

CASTING CONNECTION

• Your Link to Investment Casting News from Ransom & Randolph •

SEPT 2018

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Exclude Inclusions



Inclusions present as missing areas of metal in the casting; appearing as small, round, irregular or angular craters, depressions or cavities of various sizes.

This defect indicates that something is present in the mold cavity or the metal that prevents the casting from fully filling to the shell.

The causes of this defect can be traced to multiple parts of the process, including wax, shell and casting. To cure these

causes, R&R recommends taking the following actions.

Wax Causes & Cures

Cause 1: Ash in wax.
Cure 1: Use lower ash wax, improve burnout.

Cause 2: Poor wax assembly – undercuts. When patterns are attached to the sprue and the connection is not completely filled or contains undercuts, these undercuts fill with slurry. When the shell is dewaxed, this ceramic extends into the shell cavity and can be dislodged when metal is poured, resulting in a ceramic inclusion.
Cure 2: Wax assemblies should include gates with smooth radii, allowing for easy metal flow.

Shell Causes & Cures

Cause 1: Cracks in mold.
Cure 1: See shell cures for finning (www.ransom-randolph.com/finning).

Cause 2: Shell formed pour cups, jagged rim.
Cure 2: Use a ceramic pour cup or ensure an even top cut.

Cause 3: Invested pour cup is brittle, jagged and/or fragile. As a result, the invested pour cup is breaking when the metal is being poured, becoming entrapped as inclusions.

Cure 3: Use preformed ceramic cups.

Cause 4: The primary coat layer is spalling.

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Visit Us at ICI 2018

The Investment Casting Institute (ICI) is hosting the 65th Technical Conference & Product/Literature Expo in Kansas City, MO from October 21-24, 2018.

Visit us at the Expo (Oct. 22-23) in booth 407 to discuss your casting goals and how we can help you

achieve those goals.

Joining us are PKI and CTM. Come learn more about PKI shell room, dewax, burnout and preheat equipment, and CTM wax injection equipment.

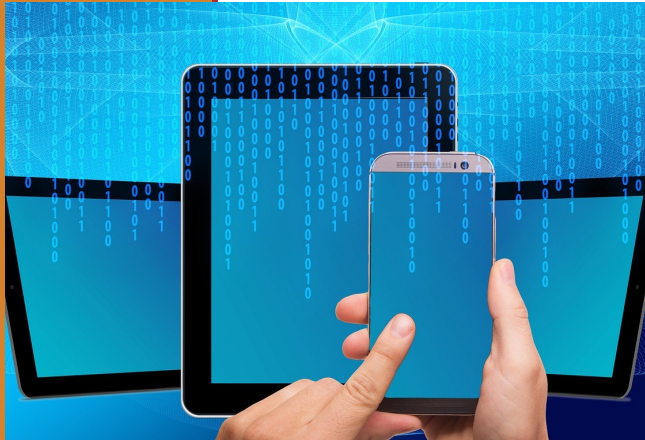
We look forward to seeing you at the show!



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We wanna get digital.
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At R&R, staying connected with you is very important to us. And if we can save a few trees in the process, even better!

Starting in January 2019, instead of sending Casting Connection out door-to-door, it will go out

exclusively server-to-screen. You will be able to enjoy the same great articles on your desktop, laptop, tablet or smartphone.

Don't miss out on future issues! To stay in the loop, please make sure you are on our email list and subscribe today at: www.ransom-randolph.com/newsletters



Dan Nixon
Vice President,
Business Unit
Manager

Nixon Returns to R&R Roots

R&R is pleased to announce Dan Nixon's return and appointment as VP, Business Unit Manager.

Dan brings a strong background to R&R as he started his tenure with us in 2000 as a Marketing Specialist. Throughout his 12 years with R&R, Dan assumed roles of increasing responsibility including Sales Manager and

Business Unit Director - Jewelry/Solid Mold. In 2012, Dan accepted a position at our corporate office, where he became a Regional Sales Manager for the Dentsply Sirona North America sales team. He most recently held the role of Corporate Director, E-Business, where he was responsible for supporting the implementation and

ongoing enhancement of Dentsply Sirona's global web presence and e-commerce channel.

Dan is a graduate of The University of Toledo, where he earned his Bachelor's degree in Business, as well as his MBA.

