



Foundry Education Updates - The ICI Academy

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ICI Director & Education Committee Chairperson

October 22, 2024

Presentation Outline



- **Statement of Purpose / Problem Statement**
- **ICI Academy**
 - **Training**
 - **Timeline**
 - **Knowledge Center**
- **Other Educational / Technical Member Offerings**

Statement of Purpose / Problem Statement



- The need for training has always existed, and often done in a “learn while you earn” environment
 - The ICI has long recognized its responsibility to the industry in supporting the education of its leaders, supervisors and workforce
- Existing ICI live training and educational events
 - Investment Casting Specialist Certification course
 - Process Control Seminar
 - Technical Conference
 - Business & Leadership Development Conference
 - Advanced Manufacturing for Investment Casting
 - Monthly Webinar Series
 - Regional Meetings
- All of these programs take the trainee out of the foundry for 1-9 days

Introducing the ICI Academy



- There is a need for workforce training that can be done at home or on site
- The ICI Education Committee has been developing web-based training modules to address this need
- Developed by industry subject matter experts, each module takes 30 minutes or less to complete
- Modules composition
 - Training video
 - Short quiz
- Training is free of charge and is an ICI Member Benefit

Getting Started



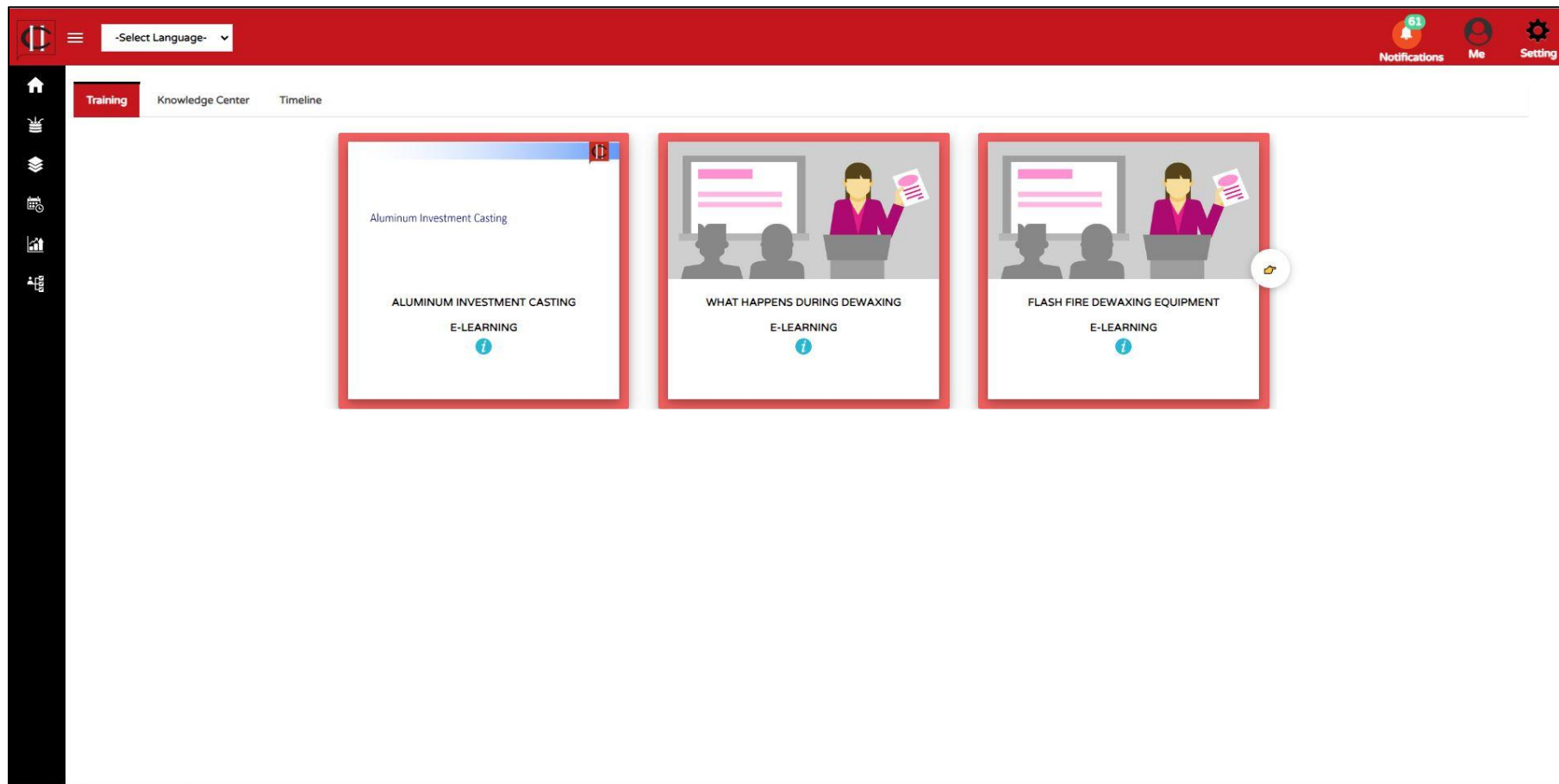
- Students must be assigned a unique username and password
 - Nora D'Ambra, ICI Business Administrator, is the point person to set up accounts

