readings at the inside wall of the pot while stirring lightly to eliminate air bubbles. This stirring action will also help to evenly distribute heat throughout the wax. If trapped air is still present, it is also helpful to spray the surface with silicone mold release agent. This will reduce surface tension and allow any trapped bubbles to break.

Once the wax has reached proper injection temperature and before pressurizing the pot, let the wax settle for a short while to permit

any remaining air bubbles to escape and for the wax to return to the required injection temperature.



Looking for other technical tips or just need general technical support?

Visit us online at: [www.ransom-randolph.com/technical-tips](http://www.ransom-randolph.com/technical-tips)

Or contact our technical team at: [RR-Technical@dentsply.com](mailto:RR-Technical@dentsply.com)

## COVID-19 Update

*As of March 24, 2020*

Amidst the COVID-19 crisis, R&R is maintaining operations while complying with federal, state and CDC recommendations to contain the spread of the virus. As an essential supplier to defense, health, and energy segments, our manufacturing facility in Ohio continues to operate. While governments respond to this crisis daily, compliance requirements may change quickly and without significant warning. Currently, we are:

- Continuing to manufacture and ship product while implementing recommended cleaning and distancing protocols.
- Taking steps to allow employees to work remotely without disrupting daily operating activities.
- Monitoring COVID-19 updates and complying with any new guidance.

It is our intention to continue to service our customers, we will do this within the restrictions that country and state governments allow. If you are concerned about possible disruption to your supply chain, we ask that you also take steps to reduce the potential for disruption by planning for material needs.

Should the situation change considerably, we will communicate with you.

Wishing you health,

A handwritten signature in black ink that reads "Daniel P. Nixon".

Dan



**Dan Nixon**

Vice President, Business  
Unit Manager

## Technical Support

Looking for other technical tips or just need general technical support?

Visit us online at:  
[www.ransom-randolph.com/technical-tips](http://www.ransom-randolph.com/technical-tips)

Or contact our technical team at: [RR-Technical@dentsply.com](mailto:RR-Technical@dentsply.com)



Visit the R&R Booth!

Booth # 317

## Flask Calibration & Use

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drilled cap. Although more expensive, the results are typically more repeatable and consistent than the volumetric flask.

### Flask Calibration

1. Place empty flask on scale (up to 0.01 gram accurate).
2. Tare scale.
3. Fill flask with deionized (DI) water, according to instructions (see sections below on using/filling volumetric or pycnometer flasks).
4. Weigh flask with water on scale.
5. The weight of the water (grams) equals the flask's volume (ml).
6. Label the flask with the volume that was obtained.

### Calculations

- $\text{Flask volume (ml)} = (\text{weight full flask (gram)} - \text{weight empty flask (gram)})$
- $\text{Liquid density (g/ml)} = (\text{weight full flask (gram)} - \text{weight empty flask (gram)}) / \text{flask volume (ml)}$

### Example Calculation

- Weight of water in 10 ml flask → 9.94 g = 9.94 ml volume of flask
- Weight of centrifuged binder in 10 ml flask → 11.50 g
- Divide weight of binder by volume of flask →  $11.50 \text{ g} \div 9.94 \text{ ml} = 1.157 \text{ g/ml}$

• *continued on page 4* •

## 2020 Industry Tradeshow Update

### 15<sup>th</sup> World Conference & Equipment Expo

*RESCHEDULED*

At the April 27, 2020 meeting, the Investment Casting Institute's Board of Directors unanimously agreed to postpone the 2020 World Conference on Investment Casting & Equipment Exposition to 2021. The venue has not changed.

**NEW Date:** October 24-27, 2021

**Where:** Anaheim, California, USA

**Venue:** Disneyland Resort

**Learn More:** [www.investmentcasting.org/world-conference-2021.html](http://www.investmentcasting.org/world-conference-2021.html)



# Flask Calibration & Use

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## Using/Filling a Volumetric Flask

1. Secure a clean, dry volumetric flask.
2. Use a clean pipette to fill the flask.
3. Immerse the pipette under the flask's reference line before emptying.
4. Fill the flask just under the reference line.
5. Tap the flask to release entrapped air bubbles.
6. Clean off any liquid residue in the flask neck with paper/tissue.
7. Complete filling the flask by carefully applying droplets of liquid until the bottom of the liquid meniscus touches the top end of the reference line.
8. Use paper/tissue again to clean any residue in the neck or to absorb the excess liquid out of the flask.

