

PRACTICAL CUPOLA

May 9-10, 2017 • Charlotte Pipe & Foundry • Charlotte, NC

seminar

Do cupola issues have you charged up?

From start-up to bottom-drop we have you covered.

**INCLUDES
PLANT TOUR**



**PRESENTED BY THE
AFS CUPOLA COMMITTEE**

Topics include:

- Basic Cupola Theory
- Charge Materials
- Preparing the Cupola for Startup
- Chemistry and Slag Control
- Tapping Out, Banking and Shutting Down

Gain expertise from experienced metalcasting facilities and suppliers, including:

Allied Mineral Products Inc.
Charlotte Pipe & Foundry Co.
General Motors
Hay Melting Solutions
Hickman Williams & Co.
Iron Casting Research Institute

Kuttner LLC
Miller and Company
Neenah Foundry Co.
Reno Refractories
Ritchie Melt Consulting
Waupaca Foundry



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**SPACE IS
LIMITED!**

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PRESENTED BY THE AFS CUPOLA COMMITTEE

Tuesday, May 9

12 p.m.

Welcome/Check-in

1:00-2:30 p.m.

Cupola Introduction: Basic Principles of Operation

David Kasun, Kuttner, LLC

- Basic cupola theory introduction, general melting principles.
- Cupola design variations.
- Cupola zones.
- Coke combustion.
- Mass energy balance principles.
- Heat transfer and thermal efficiency.
- Effects of hot blast temperature, oxygen injection, humidity and tuyeres.
- Iron dam height, slag layer depth and hearth pressure effects.
- Cupola geometry considerations.
- Slag rate and fluxing.

2:30-2:40 p.m.

Break

2:40-3:30 p.m.

Cupola Introduction: Basic Principles of Operation (continued)

David Kasun, Kuttner, LLC

- Charge makeup.
- Basic properties of charge materials.
- Iron superheating and carbon pickup.
- Slag chemistry, fluxing and slag rates.
- Well chemistry reactions—carbon pickup, silicon loss & recovery, effect of slag layer on carbon pickup and temperature.

3:30-3:40 p.m.

Break

3:40-5:00 p.m.

Charge Materials

Dan Weiskopf, Neenah Foundry Co.

Steve Hay, Hay Melting Solutions

Brian Johnson, Hickman Williams & Co.

- **Metallics (grades, specifications, physical and chemistry properties).**
 - *Steels, cast irons and pig irons.*
 - *Alternative materials (reclaimed).*
 - *Issues with charge materials.*

- Foundry coke.
 - *Heating value, properties & characteristics.*
 - *Principle of physical and chemical properties in the cupola.*
- Alloys.
 - *Natural (high purity).*
 - *Briquetted materials (FeSi, SiC, FeMn, etc).*
 - *Injection grades (carbon, FeSi, SiC).*
- Fluxes.
 - *Limestone/dolomitic limestone (properties, purity, calcium vs. magnesium).*
 - *Alternative fluxes (calcium carbide, fluorspar).*

Questions and Open Discussion

6:00 p.m.

Seminar Reception

Tavern on the Tracks
1411 South Tryon Street
Charlotte, NC 28203

Wednesday, May 10

8:00-9:00 a.m.

Safety Discussion

Alex Croll, General Motors

- PPE for various jobs.
- Carbon monoxide hazards and confined space.
- Securing area during tap out, drop, and regular operation.
- General discussion from class.

9:00-9:10 a.m.

Break

Onsite registration will not be available. Registration cut-off is May 2, 2017. You are invited to participate in the AFS Cupola Committee meeting on May 11, 2017. Contact Laura Kasch, AFS Technical Assistant, 847/824-0181 ext. 246 for details.

9:10-10:10 a.m.

Preparing the Cupola for Startup

Bart Barbee, Charlotte Pipe & Foundry Co.

- Start-up checklist, tools, safety equipment, PPE, procedures.
- Bed coke selection.
- Coke light off and measurement.
- Safety tuyere operation, discharge and drop area preparation.
- Charging, startup special charges.
- Blast on.
- Tap out procedures & safety.
- Preparation for extended campaigns.
- What to do when problems occur.

10:10-10:20 a.m.

Break

10:20-11:30 a.m.

Cupola Operation

Lyle Heberling, Iron Casting Research Institute

- Chemistry control, operator adjustments.
- Iron and slag sampling and testing.
- Cupola operation relationships to chemistry and temperature.
- Slag control (basicity, color, testing, quantity).
- Optimizing costs, special charges, transition charges.
- Least cost standard charge.
- Record keeping and reporting.
- Automation, data collection and reporting.

