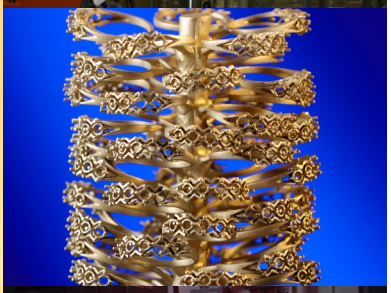
Ransom & Randolph

MAR-APR
2023

Casting Connection



R&R Glass-Cast™ Overview

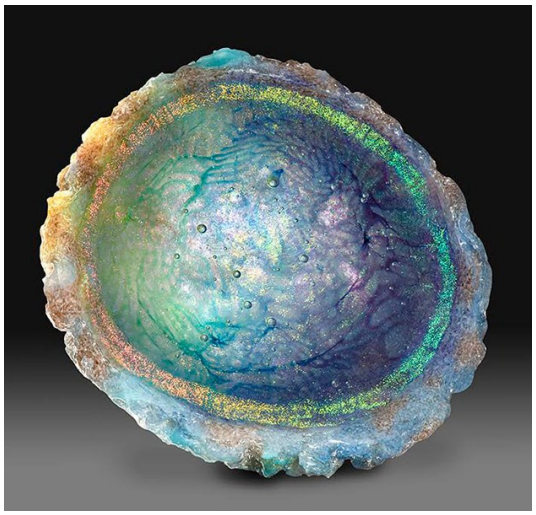
R&R offers a variety of materials for glass casting applications. In addition to a simple 50/50 blend of plaster and silica, there are 4 engineered products offered for glass casting:

- R&R Glass-Cast 101 BANDUST™ investment
- R&R Glass-Cast 400 investment
- R&R Glass-Cast 910 investment
- R&R Glass-Cast 965 investment

To ensure we are providing the highest quality products for our customers, each batch of R&R investment manufactured goes to our quality control labs to run tests, such as pour time and slump. All batches must meet the specifications before they are approved. If they do not meet the specifications, they are adjusted and retested until they meet our high standards and receive approval. This provides customers with high quality product that provides consistent performance results.

Each of R&R's uniquely engineered glass casting investments have different properties to consider depending upon the

... read more on page 3...



Opalation
Kate MacLeod (katemacleodglass.net)
Glass-Cast 400 investment

Inside this Issue

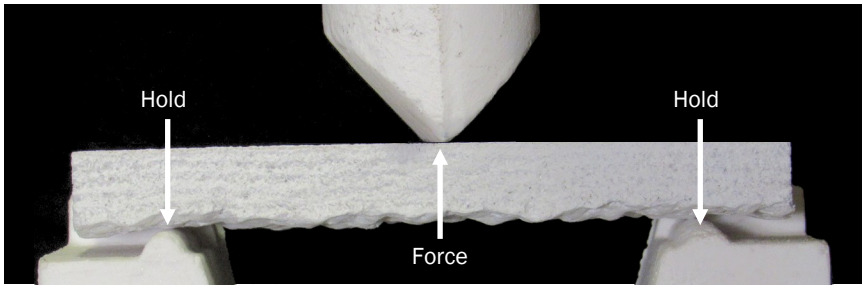
What's Your MOR?

Want to benchmark your current shell system's bending strength properties against an R&R system?

Contact our technical team by emailing technical@ransom-randolph.com

The Importance of MOR

In investment casting, the Modulus of Rupture (MOR) is a measure of a shell's strength before rupture. The MOR is often referred to as the bending strength. To determine the MOR, a shell sample is set into a three-point bending apparatus where two of the points hold the sample and a force is applied at the third point. This force (stress) causes the sample to deflect (strain) and ultimately break. The MOR is equal to the maximum force at fracture.



The MOR is tested on ceramic shells in 3 different conditions: the green stage, hot stage, and post fired stage.

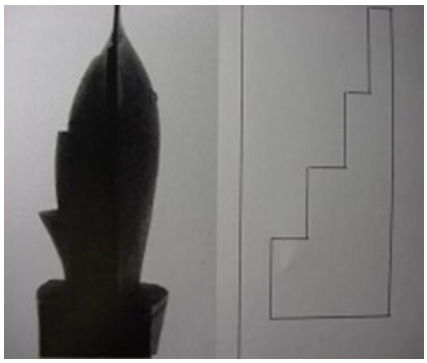
Green Stage
This is a shell sample that has only been dipped and dried. It has not been through any thermal cycles (dewax or burnout). Green MOR represents the shell strength at dewax.