A screenshot of a login form on a dark red background. The form is a lighter red rectangle with a rounded border. At the top center of the form is the ICI logo. Below the logo, the word 'Username' is followed by a text input field containing the placeholder text 'username'. Below that, the word 'Password' is followed by a text input field containing the placeholder text 'password'. Under the password field is a checkbox labeled 'Remember me'. Below the checkbox is a red button with the text 'Login'. At the bottom of the form is a link that says 'Forgot password'.

Training Landing Page



- Once logged into the ICI Academy, the trainee is placed on the Training Landing Page, where a choice of training module can be made



Controls



61

Me

TrainingKnowledge CenterTimeline

Aluminum Investment Casting

ALUMINUM INVESTMENT CASTING

E-LEARNING

WHAT HAPPENS DURING DEWAXING

E-LEARNING

FLASH FIRE DEWAXING EQUIPMENT

E-LEARNING

Click tile to select training module

Click pointer to access other modules

Once a module is selected, the video can be opened



The screenshot shows a web application interface for a training module. At the top, there is a red header bar with a logo, a language selection dropdown, and icons for notifications (61), user profile, and settings. Below the header, a navigation bar contains 'Training', 'Knowledge Center', and 'Timeline' tabs. The main content area is titled 'Aluminum Investment Casting' and includes a 'Back' button. A red button labeled 'Aluminum Investment Casting' is visible. Below this, a red banner displays the module title, and a 'Take Quiz' button is located in the top right corner of the content area. A green message states: 'Take quiz after you have viewed all the content'. A video player is shown with a progress bar at 0% and a timer at 00:00:00/00:00:00. Two blue callout boxes provide instructions: one points to the video tile with the text 'Click tile to open video', and the other points to the 'Take Quiz' button with the text '“Take Quiz” button is greyed out until video is completely viewed'.

Click tile to open video

“Take Quiz” button is greyed out until video is completely viewed

The video uses standard controls



The screenshot shows a video player interface within a training module. The video title is "Aluminum Investment Casting". The player includes a progress bar, a play button, a volume icon, a full screen icon, and a playback speed icon. A "Close" button is located at the bottom right of the video player. The background shows a sidebar with navigation options like "Training", "Knowledge Center", and "Timeline".

Play

Slider Bar

Volume

Full Screen

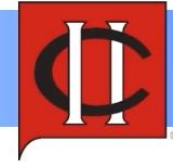
Playback Speed

If the trainee has to leave in the middle of the video, when they return, the video will pick up where they left off

