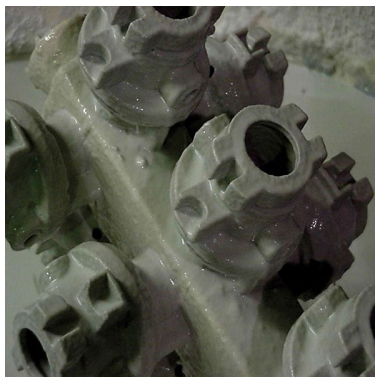




CASTING CONNECTION



The Importance of High-Performance Backup Slurries Worldwide



Creating a ceramic shell using R&R's Deluxcote® concentrate

Ceramic shell molds made with colloidal silica binders and aluminosilicate refractories are popular investment casting choices, primarily outside the USA. While both simple and economical, these basic slurry systems may not provide the performance and cost advantages that modern foundries require as they face increasing quality and productivity demands.

High performance slurry additives, like polymers and fibers, can significantly enhance shell properties and the overall casting process. These improvements translate to economic benefits applicable to foundries everywhere.

In an extensive study, researchers at Ransom & Randolph tested various backup slurry formulations containing polymers (P) and fibers (F) against a conventional colloidal/aluminosilicate control system at normal operating conditions in a production setting. The high-performance additive systems demonstrated substantial increases in green strength and fracture resistance compared to the control. This improved strength allowed for reducing the number of shell coats required, leading to lower material costs and faster production cycles.

"The enhanced green strength provided by the high-performance systems allows foundries to apply fewer shell coats while still achieving the necessary dewax strength," said Mike Hendricks, VP of Technology at Ransom & Randolph. "With coat reduction, less slurry material is required for each shell, potentially making it more cost-effective." ...read more on page 7...

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The Jewelry Symposium Sponsorship

R&R is proud to announce its sponsoring of The Jewelry Symposium!

The Jewelry Symposium will take place May 18-21, 2024 at the Detroit Marriott Troy in Detroit, MI.

Be sure to visit R&R's Research & Development Manager, Ralph Carter, at R&R's booth in the main foyer.

For more show information, visit www.thejewelrysymposium.com/2024-event-info



Dental Castings Defects - Finning



Finning presents as sharp metal fins that appear perpendicular to the surface of the casting and vary in severity. R&R recommends utilizing the following causes and solutions to guide you through any difficulties you may encounter with finning defects.

For more information on dental investment defects, read the Tech Tip: Dental Investment Defect Analysis Guide on the R&R Academy at www.ransom-randolph.com/technical-tips.

Cause	Solution
Too much model dip coating	Avoid pooling, shorten dip time
Pattern coat used too thick	Apply very thin coat
Mold overheated, cracked	Lower temperature/hold time
Burnout too fast	Check bench set time, burnout rate
Glaze and/or fines on top of ring not removed	Remove glaze/fines
Investment walls-to-ring too thin	Have more space between model and ring
Casting arm over wound	Use less winds
Vibration in casting arm	Tighten arm, check counter weight
Mold dropped	Have oven, casting machine closer
Used one liquid/powder ratio for model, another ratio for mold	Keep powder/liquid ratio mix the same

This information is intended to help you troubleshoot these problems. Should your issue persist, please contact our technical team at technical@ransom-randolph.com for additional assistance.

New Technical Paper

Four of R&R's technical experts, Mike Hendricks, Dave Berta, Bastian Schulte, and Carel Wegman, have written a new technical paper, *Slurry Formulations and the Impact they have on Drying Times & Cost*. Carel Wegman will be presenting the paper at the EICF 32nd International Conference & Expo in Napoli, Italy.

The presentation will be held on Monday, May 13, 2024 from 12:30-13:00 as track 2, session 3. For more information on the EICF 32nd International Conference & Expo, visit www.eicf2024.org/.

Read the abstract below:

"Drying of investment casting shells during dipping is a critical and necessary step in the process. The involved equipment (air conditioning, dehumidifiers, ventilators) consume energy. Reductions in dry time could certainly lead to process time savings but would also mean less energy consumption. To improve sustainability of the IC industry all factors influencing dry times would be of interest.

When drying shell coats, factors like humidity, airflow and, to a lesser extent, temperature have been considered. This

paper will take a different approach to drying and explore how the slurry formulation itself can impact the time required to dry ceramic shells during the shell building process. We will examine how slurry factors such as particle size, refractory content, binder content and other slurry components such as polymer and fiber impact drying of shell coats. This information may allow a foundry to make modifications to their slurry to reduce their dry time while at the same time reducing their energy consumption."