Hot Stage
This is a shell sample that has been burned out and is tested at elevated temperature (typically 1,200°C or 2,200°F) to represent the shell strength after molten metal is poured into the shell.

Post Fired Stage
This is a shell sample that has been through the full thermal cycle of dewax and burnout before returning to room temperature and tested. This represents the shell strength at knockout. The lower post fired strength, the better.

Strain, or deflection, is also important to fully understand the bending strength of shells. When testing shells in the green state, deflection is a benefit. The green deflection is an elastic deflection, meaning that the shell can deflect slightly and return to its original form. This deflection absorbs some of the stress the wax puts on the shell as it expands during dewaxing. In the green state, it is desirable to have a high MOR and good deflection. A green shell with a high MOR and minimal deflection will be brittle and is more prone to cracking.

When shells are in the hot state, any deflection that takes place due to the force of the molten metal is plastic deformation. With plastic deformation, once the shell deflects, the deflection is permanent and the result is a bulge or oversize dimension in the cast piece.



Defect: Bulging

R&R Glass-Cast™ Overview

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application. The properties of the investment that should be considered include pour time, slump, green compressive strength, post fired compressive strength, and permeability.

Pour Time
The pour time is a measure of the working time starting when the powder is added to the water and ending when the mixed investment is no longer fluid enough to pour. All mixing, whether its by vacuum, hand, or machine, should be done with about 1½ –2 minutes before the working time elapsed.

Slump
The purpose of the slump test is to measure the fluidity of the material after mixing the powder and water. The larger the slump, the more fluid the material. Higher fluidity would indicate ability of the investment to flow into detail and to release air during vacuum or vibration.

Green Compressive Strength
The Green compressive strength of the mold is an indication of the mold's strength during handling as well as an indication of the strength during the glass melting/casting process. The green compressive strength is determined by the ingredients of the investment, as well as the water to powder (W/P) ratio. In general, the lower the W/P ratio, the stronger the investment.

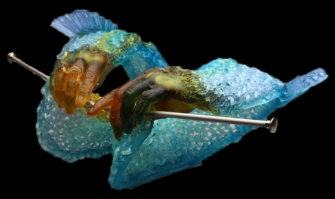
Post Fired Compressive Strength
The post fired compressive strength is an indication of the strength of the investment after the casting process is complete and the mold is cooled. In general, the lower the post fired compressive strength, the easier the material is to remove.

Permeability
Permeability is a measure of the ability of the investment to have air pass through it during the glass casting/melting process. The higher the value, the more permeable the mold. Permeability during glass casting is not as important as it is during metal casting because of the extended time mold is held at casting/melting temperature.

The key properties of the R&R engineered Glass-Cast products are shown in the table below. Choosing the right material may be easier knowing what the difference in the properties are and what tradeoffs you can make. If you are still unsure which investment is right for your glass casting needs, start with the most engineered R&R product; Glass -Cast 910 investment. It provides the highest strength with consistent working time as well as excellent fluidity.

	Glass-Cast 101 BANDUST investment	Glass-Cast 400 investment	Glass-Cast 910 investment	Glass-Cast 965 investment
W/P ratio (mL/g)	40/100	34/100	28/100	28/100
Pour time (minutes)	10-15	10-11	10-11	9-10
Slump (inches)	4-5	4 ½ - 5	4 -4 ¼	2 ¾ - 3 ⅛
Green Compressive Strength (psi)	400	680	1000	700
Post fired Compressive Strength (psi)	40	100	150	130
Permeability (Darcy)	0.045	0.036	0.020	0.050

Glass-Cast 101 BANDUST™ investment
Frog on Leaf
Robin Lehman
robinlehmanglass.com



R&R Glass-Cast 400 investment
Waterwings
Caroline Milne
carolmilne.com

R&R Glass-Cast 910 investment
Pretty in Pink
Ron Reisman
ninedaywonderstudio.com

R&R Glass-Cast 965 investment
Messenger
Harry Messersmith

Shop R&R Glass-Cast investments here

Still Unsure?

Has R&R's technical assistance made a lasting impact on your manufacturing process? Participate in a case study to spread the word!

Email our marketing team at marketing@ransom-randolph.com

To read our case studies, visit www.ransom-randolph.com/case-studies

If you are still unsure which R&R product is best suited for your application, contact our tech team for recommendations from the professionals by calling 800.800.7496 (US) or emailing technical@ransom-randolph.com.

