



CASTING CONNECTION



Jewelry Investments: Gypsum or Phosphate?

Casting methods place aggressive stresses on investments, so its best to use an investment to match your method.

Gypsum-Based Investments

The major components of a gypsum-based investment are gypsum (plaster) and various refractories. These refractories include quartz, cristobalite (a form of silica), and other silica-based refractories. The gypsum is used as a binder. Gypsum-based investments are recommended for low temperature alloys with melting points below 2,200 °F, which includes most non-ferrous alloys.



Raw gypsum

Ultra-Vest® universal investment, Advantage™ investment, and SC20 investment are a few examples of investments that are gypsum-based.

Phosphate-Based Investments

Phosphate-based investments use a combination of phosphate chemicals with known binding systems to replace gypsum as the binder. The composition of this these investments includes phosphate chemicals and finely ground quartz. This system can ... continued on page 2...



Raw phosphate

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Tech Tip: Vulcan® Thermocouple Replacement

If your Vulcan burnout furnace is displaying an "ERROR CODE 2" message, this means you may have a shorted thermocouple and its time to replace it.

Tools & Parts Required:

- Phillips head screwdriver
- Flathead screwdriver
- Replacement thermocouple

To purchase a new thermocouple, call customer service at 1-800-800-7496 and provide the thermocouple item number #TC-005

For easy, picture guided, step-by-step instructions on how to replace your thermocouple at home, read our tech tip on the [R&R Academy](#) under "Tech Tips"



For technical assistance contact our tech team by calling 800-253-4502 or emailing technical@ransom-randolph.com.

Jewelry Investments: Gypsum or Phosphate?

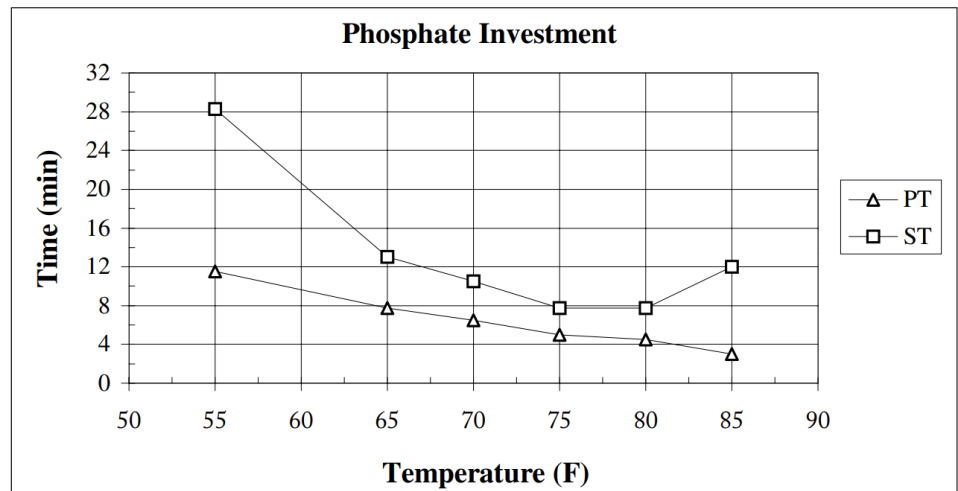
... continued from page 1...

cast high temperature alloys with melting points above 2,200°F, Astro-Vest® investment, Plasticast® PT investment, and Platinum investment are a few examples of investments that are phosphate-based.

Phosphate-based investments have a shorter pour time than those that are gypsum-based. While Ultra-Vest universal investment (gypsum-based) has a 10 - 10 ½ minutes pour time, Astro-Vest investment (phosphate-based) only has a 5 - 5 ½ minutes pour time.

Major Differences Between Investments

- Gypsum-based investments are only ideal for low temperature alloys with melting points below 2,200°F, while phosphate-based investments can withstand high heat and can be used with alloys with melting points over 2,200°F.
- The pour time for a gypsum-based investment is significantly longer than phosphate-based investments. However, the pour time for phosphate-based investments can be extended by mixing the investment with a cooler temperature of de-ionized water (see figure below).
- Gypsum-based investments typically have greater green strength than phosphate-based investments. Therefore, phosphate investments need to be handled with care before firing.
- Due to their low fired strength, gypsum-based investments allow easier breakout than those that are phosphate-based.
- When using phosphate-based investments, the steam de-waxing method is not recommended due to their low green strength.