Meet the experts behind this paper:



Mike Hendricks
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EICF 32nd International Conference & Exhibition

Not only will Carel Wegman be presenting, but R&R will also be exhibiting at this ceramic shell casting event!

May 12-15, 2024

Città della Scienza
Napoli, Italy

Booth #25

Visit Carel Wegman, Bastian Schulte, and Stefan Frank

Get tickets [here](#).



Completion of Maumee Facility Expansion Project

On Tuesday, January 9, 2024, Ransom & Randolph (R&R) hosted a grand opening of their newly renovated Maumee, OH production facility. Chuck Klusmeyer (Facility Manager), Frank Dudek (employee of 37 years), Daniel Nixon (President), and Chad Hutson (Project Manager) had the honor of cutting the ribbon, officially opening the Maumee production facility located at 520 Illinois Avenue, Maumee, OH 43537.

In June 2023, R&R announced the 50% expansion of its Maumee, Ohio production facility, located at 520 Illinois Avenue, to accommodate the company's continued growth. Between the rapidly growing demand of innovative products such as ready-to-use slurries and engineered refractories in the investment casting industry and R&R's strategic acquisitions over the past several years, including the former Kerr solid mold and jewelry investments and

select Dentsply Sirona dental investments, R&R needed increased capacity to meet customer demand.

This was the fourth major renovation of the facility in 70 years. Starting in downtown Toledo, R&R has resided in Northwest Ohio for over 150 years manufacturing innovative products for industrial foundries, dental labs, art casters, and jewelry manufacturers. R&R has been housing manufacturing, warehousing, distribution, quality testing laboratories, and several offices since 1954. Products made at the Maumee production facility are shipped to over 50 countries worldwide.

Check out a complete time lapse of the construction of the expansion project on R&R's YouTube page at <https://youtu.be/mRbfgiYc3lo>.



Pictured L to R: Chuck Klusmeyer (Facility Manager), Frank Dudek (employee of 37 years), Daniel Nixon (President), and Chad Hutson (Project Manager)

TKG Industrial Ceramics Update

For over two decades, R&R has partnered with TKG Industrial Ceramics, formerly known as Schaefer Industrial Ceramics, to bring our customers state of the art ceramic pour cups and alumina crucibles.

In early 2023, TKG Industrial Ceramics began the installation of a new continuous kiln for its pouring cup manufacturing process. This was the final step of a multi-year upgrade of mixing and pressing capacity to meet growing demand, while improving product quality and consistency.

“The new kiln became fully operational last summer and the results have been far better than we ever anticipated,” owner Rich Kilgore remarks. “We have seen substantial reductions in dimensional variation as well as reduced scrap, reduced labor costs, and a safer work environment for our employees. This will help us to keep costs in check while producing a better pouring cup.”

In the event of an unexpected situation, TKG’s flexibility and extra capacity allow them to adjust production on the fly and

rapidly produce parts to keep customers operating. One of the benefits is the reduction in cycle times, offering the flexibility needed to meet customer needs. TKG is now able to press cups one afternoon and ship them the following morning in order to prevent customers from stopping their production.

Both R&R and TKG recognize that every customer is a repeat customer. It is necessary that we keep every customer supplied at all times. With new expansions from both R&R and TKG, we commit to providing our customers with superior product and excellent customer service.



Learn More

Alumina crucibles:
www.ransom-randolph.com/alumina-crucibles



Ceramic pour cups:
www.ransom-randolph.com/ceramic-pour-cups



TKG Industrial Ceramics:
www.tkg-ceramics.com/about-us

Jewelry Investment Q&A

- Q.** At times, I would like to lengthen or shorten the set time of the material I am investing. Do you have any suggestions?
- A.** In general, warmer water and/or warmer powder will speed up the setting time. Cold water and/or powder has the opposite effect.
- Q.** I've noticed that investments seem to heat up a bit while they are mixing. Why?
- A.** Gypsum is somewhat exothermic. The more material you mix, the warmer the mix will become. This is not a problem because the vacuum will cool the investment and you may even notice a cooler flask after the second vacuum step.
- Q.** How do I determine the pounds of investment needed for my flask?
- A.** Use the appropriate [flask calculator](#) for your investment, located in the [R&R Academy](#).
- Q.** Where can I find more frequently asked questions?
- A.** Under “[FAQs](#)” in the [R&R Academy](#).



Welcome to the Team, Katie Elco!