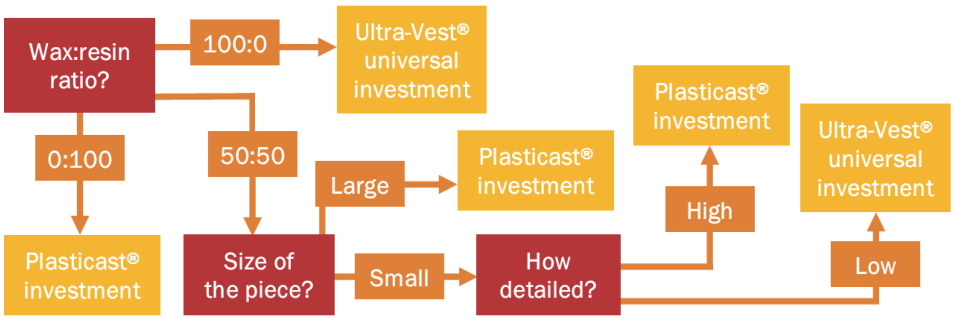
Jewelry Q&A: Investments for Resin & Wax Mixtures

A customer asked a question regarding Ultra-Vest® universal jewelry investment and its compatibility with resin & wax mixture prototypes.

Q: "I've always sworn by Ultra-Vest® universal investment, but I am starting to cast with resin & wax mixtures. Am I still able to use Ultra-Vest® universal investment for this application?"

A: Depending on the project, you may not need to change your investment. Ultra-Vest® universal investment is great for smaller prototypes containing lower percentages of resin. For larger prototypes containing higher percentages of resin, we recommend using our Plasticast® investment.

Although we recommend using Plasticast® jewelry investment, Ultra-Vest is compatible in certain environments! See the flowchart to determine which investment is best for your project.



Participate in a Case Study

Has R&R's technical assistance made a lasting impact on your manufacturing process?
Did R&R go above and beyond to assist you?
Has R&R helped you make a minor product or process change?
Has R&R assisted your foundry in a complete system overhaul?
Want to share your thoughts with your fellow casters?

Participate in a case study to spread the word! Email our marketing team at marketing@ransom-randolph.com.

To read our case studies, visit www.ransom-randolph.com/case-studies

NEW PRODUCT ALERT: Multiflex™ Duplicating Material

R&R is proud to announce the launch of Multiflex™ duplicating material. Multiflex duplicating material is an economical duplicating hydrocolloid that is all-purpose, premium quality, and reversible. Multiflex duplicating material is aqua blue in color, designed to simplify visual mold inspection.

This all-purpose duplicating material is ideal for producing both refractory and dental stone models, as well as molds for the fabrication of partial and full dentures (utilizing the fluid resin pouring technique). Multiflex duplicating material can be used with stones, ethyl silicate investments, and phosphate investments.

Multiflex duplicating material is a fully reversible hydrocolloid, allowing the material to be reheated and reused up to 20 times. It works great with duplicating units, such as the Neycraft® duplicating unit. This product is user friendly with a low melting temperature, minimal hold time, and easy clean up.

Multiflex duplicating material is made in the USA. To ensure we are providing the highest quality products for our customers, each batch of Multiflex duplicating material manufactured goes to our quality control labs where every batch must meet R&R's required specifications before they are shipped. This provides customers with high quality product that provides consistent performance results.

Quick Links

Learn more: www.ransom-randolph.com/multiflex

Place an order: www.shop.ransom-randolph.com/multiflex-blue-2-gal-pail or contact an authorized distributor. For a list of authorized distributors near you, visit www.ransom-randolph.com/distributors or contact R&R customer service at 800.800.7496.

Multiflex™ is a trademark of Ransom & Randolph.

R&R Calendar of Events

APRIL 27

Great Debate: Additive Manufacturing vs. Casting vs. Forging
www.afsinc.org/tradeshows/metalcasting-congress-2023
Moderated by our own Eastern Sales Engineer, Vasko Popovski, during the Metalcasting Congress by the American Foundry Society.

MAY 7

EICF 30th Technical Conference & Expo
www.eicf2023.org/
Bregenz, Austria | May 7-9, 2023
Visit Bastian, Carel, & Stefan at booth #3!

MAY 12

LMT® LAB DAY® West Dental Expo
www.lmtmag.com/lmtlabday
Garden Grove, CA, USA | May 12-13, 2023
Visit Darin & Steve at booth #D-17!

MAY 14

Jewelry Technical Paper Presentation
www.thejewelrysymposium.com
Ralph Carter will be presenting his technical papers “Improving Performance of Jewelry Investment Powder” at the Jewelry Symposium.

MAY 29

Memorial Day
To remember and honor those who have fallen, R&R will be CLOSED for the holiday.

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

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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™