

You and your company  
will benefit from  
**METALLURGY** of  
gray &  
ductile iron

### You Will...

- Learn how to reduce scrap by applying basic metallurgical principles
- Control structure to provide desired mechanical properties
- Learn how cooling rate affects structure
- Discover how to save money by properly inoculating gray and ductile iron
- Discuss methods of treating ductile iron
- Learn which quality-control tests should be used to control gray and ductile iron
- Learn how to prevent heat loss through better molten metal handling

### Who should attend

Metallurgy of Gray & Ductile Iron is recommended for operators, foremen, metallurgists, chief melters, supervisors, management personnel and trainees.

### Instructors

**Fred Linebarger,**  
Director of Technology, Miller and Co.

**Gene Muratore,**  
Sr. Foundry Metallurgist, Rio Tinto Iron Titanium America



Cast Metals Institute, Inc. has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 8405 Greensboro Drive, Suite 800, McLean, VA 22102.

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**Cast Metals Institute, Inc.**  
1695 N. Penny Lane  
Schaumburg, IL 60173-4555  
[www.castmetals.com](http://www.castmetals.com)



Return Service Requested

A Continuing Education Course  
for Quality-Conscious Iron Casters  
**METALLURGY** of  
gray &  
ductile iron



**September 22-24, 2009**  
**Genetti Hotel & Suites**  
**Williamsport, PA**

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CAST METALS INSTITUTE, INC.

**The first name in  
foundry education!**

# METALLURGY of Gray & ductile iron

September 22-24, 2009 • Genetti Hotel & Suites • Williamsport, PA

## TUESDAY, SEPTEMBER 22

### Basic Metallurgy

- Atoms, States of Matter, Solubility
- Phases & Phase Relationships
- The Iron-Iron Carbide Phase Diagram
- Equilibrium vs. Nonequilibrium Cooling

### Cast Iron—Basics

- Definitions & General Characteristics of Structure
- Solidification Behavior

### Solidification

- Brief Review of Solidification
- Effect of Process Variation
- Effect of Variations in Treatment & Section Size

### Microstructural Features

- Graphite
- Matrix

## WEDNESDAY, SEPTEMBER 23

### Gray Iron Composition Control

- The Role of Carbon & Silicon
- Control of Sulfur, Manganese, Phosphorus
- Alloying Elements

### Ductile Iron Composition Control

- Sulfur Control
- The Role of Carbon and Silicon
- Deleterious Elements
- Alloying Elements

### Molten Metal Handling & Treatment

- Temperature Loss
- Factors Affecting Chill Control
- Inoculation of Gray & Ductile Iron

### Ductile Iron Treatment Processes

- Use of Magnesium & Its Alloys
- Treatment Methods
- Effect of Treatment Variations on Quality
- Quality Control

## THURSDAY, SEPTEMBER 24

### Controlling Metal Quality

- Specifications for Cast Iron
- Determination of Physical Properties
- Determination & Control of Processes, Microstructure & Chilling Tendencies
- QC Tests

### Effect of Superheating On Section Sensitivity of Cast Iron

### Austempered Ductile Iron

- Definition & General Characteristics
- Solidification Behavior
- Composition
- Classification & Mechanical Properties

### General Discussion

For more information, visit us at: [www.castmetals.com](http://www.castmetals.com)

**Course Hours** The course is conducted from 8:30 am to 3:15 pm on the first and second day. The course ends at 1:30 pm on the last day.

**Registration Fee and Discounts** The registration fee is \$835 for AFS members and \$935 for non-members. Fee covers all course materials, luncheons and coffee breaks. (Payable in U.S. dollars or equivalent.)

**Tax Deduction of Expenses** An income tax deduction is allowed for expenses of education (including registration fee, travel, meals and lodging) undertaken to maintain and improve professional skills. (See U.S. Treas. Regulation 1.162.5.)

**Cancellations and Substitutions** Substitute students will be accepted anytime. However, cancellations of confirmed registrants with full refund of course fees cannot be accepted unless received one week prior to course date. After that time, a \$25 penalty will be assessed. *In the unlikely event a course is cancelled for any reason, CMI liability is limited to the return of the registration fee.*

**Continuing Education** CMI will award 1.6 CEU to each participant who successfully completes this program. The CEU (Continuing Education Unit) is a nationally recognized unit of measure for continuing education and training programs that meet certain criteria. CMI students will receive CEU upon successful completion of the course. Certificates of completion will be issued to each student awarded CEU. A permanent record of each individual's completion will remain on file, with copies issued to each participant upon request.

**Housing** Registrants should make their hotel reservations directly with the Genetti Hotel & Suites, 200 West Fourth Street, Williamsport, PA 17701. Phone: 800/321-1388. The Genetti offers a discounted room rate of \$72.86/night plus tax for our attendees. You must identify your affiliation with the Cast Metals Institute to receive the special rate. **Reserve rooms early. The last day our room block will be protected is two weeks before the course.**

### CAST METALS INSTITUTE, INC.

1695 N. Penny Lane, Schaumburg, IL 60173-4555

All fees payable in U.S. dollars or equivalent.

Remit payment to: 35169 Eagle Way, Chicago, IL 60678-1351

Check Enclosed

For Credit Cards:

To register toll free, call 800/537-4237 or 847/824-0181. FAX: 847/824-2174

The following information is required in order to charge

American Express  MasterCard  VISA

Account Number \_\_\_\_\_

Exp. Date \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Qty.	Reg #	Title	Price
	11-10	Metallurgy of Gray & Ductile Iron—Member	\$835
	11-10	Metallurgy of Gray & Ductile Iron—Non-member	\$935
Total			

**COURSE NO. 5-242** ▶ September 22-24, 2009  
**Metallurgy of Gray & Ductile Iron (11-10)**  
**Member: \$835** ▶ **Non-member: \$935**  
**Genetti Hotel & Suites** ▶ **Williamsport, PA**

Name \_\_\_\_\_

Title \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

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Telephone \_\_\_\_\_

FAX/E-mail \_\_\_\_\_