11:30 a.m.-12:30 p.m.

Lunch

12:30-1:30 p.m.

Tapping Out Cupola, Banking, Shutting Down

John Berzsenyi, Waupaca Foundry

- Melting down.
- Special charges, skull prevention and gas handling system considerations.
- Charge changes, blast and oxygen settings.
- Opening drain hole, blowing/cleaning cupola.
- Bottom drop, safety considerations.
- Cupola interior inspection and recordkeeping.
- Tuyere inspection, repair, record keeping.
- Skull removal and repair.

1:30-1:40 p.m.

Break

1:40-3:10 p.m.

Troubleshooting

Gene Ritchie, Ritchie Melt Consulting

Charley Graf, Miller and Company

**Note: This is a town hall, open discussion setting*

- Chemistry issues.
- Temperature control.
- Leaking tuyeres or shell.
- Hot spots on shell and well.
- Blowing at taphole and high back pressure.
- Refractory problems.
- Iron conversions.

3:10-3:20 p.m.

Break

3:20-4:30 p.m.

Refractory Systems — Material and Installation

Charlie Hardin, Reno Refractories

Pete Satre, Allied Mineral Products Inc.

- Inspecting and removing old refractory.
- Taphole and separator repair.
- Bottom installation.
- Well repair.
- Melt zone.
- Charge zone.
- Dry-out.

4:30-5:00 p.m.

Questions, Evaluations, and Open Discussion

5:00 p.m.

Seminar Conclusion

AFS Cupola Technical Committee Meeting

Thursday, May 11

9:30 a.m. - 2:00 p.m.

The AFS Cupola Committee meeting will be hosted at Charlotte Pipe and Foundry. Students from the Cupola Seminar are welcome to attend the meeting as guests. Please RSVP with AFS for the meeting at the time of registration for the Practical Cupola Seminar.

Foundry Tour: Charlotte Pipe and Foundry Charlotte, NC

Attendees will have an opportunity to participate in a tour of Charlotte Pipe and Foundry. Attendees can choose one of the following tours:

**Tuesday, May 9
9:00-11:00 a.m.
OR
Thursday, May 11
7:30-9:30 a.m.**



PRACTICAL CUPOLA seminar

May 9-10, 2017 • Charlotte Pipe & Foundry • Charlotte, NC

Registration Fees: AFS Member \$395 • Non-AFS Member \$595

Name _____

AFS Membership # (if applicable) _____

Title _____

Check enclosed

Company _____

Charge my : American Express MasterCard Visa

Address _____

Card Number _____

City/State/Zip _____

Expiration Date _____

Phone _____ Fax _____

Authorized Signature _____

E-mail _____

Yes, I want to attend Charlotte Pipe and Foundry tour

Yes, I want to attend the Cupola Committee Meeting

Tuesday, May 9 **Thursday, May 11**

RETURN FORM TO:

American Foundry Society, 35169 Eagle Way, Chicago, IL 60678-1351
Contact AFS Customer Service at 800/537-4237 Fax: 847/824-7848

Hotel: Holiday Inn Charlotte City Center, 230 North College Street, Charlotte, NC 28202. Phone: 800-HOLIDAY or 704-335-5400. For reservations, you can call the hotel directly at 704-335-5400, Monday – Friday from 8:00 a.m.– 5:00 p.m. For the established Group Rate, please identify yourself as being with the **AFS Cupola Workshop** when making your reservation. The online group code is: **AFS** or **Click Here** for direct access to the room block to receive the group rate.

Room Rate is \$138/night. Hotel Cut-off date is 04/17/2017. In addition, the group rate is available three days post and three days prior, based on availability. All guestroom reservations must be guaranteed, with a credit card or advance deposit. A guaranteed reservation will be held the night of the arrival date. If the guest does not arrive, he/she will be billed for the one night's room rate plus all applicable taxes, providing the reservation was not cancelled prior to 72 hours of the date of arrival. Complimentary shuttle is available Monday through Saturday 7a.m. to 9:30 p.m., within a 3-mile radius. Daily Parking: \$18

Cancellations and Substitutions: Substitutions will be accepted any time. However, cancellations of confirmed registrants with full refund of fees cannot be accepted unless received two weeks prior to conference date. In the unlikely event the conference is canceled for any reason, AFS liability is limited to the return of the registration fee.

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. Treasury Regulation 1:162-5).

Class will be held at: Charlotte Pipe and Foundry Product Knowledge Building, 904 Post St., Charlotte NC 28208