Please join us in welcoming Dan back to the R&R team!



Mike Hendricks
Applications
Engineering Director

Hendricks Heads Up Technical

After six years of successfully leading R&R, Mike Hendricks has decided to move into the Applications Engineering Director position, resuming his previous technology role. Providing exceptional technical

support is a top priority for R&R and Mike's expertise will prove invaluable to customers.

Mike joined R&R in 1988. Since that time, he has held a number of key roles in the business, some of which

include Operations Director and Business Unit Director. Mike holds a Chemical Engineering degree from the University of Dayton.

Please join us in congratulating Mike!

2019 Capital Planning

Planning your capital expenditures for 2019? Let the experts at R&R help! We offer a complete line of shell room, dewax, burnout and preheat equipment to meet your needs. Learn more at www.ransom-randolph.com/equipment. To request a quote, email: RR-Marketing@dentsply.com today!



Slurry Mixers

Knockout Machines

Barrel Rain Sanders

FlashFire Dewax Systems

Burnout Furnaces

Ask Our Jewelry Expert

Q: If I alter the amount of Platinum binder being added to Platinum investment, will the mold strength be altered?

A: Yes. If you reduce the amount of binder in a mix, you will create a stronger mold.

The mold will dry faster, but the working time will not be affected.

Remember that a stronger mold is harder to clean from the castings!



Have a question?

Ask our jewelry expert!

Mike.Stover@dentsply.com

For more jewelry FAQs, visit: www.ransom-randolph.com/jewelry-faqs

PKI Kiln Korner

Pacific Kiln Moves to New Control System for New Generation Furnace Lines

PKI has moved from the traditional plug-and-play PID type temperature controllers for process temperature control to PLC/HMI touch screen control on all New Generation Pre-heat, Burnout, FlashFire, Pusher, Car

Bottom, Rotary, Shuttle car and custom furnaces.

This opens up many more possibilities and performance enhancements to the furnace line. Such standard features as: Built in Trend viewing and Archiving, Unlimited temperature Ramp/Soak Recipe storage and retrieval, Monitoring and control

of all combustion parameters, Oxygen level and control, Data collection and storage, and many, many more improved functions.



Source: PKI, Degrees° Newsletter, June 2018, Vol. 20 No. 2

Managing Freezable Shipments

During winter months, freezable materials, like colloidal silica based binders, should be shipped as early as possible in the week to ensure that they are continuously moving to their destination. While this does not guarantee product will not freeze, it reduces the risk associated with shipping over a weekend where product may sit at a freight facility unprotected from freezing temperatures.

To help you ensure that the product you receive has not been damaged, R&R applies a freeze check indicator, which features a check mark in a green circle. Temperature-sensitive liquid is encased in a clear bubble over the check mark. The fluid will turn opaque and the check mark

is no longer visible once it has been exposed to subfreezing temperatures.



Note: This does NOT mean that the material in the package has been frozen; it only means the package has been exposed to freezing temperature.

If this occurs, immediately:

1. Make a notation on your carrier delivery receipt prior to the carrier leaving your facility: **“POSSIBLE CONCEALED DAMAGE – PRODUCT HAS BEEN**

EXPOSED TO FREEZING TEMPERATURES”

Always accept a damaged shipment unless the damage has made the goods worthless. In cases of partial damage or loss, accept the entire shipment, document the loss/damage on the carrier receipt and follow the instructions on [How to Handle Lost or Damaged Shipments](#).

2. If able, test the specific gravity of the material as soon as possible. Material may be used if it falls within the limits noted below. If you are unable to test specific gravity, contact R&R customer service to have a freeze test kit sent to you.

	Specific Gravity Acceptable Limit		Specific Gravity Acceptable Limit		Specific Gravity Acceptable Limit
Core-Hardener 2000™ binder	1.390-1.410	Keycote® binder	1.197-1.214	Plasticast® PT binder	1.385-1.407
Customcote® binder	1.145-1.155	Kwik-Core™ binder	1.108-1.112	Primcote® binder	1.177-1.183
EHT binder	1.322-1.328	Levasil® colloidal silica	1.200-1.230	Primcote® PLUS binder	1.173-1.179
Fascote® binder	1.146-1.152	Matrixsol® 30 colloidal silica	1.200-1.230		

R&R 2018 Holiday Schedule

Please consider these closing dates when planning for your material needs.