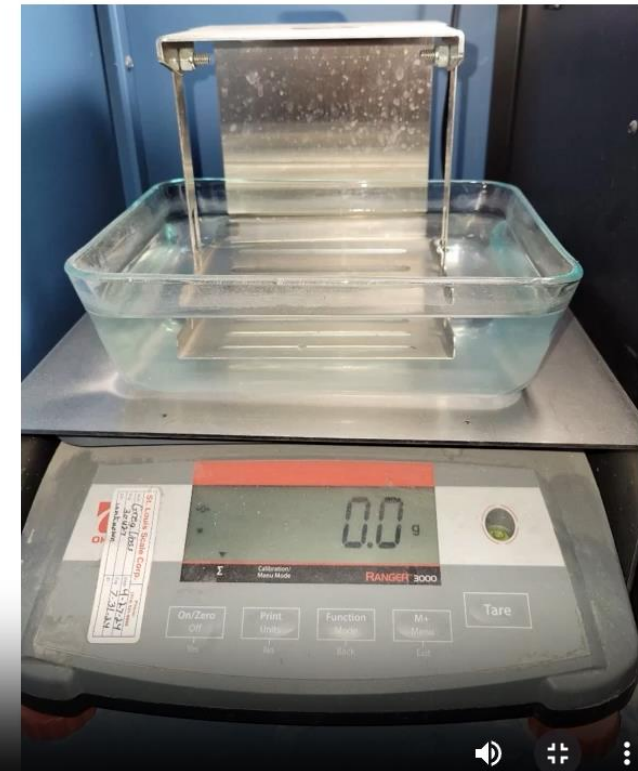
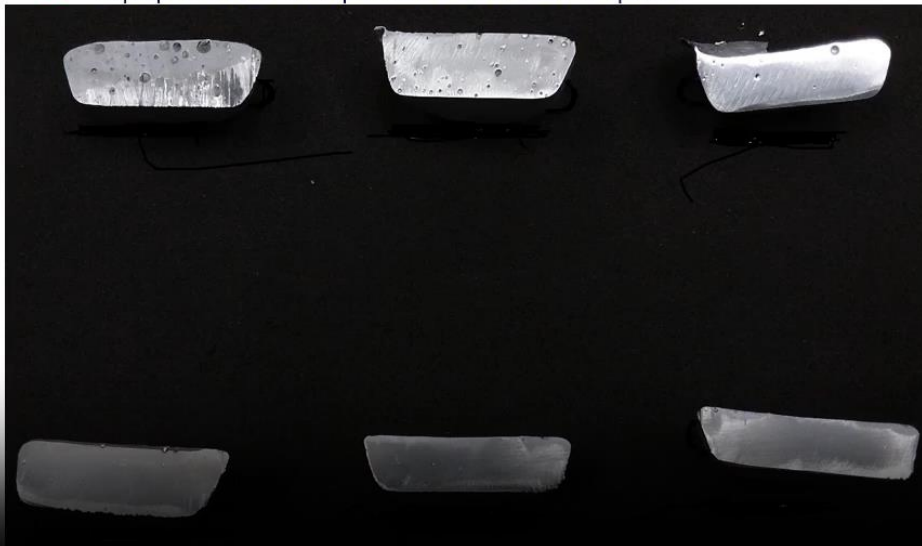
Close



Melt Treatment - Gas Measurement Testing



- Reduced Pressure Testing (RPT)
 - Sample is solidified under partial vacuum
 - Sample surface can be polished and observed - qualitative
 - Sample density can be compared to theoretical density – quantitative
 - Good measure of the combination of hydrogen and inclusions
 - Equipment is inexpensive and test is quick.



Once the video is complete the quiz becomes available



A screenshot of a web-based training interface. The top navigation bar is red and contains a language selector, a notifications bell with '61' alerts, and user profile icons for 'Me' and 'Setting'. The main content area has a sidebar with icons for home, list, stack, document, and chart. The main panel shows a 'Training' tab selected, with sub-tabs for 'Knowledge Center' and 'Timeline'. A 'Back' link is visible. Below, a red box highlights 'Aluminum Investment Casting'. A large red banner at the bottom of this section also says 'Aluminum Investment Casting' and features a red 'Take Quiz' button on the right. A green message states 'Take quiz after you have viewed all the content'. On the left, a video player shows a thumbnail for 'Aluminum Investment Casting' with a green progress bar at '100%' and the word 'Completed' below it. A blue callout box with a black border points to the 'Take Quiz' button, containing the text: "Take Quiz" button has turned red, indicating that it can be selected.

All quizzes are multiple choice



Subject Name -Aluminum Investment Casting

Question 1 of 11

1. Which quality issue(s) occur most frequently in aluminum castings?

- ☐ A Mold handling damage
- ☐ B Gas porosity and oxide bi-films
- ☐ C Lack of fill
- ☐ D Recrystallized and misoriented grains

Selecting a wrong answer goes back to the training content



Subject Name -Aluminum Investment Casting

Question 1 of 11

1. Which quality issue(s) occur most frequently in aluminum castings?

A

Mold handling damage

B

Gas porosity and oxide bi-films

C

Lack of fill

D

Recrystallized and misoriented grains

The trainee can review the associated material...



You answered incorrectly. Please review the following content and correct your answer

Aluminum Investment Casting



- Aluminum investment casting is not a complex process but can be tricky. Care must be taken during melt preparation, casting and solidification to avoid creating quality issues.
- Quality issues that arise most frequently in aluminum casting are
 - Gas Porosity
 - Oxide inclusions/Bi-films
- In this module, we will discuss the cause of quality issues and best practices to avoid them.