The above figure demonstrates the pour times (PT) and set times (ST) of phosphate-based investments in relationship to the temperature of both the de-ionized water and investment at the start of mixing. For more information, read "Effects Of Water Quality And Temperature On Investment Casting Powders" written by our Product Development Manager, Ralph Carter, in the [R&R Academy](#) under "Technical Papers."

Buy 3 Get 1 FREE Dental Stones & Plasters!

For a limited time, with every 3 boxes of select stones & plasters purchase online, we will add another box of the same stone or plaster to your cart at no charge to you. This offer is valid January 16 - March 31, 2023. The select stones & plasters include:



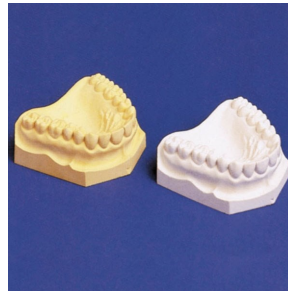
FiberStone™ resin die stone
Type IV die stone



Tuff-Stone™ die stone
Type IV die stone



Master Model™ Blue die stone
Type IV die stone



Castone® Cream dental stone
Type III dental stone



LabStone® dental stone
Type III dental stone



Plaster Fast Set
Type III model plaster

All three boxes must be the same product in order for the 4th box to be automatically shipped with your order at no charge to you- no mixing and matching. Offer valid on online sales only. Orders must be placed between 12:00am EST on January 16, 2023 through 11:59pm EST on March 31, 2023. No coupon code necessary.

Shop Now

To take advantage of the B3G1 FREE offer, order online at <https://shop.ransom-randolph.com/stones-plasters/>

Slurry Testing Schedule

To get the best castings possible, we recommend the following testing schedule:

2x Per Shift
-Slurry Viscosity*

Daily
-Slurry Temperature

2-3x Per Week
-Binder Solids

1x Per Week
-Binder pH
-Slurry Density
-Total Solids/Refractory Solids*
-Gelation
-Antifoam

As Needed
-Bacteria
-Loss of Ignition (LOI)

*Note that these are the only slurry control tests required for SuspendaSlurry® materials


Why Test Your Slurry?

Testing your slurry allows you to take early precautions and make adjustments that ensure both the life of your slurry and the quality of your shell.

The goal of slurry control is to keep the components within the slurry in consistent. A consistent slurry should produce consistent shells. If you don't test your slurry often, it is more likely your slurry will become unbalanced, resulting in more frequent slurry changes and poor quality castings.

The easiest way to monitor your slurry is to use a slurry control worksheet. Our [R&R Academy](#) provides you with free, Excel-based [slurry control](#) worksheets available for download which are specific to your R&R slurry.

RANSOM & RANDOLPH



Primcote® Binder
 Slurry Control Worksheet
 English Measure

A Tank Calculation A1 Cylindrical Tank A2 Tank Diameter (inches) A3 Slurry Depth (inches) A4 Volume (gallons)	12.00 20.42 10.00	H Slurry Density Calculation H1 100 ml Cylinder (grams) 155.00 H2 100 ml + Slurry (grams) 314.61 H3 Calculated Slurry Density 1.60
B Slurry Control Target Values B1 Binder Solids (recommended target 28.8-30.8) B2 Refractory Solids	29.80 72.00	I Total Solids Calculation I1 Pan Weight (grams) 0.44 I2 Wet Weight (grams) 10.17 I3 Dry Weight (grams) 7.50 I4 Calculated Total Solids 72.56
C Slurry Test Results C1 Slurry Density (H3 at right or direct input) C2 Total Solids (I4 at right or direct input) C3 Specific Gravity (J4 at right or direct input) C4 Binder Solids	1.60 72.56 1.160 26.78	J Specific Gravity Calculation J1 10 ml Flask (grams) 9.45 J2 10 ml + Binder (grams) 21.05 J3 Flask Calibration 10.00 J4 Calculated Specific Gravity 1.160
D Current Slurry Makeup D1 Refractory Solids	62.52	
E Water Addition E1 Binder Solids Difference E2 Water Addition (pounds) E3 Adjusted Refractory Solids	-3.02 0.00 Evaporate 62.52	
F Binder Addition F1 % Difference F2 Binder Addition (pounds)	0.87 0.00	
G Refractory Addition G1 % Difference G2 Refractory Addition (pounds)	1.34 45.02	

Property	Target		Actual
	(Lower)	(Upper)	
Binder Solids	28.80	30.80	26.78
Refractory Solids	71.00	73.00	62.52

Instructions:

- Select your tank type from the drop down menu in A1.
- For cylindrical tanks, enter the tank diameter and slurry depth in **ORANGE** in section A. For tear drop tanks, enter inches from top of tank in **ORANGE** in section A.
- Enter the target binder and refractory solids in **GREEN** in section B.
- Manually enter all data in **RED** in sections H, I and J if you want the program to calculate the values **OR** directly input the required values in **BLUE** in section C.
- If additions are required, they appear in boxed fields in sections E, F and G.