Contact R&R at 800.800.7496 if you have any questions regarding this schedule.

CLOSED for Thanksgiving

Thursday November 22 & Friday November 23

CLOSED for Christmas

Monday December 24 & Tuesday December 25

OPEN to take orders & ship materials

Wednesday December 26 & Thursday December 27

Hours of operation

Customer Service & Shipping from Ohio: 10AM-3PM EST

CLOSED for New Year's

Friday December 28, Monday December 31 & Tuesday January 1

REOPEN for the 2019 New Year

Wednesday January 2 at 8AM EST

Ask Our Ceramic Shell Expert



Have a question?
Ask our ceramic
shell expert!

Dave.Berta@dentsply.com

Q: What are the advantages of using either fused silica or aluminosilicates as a backup refractory in my shell?

A: Fused silica has a low density (about 2.2 g/ml) and pound for pound will go a longer

way. Shells made with fused silica are lighter. Fused silica is very rigid at casting temperatures and is not prone to shell bulging during casting. Fused silica is also much easier to knock out as it goes through a volume/phase transformation during the casting process.

The primary advantage of using aluminosilicates is that it is very abundant and is more economical than fused silica.

For more ceramic shell FAQs, visit: www.ransom-randolph.com/ceramic-shell-faqs

Exclude Inclusions



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Cure 4: See options under scabbing/delamination (www.ransom-randolph.com/scabbing-delamination).

Cause 5: Inadequately dried shells.

Cure 5: Verify that the shell is dry before applying additional layers. If necessary, add appropriate equipment or cycle time to ensure the shell is dry between coats.

Cause 6: Out of control slurry.

Cure 6: Check binder solids.

Cause 1: Poor deslagging.

Cure 1: Determine proper method and control.

Cause 2: Dirty revert metal.

Cure 2: Clean shell material from revert metal.

Other Causes & Cures

Cause 1: Housekeeping.

Cure 1: Cover molds after dewax and use a filter.

Cause 2: Molds are being fired with the cup upright, entrapping dust or ash from residual wax residue.

Cure 2: Fire molds with the cup facing down. This eliminates the potential for foreign material to enter the mold cavity and become a metal inclusion later in the process.

Cause 3: Dust particles

are trapped in the shell cavity.

Cure 3: If a double-firing cycle (firing/preheating) is occurring, blow the molds out prior to preheat. Consider covering the molds after firing to prevent foreign material from entering the mold cavity. Cleaning the top of the ladle or furnace prior to pouring metal may also eliminate the opportunity to introduce foreign material into the shell.

Struggling with defects in your foundry? R&R can help! Contact our ceramic shell technical department:

Mike Hendricks
Applications Engineering
Director
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Dave Berta
Product & Application
Specialist
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Jewelry Inclusions

Potential causes of jewelry inclusions, or foreign particles, in castings include:

- Patterns were improperly sprued to the wax base or tree, or not filleted; causing investment to break at sharp corners during casting.
- Flask was not sufficiently cured before placing into the burnout oven.
- Improper dewaxing cycle was used.
- Flask was not cleaned from prior cast.
- Loose investment in sprue hole.
- Molten metal contains excess flux or foreign oxides.
- Crucible disintegrating or poorly fluxed.
- Improperly dried graphite

crucible.

- Investment was not mixed properly or long enough.
- Contaminants in the wax pattern.
- Flask was not held at a low burnout temperature long enough.
- Flask was placed too close to the heat source in the burnout oven.

Struggling with inclusions or other jewelry casting defects? Contact our jewelry expert!

Mike Stover
 419.794.1239
Mike.Stover@dentsply.com

For more potential causes of jewelry casting defects, visit: www.ransom-randolph.com/jewelry-technical-tips

Safety Milestone

At R&R, we are committed to safety and are proud to announce we achieved zero recordables in 2017!

We were honored to receive the following awards for this accomplishment: *Achievement Award* and *100% Award*

We were recognized locally by the Ohio Bureau of Workers' Compensation, presented by the Safety Council of Northwest Ohio, and state-wide by The State of Ohio House of Representatives.

Learn more at: www.ransom-randolph.com/manufacturing-logistics