...and select the correct answer to the question



Subject Name -Aluminum Investment Casting

Question 1 of 11

1. Which quality issue(s) occur most frequently in aluminum castings?

A

Mold handling damage

B

Gas porosity and oxide bi-films

C

Lack of fill

D

Recrystallized and misoriented grains

Once complete, the trainee can exit the module



Congratulations Joseph,
You have successfully completed the Aluminum Investment Casting Training offered by the
Investment Casting Institute.

Close

Training Module Offering as of October 2024



- **ICI Academy offering**
 - **Aluminum Investment Casting**
 - **What Happens During Dewax**
 - **Flash Fire Dewaxing Equipment**
 - **Dewax Testing**

- **More modules are currently under development**
 - **Wax**
 - **Shell**
 - **Firing and Melting**
 - **Foundry**

ICI Academy – Other Features



- The ICI Academy offers other features
 - Knowledge Center
 - Timeline
- Let's take a look at the Timeline feature first, as it relates closely to Training
- Timeline
 - Tracks ICI Academy use
 - Retains Certificates of Completion for trainees
 - Certificates may be downloaded and printed

Other ICI Academy Feature: The Timeline



The screenshot displays the ICI Academy interface. At the top, a red header bar contains the ICI logo, a language selection dropdown, and icons for Notifications (61), Me, and Setting. Below the header, a navigation bar shows 'Training' (selected), 'Knowledge Center', and 'Timeline'. A blue callout box with the text 'Select Timeline' has an arrow pointing to the 'Timeline' tab. The main content area displays three e-learning modules, each with a red border and a white background:

- Aluminum Investment Casting**
ALUMINUM INVESTMENT CASTING
E-LEARNING
- WHAT HAPPENS DURING DEWAXING**
E-LEARNING
- FLASH FIRE DEWAXING EQUIPMENT**
E-LEARNING

Each module includes an illustration of a person presenting to an audience and a small blue information icon at the bottom.

The Timeline lists all completed modules



The screenshot displays the 'Timeline' section of a learning management system. The top navigation bar includes a logo, a language selector, and links for Notifications (61), Me, and Setting. The left sidebar contains icons for Home, Courses, Knowledge Center, and other features. The main content area shows a list of completed modules:

- 22 Sep. 2024**
 - E-learning has been completed by you
 - You have successfully Completed the E-learning for Aluminum Investment Casting
 - [View Certificate](#)
- 12 Sep. 2024**
 - E-learning has been completed by you
 - You have successfully Completed the E-learning for Flash Fire Dewaxing Equipment
 - [View Certificate](#)

A blue callout box with the text **Click to view and download Certificate of Completion** points to the 'View Certificate' link for the 'Aluminum Investment Casting' module.

Certificates are maintained in the trainee's account



A screenshot of a web application interface for a trainee's account. The interface is divided into three main sections: a left sidebar, a central content area, and a right sidebar. The left sidebar is dark red and contains a vertical list of icons representing different functions: a home icon, a document icon, a stack of books icon, a calendar icon, a bar chart icon, and a group of people icon. The central content area is white and displays a certificate. At the top of the certificate, it says "Issued on October 05 2024". Below this is the ICI logo. A teal banner across the middle of the certificate reads "CERTIFICATE - of - COMPLETION". Below the banner, it says "Awarded to Joseph Fritz" and "for successfully completing Aluminum Investment Casting". At the bottom of the certificate, it says "ICI, 2024". The right sidebar is dark red and contains a vertical list of icons: a person icon, a gear icon, and a document icon. The top of the central content area has a "Download Certificate" button with a download icon.

Other ICI Academy Feature: The Knowledge Center



- **Knowledge Center**
 - Provides members access to presentation videos from past events
 - Copies of technical presentations and papers
- **Current Offering**
 - Business & Leadership Development Conference (video): 2022, 2023, 2024
 - Technical and World Conferences (video, paper & presentation): 2021, 2022, 2024
 - Advanced Manufacturing for Investment Casting (video): 2024
- Knowledge Center videos from events that you have attended are available free of charge
- Access may be purchased by those who did not attend the event
 - Contact the ICI for more details

Other Feature: Knowledge Center



The screenshot displays the Knowledge Center interface. At the top, a red navigation bar includes a language selector set to '-Select Language-' and user icons for Notifications (61), Me, and Setting. A sidebar on the left provides navigation options. The main content area features three e-learning cards, each with a red border and an illustration of a presenter. The first card is titled 'Aluminum Investment Casting' and 'ALUMINUM INVESTMENT CASTING E-LEARNING'. The second card is titled 'WHAT HAPPENS DURING DEWAXING' and 'E-LEARNING'. The third card is titled 'FLASH FIRE DEWAXING EQUIPMENT' and 'E-LEARNING'. A blue callout box with the text 'Select Knowledge Center' points to the 'Knowledge Center' tab in the top navigation bar.

