

Course Syllabus

Aluminum 101: An Introduction to Aluminum and Aluminum Casting Processes



Course Code 4-110	CEUs 0.6 CEUs
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Course Introduction

An introductory course covering the characteristics and properties of aluminum, alloying elements and their general applications and considerations for working with aluminum cast parts. This course also covers melting technology and foundry casting technology, and looks at the decision making process behind specific technologies used.

Benefits to Taking the Course: This course offers practical and theoretical knowledge for those entering into or establishing relationships with others in the aluminum casting business. It provides a comprehensive foundation of the processes, treatments and practical applications of cast aluminum, and walks the participant through decisions that affect final product cost. This course also serves as a prerequisite for other aluminum courses.

Learning Outcomes

After completing this course, participants should be able to:

1. Describe the principle properties of aluminum.
2. Describe the AAUS alloy classification system.
3. Identify the role of alloying elements in aluminum castings.
4. Identify aluminum alloys suited to specific applications.
5. Identify common melting methods for aluminum.
6. Identify common molding/casting methods for aluminum.

Lesson Outline

- Overview
 - Aluminum Processing
- Aluminum Properties
 - Basic atomic structure
 - Physical and mechanical properties
 - Desirable properties
- Alloying Elements
 - AAUS Alloy Designation System overview
 - Key aluminum alloy groups
 - Effects of alloying elements overview
- Applications of aluminum alloys
 - Alloy families and general applications
 - Alloy selection and use considerations
- Aluminum Melting Technology
 - Wrought-Casting products
 - Safe Handling of Molten Aluminum
 - Furnace types
 - Basic furnace processes, requirements and handling
 - Impurities - Sources and consequences
 - Melt treatments

- Aluminum Foundry Casting Technology
 - Sand Casting
 - Permanent mold casting and semi-permanent mold casting
 - Die Casting
 - Investment Casting
 - Lost foam casting
 - Heat Treatments

Instructional Methods:

- Group activities
- Individual problem solving
- Lecture with images, animation and materials samples
- Class discussion
- Case studies
- Informal assessments

Assessment Methods:

No formal assessment will take place in this course; however, attendees will participate in informal activities such as knowledge check and Q&A sessions with the facilitator to verify that learning outcomes are being met. Assessment of successful achievement of learning outcomes must be included throughout the course in order to meet the ANSI/IACET 1-2013 standard for continuing education programs and for CEUs to be awarded.

Course Prerequisites:

None

Attendee Requirements to Earn CEUs:

1. Present at least 5.5 hours of the total 6 hours of instructional time (90%), which does not include lunch and breaks.
2. Active participation (can include asking questions, communicating with other attendees during and taking part in group activities, providing responses during whole class or group discussions).
3. Successful achievement of learning outcomes.

Who Should Attend?

- Management – All levels
- Production engineers
- Production personnel new to working with aluminum
- Technical sales staff
- Purchasing staff
- Design engineers