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Simply use the dropdown bar to select your tank type, input your dimensions, enter your target binder and refractory solids, then fill in your recorded test results. Using the information you provide, the slurry control worksheet provides you with required water, binder, and/or refractories additions.

For additional information on this topic, read our Tech Tip: [Slurry Control](#). The last page of this printable tech tip provides you with a slurry control log to keep in your foundry and appropriately record your findings when performing your slurry testing. This allows you to spot unusual changes overtime.

For any technical questions, contact our tech team at 800.800.7496 or technical@ransom-randolph.com.

Welcome to the Team, Vasko!

R&R is pleased to announce the appointment of Vasko Popovski as Sales Engineer- East Region.

In this role, Vasko will be responsible for managing customer needs, conducting field evaluations, and troubleshooting problems.

He will serve customers in the United States in CT, DE, KY, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV; as well as Quebec and Ontario, Canada.

Vasko joins the R&R team with an extensive sales and engineering background. He has not only earned two Bachelor's and two

Master's degrees in majors such as Economics and Metallurgical Engineering, but he is also a licensed Professional Engineer in Pennsylvania, Ohio, and Wisconsin.

Vasko has worked in metal casting, metallurgy, and heat treatment for 30 years. In that time he has served on and chaired several industry committees.

Please join us in welcoming Vasko to the Ransom & Randolph team!

Contact Information

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**Vasko
Popovski**

Sales Engineer-
East Region

Solid Mold Mixing Influences

Mixing methods will change investment properties if not executed consistently each time. A few vital mixing factors include equipment design, mixing time, and mixing speed.

Equipment Design

While hand mixing is an option, most casters are tempted to use more water than what is recommended in order to make mixing easier. We advise against this as it can affect the investment properties. Using a planetary mixer or vacuum mixer provides consistency to the mixing process. The equipment must be a suitable size and design in relationship to the mixing vessel to ensure proper mixing will occur. The propellers in mixing equipment wear down over time, for best results be sure to frequently check your propellers and replace them as needed.

Mixing Time

Solid mold investments must be mixed at a minimum of 3 minutes to activate all ingredients. If the investment is not mixed long enough, there will likely be defects on the casting such as water markings, finning, and air bubbles.

Mixing Speed

The investment must be mixed at a speed that is adequate without shearing the material. If the mixing speed is not controlled, the investment may set improperly. When using a vacuum mixer, ensure the RPM (rotations per minute) is at least fast enough to allow adequate intermingling of the water and investment, but not so fast as to grind the particles and create shearing. When using a planetary mixer, its best to mix at the highest speed without causing the mixture to splash.





For more information on closures, trade shows, and other important events, visit <https://www.ransom-randolph.com/calendar/>

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Webstore:
shop.ransom-randolph.com

Social:



R&R Calendar of Events



T. Gold Jewelry Boutique Show

<https://www.vicenzaoro.com/it/t-gold>

Vicenza, Italy | January 20-24, 2023

Visit Dan & Scott at Pad 9, Booth #130!



LMT® LAB DAY® Chicago Dental Expo

<https://lmtmag.com/lmtlabday>

Chicago, IL, USA | February 24-25, 2023

Visit Dan, Scott, Darin, & Steve at Booth #0-2!



MJSA Jewelry Expo

<https://www.mjsa.org/events/mjsa-expo>

New York City, NY, USA | March 5-7, 2023

Visit Dan, Scott, Vasko, & Katie at Booth #128!



International Dental Show (IDS)

<https://www.english.ids-cologne.de/>

Cologne, Germany | March 5-7, 2023

Visit Dan & Steve in Hall 11.2 at Booth #P-058!



Good Friday

R&R will be CLOSED for the holiday.

Happy Easter!

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'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.

Investing with Innovation™