Select Knowledge Center

Training Knowledge Center Timeline

Aluminum Investment Casting

ALUMINUM INVESTMENT CASTING E-LEARNING

WHAT HAPPENS DURING DEWAXING E-LEARNING

FLASH FIRE DEWAXING EQUIPMENT E-LEARNING

The Knowledge Center contains videos from past events



-Select Language-

61
Notifications

Me

Setting

Training Knowledge Center Timeline

Search

ICI 68th Technical Conference 15th World Conference on Investment Casting & Equipment Expo 2022 Business and Leadership Conference 2022

Business and Leadership Conference 2024 ICI 70th Technical Conference Business and Leadership Development Conference 2023

2024 AM4IC Symposium

ICI 68th Technical Conference - Day 1

68th Technical Conference & Expo
Grand Rapids, Michigan

OPENING REMARKS AND AWARDS
PRESENTATION

Joseph E. Fritz
ICI Executive Director

Russ Gallagher
ICI Director

Russ Rossmait
ICI Academic Advisor

0%

68th Technical Conference & Expo
Grand Rapids, Michigan

ICI SPONSORED INTERN PROJECT

Benjamin Fahrney
Pennsylvania State University -
Behrend

7%

68th Technical Conference & Expo
Grand Rapids, Michigan

TECHNICAL CONFERENCE PAPER
SELECTION CRITERIA

Joseph E. Fritz
ICI Executive Director

0%

68th Technical Conference & Expo
Grand Rapids, Michigan

ICON - INTEGRATED CASTING
ORDER NETWORK

Jerrod Weaver
Executive Director
Non-Ferrous Founders' Society

0%

Other Educational / Technical Member Offerings



- **The Members-Only website complements the ICI's formal training with interactive modules designed to support your foundry's operation**
- **Access is free and is only available to Member companies and their employees**
- **Current interactive modules**
 - **Atlas of Casting Defects**
 - **Ceramics Testing Guidebook**
 - **Standard Test Procedures for Pattern Materials**
- **If you don't have access to the Members-Only website, see Nora D'Ambra or your company's Designated ICI Representative to have your account set up**

Interactive Foundry Support on Members-Only Website





An Investment Casting Institute Publication

Atlas of Casting Defects

∞ Defect Identifier
∞ List of Defects

 Atlas of Casting Defects
Download PDF



The Atlas of Casting Defects was updated and reformatted based on feedback from our members. This restructured Atlas combines the previous versions of the Atlas of Shell Defects and the Atlas of Casting Defects into a single publication. We have addressed all the potential causes of a casting defect broken down by Wax, Shell or Foundry. In addition, there is a new tool, the Defect Identifier, which can assist in pinpointing a particular defect. The only defects which are not included in this Atlas are wax defects that should be caught and corrected in the wax department. These defects are still covered in the Atlas of Wax Pattern Defects.

Acknowledgments

The Investment Casting Institute wishes to thank all of the members of the Institute's Publication Committee who provided information, photographs and valuable resources. The individuals on this committee worked hard to create this Atlas of Casting Defects. Without their support, time and effort, we would not be able to provide this valuable updated publication.

Publications Committee


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Key Process Innovations, LLC

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Russ Gallagher
Besicast, Inc.

Wayne Gayford
DePuy



An Investment Casting Institute



Investment Casting Institute

Ceramics Testing Guidebook

Table of Contents






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An Investment Casting Institute Publication



An Investment Casting Institute Publication

Standard Test Procedures for Pattern Materials

Test Procedures developed by the industry's leading wax manufacturers for the purpose of recommending standard specifications for use with investment castings



This release of the Investment Casting Institute's *Standard Test Procedures for Pattern Materials* represents the efforts of the industry's four leading wax suppliers, namely The Blayson Group Ltd., Westech Wax Products, Paramelt and Remet Corporation/Remet UK Ltd. The test procedures contained herein have been prepared and reviewed by these manufacturers and are representative of the testing procedures in use today. The Investment Casting Institute expresses its appreciation to all those who contributed to this publication.

TABLE OF CONTENTS



Thank you! Any Questions?