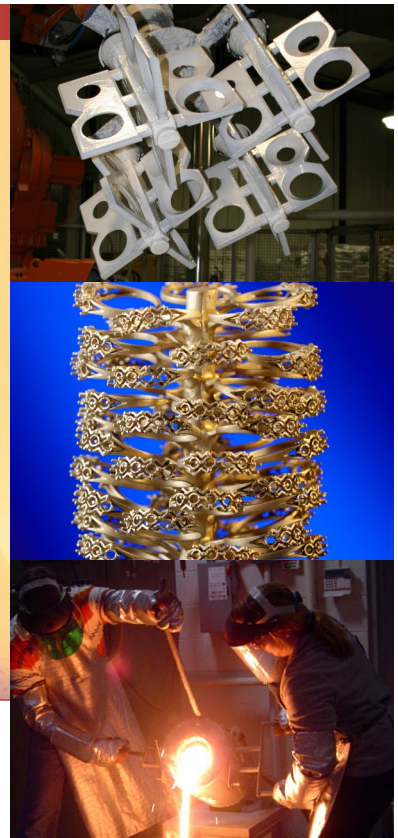




# CASTING CONNECTION



## Tech Tip: Purified Water for Slurries

### TECH TIPS



A colloidal silica binder is produced by suspending micro-fine silica particles in water to form an aqueous mixture. Each silica particle is surrounded by ions to create a negative charge on the surface. The charge around each particle maintains particle separation by repelling one another. For binder stability, it is important to sustain this negative charge and concentration of particles.

By introducing unwanted ions, this protective charge will be reduced. Once the charges are reduced sufficiently,

the silica particles will no longer repel each other and will instead start to agglomerate. This will reduce the surface area and number of particles available for bonding. Shells made from this slurry would have lower strength, resulting in performance issues, such as cracking, spalling, or bulging, etc.



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## Testing Conductivity

Conductivity is the measure of water's capability to pass an electrical flow. This ability is directly related to the concentration of ions in the water. The electrical conductivity value of a component is expressed in siemens per meter. Purified water is not a good conductor of electricity and therefore, conductivity results will be low.

The acceptable conductivity limit for deionized water in a shell room is <5  $\mu\text{S}\cdot\text{cm}$  (micro or 10<sup>-6</sup> Siemens).

The Hannah Instruments HI98308 Pure Water Tester is an affordable conductivity tester for deionized water



- Calibration of HI98308:
1. Submerge meter in HI7033L 84  $\mu\text{S}\cdot\text{cm}$  buffer solution
  2. Measure temperature of buffer solution.
  3. Adjust dial on side until the specified conductivity at set temperature is displayed
  4. Tester is now ready to analyze a water sample

## Tech Tip: Purified Water for Slurries

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Tap water contains many different minerals (ions) including Hydrogen carbonate ( $\text{HCO}_3^-$ ), Chloride ( $\text{Cl}^-$ ), Sulfate ( $\text{SO}_4^{2-}$ ), Nitrate ( $\text{NO}_3^-$ ), Sodium ( $\text{Na}^+$ ), Potassium ( $\text{K}^+$ ), Calcium ( $\text{Ca}_2^+$ ), and Magnesium ( $\text{Mg}_2^+$ ). Although treated according to strict local regulations, tap water often contains these ions at different levels at any given time, especially when microorganisms are a concern from poor housekeeping.

Microorganisms (i.e., bacteria, fungi, algae) have a detrimental effect on colloidal stability. They secrete a low pH substance during metabolism. Therefore, any contamination by microorganisms should be prevented.

To prevent agglomeration, best practice is to use deionized water in your slurry. There are a variety of options for water purification, some of which are noted below.