## Results

### Sample 1 - Right

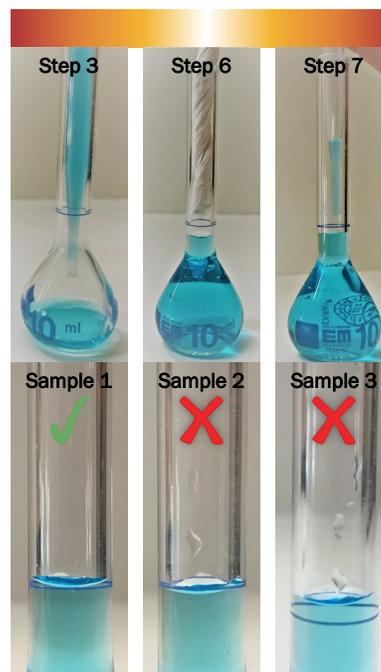
There is no excess of liquid above the reference line. The bottom of the meniscus touches the top end of the reference line.

### Sample 2 - Wrong

There is an excess of liquid above the reference line. The meniscus is below the reference line.

### Sample 3 - Wrong

There is an excess of liquid above the reference line. The meniscus is above the reference line.



*Volumetric and pycnometer flasks are both commonly used to measure binder density.*

## Using/Filling a Pycnometer Flask

1. Secure a clean, dry pycnometer flask.
2. Fill the pycnometer flask with a clean pipette until halfway to its neck.
3. Release entrapped air by taping the flask.
4. Apply the cap by dropping it gently into the neck.
5. Do not force the cap into the neck.
6. Carefully absorb any excess liquid from the flask and cap surface with tissue/paper.
7. Be careful not to absorb any liquid out of the cap bore.

## Results

### Sample 1 - Right

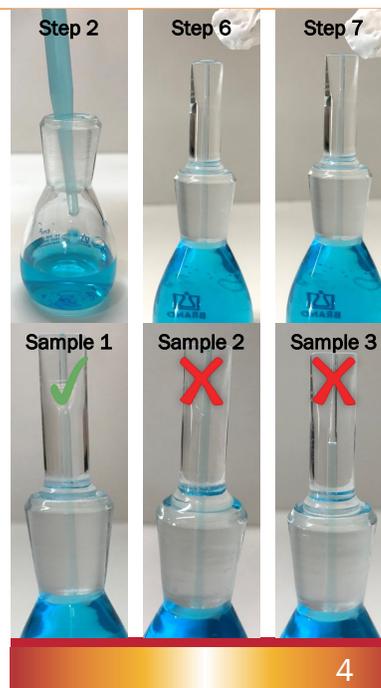
The cap bore is full. There is no excess of liquid on the flask surface.

### Sample 2 - Wrong

There is excess liquid between the cap and the flask. Absent of liquid in cap bore (absorbed).

### Sample 3 - Wrong

Absent of liquid in cap bore (absorbed).





## Select Solid Mold Investments Now Available Online!

We are excited to announce the following solid mold investments are now available for order through our webstore:

- Rancast™ investment
- 910 investment



### Rancast investment

A low temperature investment,

ideal for non-ferrous artwork. It provides exceptional detail reproduction with superior mold strength. It is successfully employed from small to very large molds using standard methods of investing for conventional solid mold lost wax casting.



### 910 investment

A low temperature investment, ideal for

aluminum, copper based alloys, other low temperature alloys and glass. It is formulated to have sufficient fluidity to help eliminate air entrapment and eliminate water marking defects. Its high green strength and good thermal shock properties make it well-suited for use with castings that have troublesome cores.

Learn more about our solid mold products at:

[www.ransom-randolph.com/solid-mold](http://www.ransom-randolph.com/solid-mold)

Shop our webstore today at: [shop.ransom-randolph.com/](http://shop.ransom-randolph.com/)!

## Contact Us

3535 Briarfield Boulevard  
PO Box 1570  
Maumee, Ohio 43537 USA

US Toll Free: 800.253.4502  
US Phone: 419.865.9497

US Fax: 419.865.9997

Email:  
[RR-Marketing@dentsply.com](mailto:RR-Marketing@dentsply.com)

Web:  
[www.ransom-randolph.com](http://www.ransom-randolph.com)

Webstore:  
[shop.ransom-randolph.com](http://shop.ransom-randolph.com)

Social:



## Ransom & Randolph



At R&R, *Investing with Innovation™* is more than just a slogan, it's a way of life. Dedicated to advancing the investment casting industry, we take pride in providing foundries with extensive process knowledge, exceptional technical expertise and innovative product technology. By coupling our revolutionary product developments with our experienced staff, manufacturing and warehousing facilities, we successfully help you become a casting industry leader. R&R is a wholly owned subsidiary of Dentsply Sirona (NASDAQ: XRAY).

R&R's core businesses are comprised of ceramic shell, industrial mold, jewelry and dental investment casting.

R&R takes great pride in providing customers with a pleasant procurement experience. R&R's Maumee, Ohio based customer service team services North America and US export customers. Our UK-based agent, HTM Tradeco, Ltd., provides service for the European Union. From initial order placement through delivery, R&R's customer service team takes responsibility for accurate and efficient processing of your material needs. As a result, R&R's customer service team is unmatched in the industry.

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