R&R is pleased to introduce Katie Elco as our new Product Development Engineer! Katie will be instrumental in research and testing done to develop cutting edge technology for the investment casting industry.

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

Contact Information

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Understanding R&R Lot Numbers



R&R provides lot number for all of its products. The lot number is composed of nine digits and can be found on every label. The first six digits represent the month, day, and year of manufacture (MMDDYY). The last three digits represent the manufacturing location and order during the given day.

In this example, this batch of Ultra-Vest BANDUST investment was manufactured on July 28, 2022

(072822) at our Maumee, OH facility. The lot number allows us to trace material back to the original testing results and raw materials.

New Shelf Life on Refractory Cement

As a result of R&R's dedication to continuous improvement, R&R is happy to announce that Shell Shield™ 101 refractory cement was extended.

Previously best for 6 months after manufacture, Shell Shield 101 refractory cement is now best for 12 months after the manufactured date.

To learn more about ShellShield refractory cements, visit www.ransom-randolph.com/shellshield.



The Importance of High-Performance Backup Slurries Worldwide (cont.)

Table: Economic Impact of Shell Systems *

	# of Coats Reduced	Thickness	Slurry Cost (USD)	Cost per Shell (USD)
Control	0	7.37	1.00	1.00
P1	2	4.58	1.26	0.783
P1F1	2	5.31	1.18	0.850
P1F2	2	5.61	1.18	0.899
P2	2	4.28	1.56	0.906
P2F1	2	4.72	1.31	0.839
P2F2	2	5.08	1.35	0.931
F1	0	8.18	1.02	1.132

*Coat reduction potential can vary from foundry to foundry and each foundry needs to determine their process. The data presented in this table is an example only for comparative and illustrative purposes of the potential economic impact of adding polymer and fibers to the backup slurry.

While the upfront slurry costs are higher for the additive-enhanced systems, the economic benefits of reduced material consumption, shorter labor hours, faster throughput, fewer shell cracks and repairs, and quicker knockout can outweigh purchase cost. Lighter-weight shells also facilitate easier handling.

Polymers contribute elasticity and toughness for increased shell strength and ductility during dewax. Fibers modify rheology to build a more robust, thicker shell that resists cracking. When combined, the polymer-fiber systems exhibited green modulus of rupture over three times higher than the control system.

"Foundries globally are under pressure to enhance quality while reducing costs and lead times," noted Michael Hendricks, Ransom & Randolph Vice President of Technology. "Adopting new slurry technologies like polymer-enhanced backup systems can provide a competitive advantage through better castings and more efficient production."

As foundries seek an edge through optimized shell technology, polymer and fiber additives offer a compelling solution to elevate their casting operations.

To download more data from the study conducted, click [here](#).

Click [here](#) to contact our technical team to discuss what a polymer/fiber enhanced system can do for you.



Learn More About Slurry Additives

This article was inspired by R&R's technical paper, *The Impact of High Performance Additives to Slurries with Aluminosilicate Refractories Technical and Economic Effects* written by Mike Hendricks, VP of Technology.

For more data on this topic, download this paper by clicking [here](#).

Read more papers written by the R&R technical experts by clicking [here](#).



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Calendar of Events - Quarter 2

APRIL 4-6, 2024

DLAT/ORG Conference & Expo
Dental Exhibition | Dallas, TX
Visit Mark Ries at booth #52!
Learn more [here](#).

MAY 9, 2024

Ascension Day
R&R GmbH will be CLOSED for the holiday.
R&R (US) will remain open.

MAY 12-15, 2024

EICF International Expo
Ceramic Shell Exhibition | Napoli, Italy
Visit Carel Wegman, Bastian Schulte,
and Stefan Frank at booth #25!
Learn more [here](#).

MAY 17-18, 2024

LMT® LAB DAY® West
Dental Show | Garden Grove, CA
Visit Steve Jonas & Darin Wise at booth
#D-17 in the Grand Exhibition Hall!
Learn more [here](#).

MAY 18-21, 2024

The Jewelry Symposium
Jewelry Conference | Detroit, MI
Visit Ralph Carter at R&R's booth,
located in the Main Hall!
Learn more [here](#).

MAY 20, 2024

Whit Monday
R&R GmbH will be CLOSED for the holiday.
R&R (US) will remain open.

MAY 27, 2024

Memorial Day
R&R (US) will be CLOSED for the holiday.
R&R GmbH will remain open.

STAY UP TO DATE!

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

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. Ransom & Randolph GmbH, based in Rötha, Germany, provides service for the European Union and United Kingdom. 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™

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