### Water Purification Processes

Purification Method	Description	Benefit	Drawback
Distillation	Water is purified by cooking and re-condensation, removing all minerals and essentially all organic contaminants (i.e., bacteria, viruses, etc.)	<ul style="list-style-type: none"> <li>• Ultra-pure water</li> <li>• No microorganisms present</li> </ul>	<ul style="list-style-type: none"> <li>• Energy consuming on a large scale</li> <li>• Time consuming on a large scale</li> </ul>
Deionization	An ion exchange resin replaces all + ions with hydrogen ions and all - ions with hydroxide ions, making water. After a large portion of the ions are removed, this water is practically identical to distilled water, except microorganisms are not removed	<ul style="list-style-type: none"> <li>• Pure water</li> <li>• Least energy consuming</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of microorganisms in water</li> </ul>
Reverse Osmosis	Water is forced through an ultra-fine particle filter, removing anything bigger than a water molecule, including organic substances (i.e., bacteria, etc.), but ions are removed to a lesser extent as some are similar or smaller in size to a water molecule	<ul style="list-style-type: none"> <li>• Removes microorganisms and large ions</li> </ul>	<ul style="list-style-type: none"> <li>• Residue of small ions</li> <li>• Energy consuming</li> <li>• Failing filters</li> </ul>
UV-Disinfection	Bacteria and viruses are exposed to the wavelengths of UV light, which causes an effective inactivation of microorganisms through a physical process, making them incapable of reproducing and infecting	<ul style="list-style-type: none"> <li>• Eliminates infection by microorganisms</li> <li>• Cheap and easy to install</li> </ul>	<ul style="list-style-type: none"> <li>• No removal of minerals/ions</li> </ul>

Although technically a good solution, a water distillatory is not often the preferred method to purify water due to its process complexity and energy consumption.

Ideally, a combination of an ion exchanger and reverse osmosis is used, but this also comes with excessive costs. The preferred choice is typically deionization by an ion-exchange resin. In this case, precautions must be taken to prevent the possible presence of microbiological organisms. Once the water is produced, the

quality of the purified water should be guarded. A simple conductivity test can be implemented in any shell room.

Many foundries choose to outsource the production of deionized water. In this case, it is important to check the following with the manufacturer: method of deionization, maximum allowable conductivity levels, quality control, packaging material, opaque containers, and method of cleaning and disinfection.

For more tech tips, visit the [R&R Academy: Tech Tips](#)

# Massad® Trays are Back!



DenPlant™  
Tray



Overdenture  
Tray



Edentulous  
Tray

"I am pleased to bring my revolutionary impression trays back to the market and announce my partnership with Ransom & Randolph. My trays are a perfect fit with R&R's existing dental line. As one of the oldest dental suppliers and a global leader in dental stones and model making, teaming up with R&R just made sense.

We coupled the Massad tray system, including my new Overdenture tray, with R&R's FiberStone™ resin die stone to create models for a variety of cases, including implant analogs, edentulous models, and small teeth fragment models. Our results have been excellent, with exceptional strength, detail, and scanning ability. I highly recommend FiberStone resin die stone! Plus, finding my trays is now easier than ever with R&R's distribution partners, global logistics, and e-commerce options."

- Dr. Joseph J. Massad, DDS



## New Product Alert!

Flex-Form™ resin patterns & Flex tack™ solution!

Flex-Form resin patterns are a proprietary blend of plastic and wax available in a variety of pre-made shapes that provide excellent burnout capabilities for optimal castings.

There are 20 different patterns to choose from.

These resin patterns perform best when paired with Flex tack solution for optimal results.

Flex tack solution is an adhesive liquid formulated to increase adhesion between plastic patterns and models.



## 150th Anniversary Celebration: Social Media Contests

- Print and cut out R&R and take a photo of them in your foundry/lab/office/etc.
- Post it to Facebook or LinkedIn with #RR150years and tag us
- Get entered into a quarterly drawing for a \$150 Amazon gift card

Printable flat of Ransom & Randolph are available on the website!



Remember: Please, no inappropriate pictures. Ransom & Randolph are gentlemen!



- Take a selfie with the R&R cutouts at a tradeshow or event
- Post it to Facebook or LinkedIn with #RR150years and tag us
- Get entered into a quarterly drawing for a \$150 Amazon gift card



# FAQ

## Glass Casting FAQ

### QUESTION

“Will fibers improve the strength of my mold? Will they affect the surface of the glass?”

### ANSWER

Similar to the way rebar improves the strength of concrete, fiber glass can improve the strength of a mold. While the investment is fluid, plaster flows around the fibers, shielding them from the pattern itself. The end result is a plaster barrier between any fibers and the casting. This barrier keeps the surface of the glass from being affected.

For more FAQs, [click here](#)

Have a different question? Our tech team can help! Email us at [technical@ransom-randolph.com](mailto:technical@ransom-randolph.com) or call at 800-800-7496 (US)

## Product Testing

At Ransom & Randolph every single batch that we make is tested to quality specification prior to shipping it out to the customer. This ensures customers receive consistent material every time product leaves our doors.



Lab technicians Kristian Horne (left) & Ben Skeels (right) testing batches for quality.

Before you get your product, that specific batch was tested by one of our lab technicians to ensure the best quality. The lot number found on the front of the product packaging refers to the batch made. This number allows us to reference the details from that specific batch. These details include: production time, date, personnel, raw materials used; and the testing results.

We do this testing to ensure the highest quality for customer satisfaction. Our goal is to provide innovative, high-quality products and exceptional technical service and customer support. We hold ourselves and each other, as individuals and as an organization, accountable for our results, so we test to ensure the result is something both R&R and the customer can depend on.

## Save the Date: LMT Lab Day East

**When:** October 1, 2022

**Where:** Tarrytown, NY

**Venue:** Westchester Marriott

Stop by to see Scott Todd & Chris Matej at booth B5!



[Click here](#) to learn more.

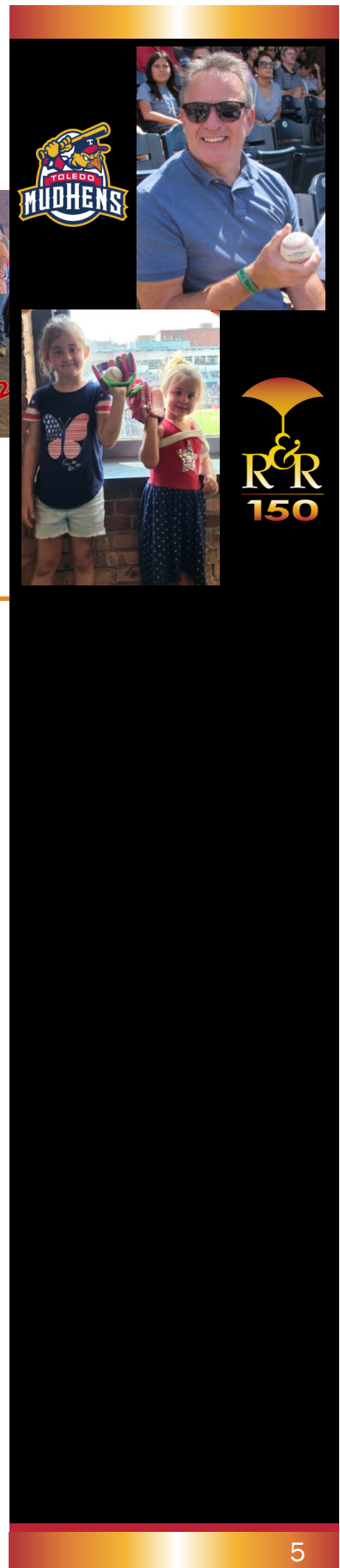
# Family Day at the Toledo Mud Hens

We had so much fun celebrating our 150th Anniversary with our families at a Toledo Mud Hen's baseball game! Our festivities included a thoughtful speech by president Dan Nixon, honoring several milestone service anniversaries, a buffet dinner, novelty ice cream, an R&R goodie bag, selfies with Ransom & Randolph, and a lot of fun!



Our Global Sales Director, Scott Todd, caught a foul ball! Scott gave the baseball to another employee's daughters, making their day.

Everyone had a blast!



## Understanding R&R Lot Numbers

The R&R Lot Number is found on every label. It is composed of nine digits. 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, the product was made 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.



## Welcome to the Team!



Doug Smalley

Doug Smalley is Ransom & Randolph's Materials Manager and he is responsible for keeping the plant supplied with raw material.

Before joining R&R, Doug served five years in the Air Force before spending over 20 years in the automotive industry. He is experienced in production, scheduling, lean manufacturing, ERP system integration, packaging, prototype, product launch, and other supply chain management roles.

Doug enjoys hockey and volunteers as an assistant coach for St. Francis High School in Toledo, OH. He also spends his free time backpacking. His latest trip was 3 days in the Great Smokey Mountains. He hopes to one day hike the Appalachian trail.

His favorite part about R&R is the family atmosphere and the willingness of the plant and office teams to support cost reduction initiatives and provide honest and thoughtful feedback.



Chad Hutson

Chad Hutson is our Continuous Improvement Manager. Chad investigates cost savings and efficiency improvements on current and future operations.

Previously, Chad worked in Pharmaceutical Manufacturing leadership. He joined R&R for new growth opportunities and he feels he can be a valuable resource here. Chad possesses a Lean Six Sigma Blackbelt that facilitates in his day-to-day activities.

Off the clock, Chad enjoys golfing and fishing. One of his favorite things to do is to spend time with his two boys watching them participate in their various sporting activities.

Chad's favorite part about R&R is the entrepreneurial aspect that we embrace.

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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™*