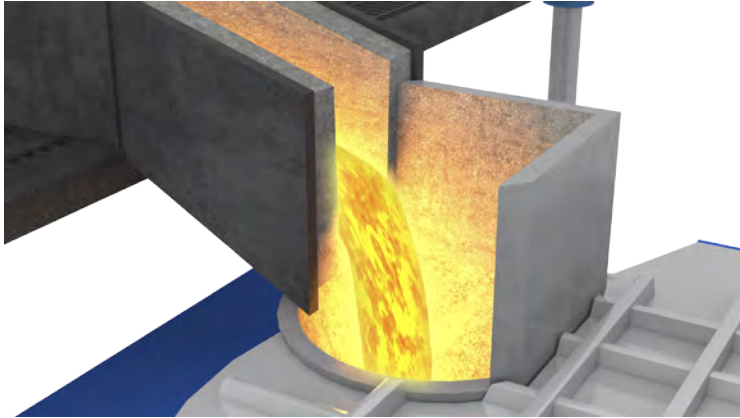


# CUPOLA FURNACE TROUBLESHOOTING AND TECHNIQUES

*eLearning courses designed to increase productivity and profits*



## Learning made Simple, Visual, and Interactive

This course is designed to provide cupola operators and other interested individuals with suggestions for troubleshooting common issues and for proactively changing a cupola's state. The course begins with a discussion on cupola design, specifically on what is efficient cupola design, operating at the optimum blast air rate, being under or oversized for the melt demand, and understanding stack gas concentrations. With this understanding, learners are then introduced to potential methods to inspect and correct errors in an operation through troubleshooting, followed by ways in which to change a cupola's state when an operation's needs change.

Credit Hours **3**

## Learning Objectives

- 💡 Understand what is the optimum blast air rate and how it affects the efficiency of a cupola.
- 💡 Recognize the correct immediate checks per troubleshooting situation.
- 💡 Identify the correct corrective actions per troubleshooting situation.
- 💡 Distinguish between the different utilization capacities of a cupola.
- 💡 Comprehend the methodology of changing the state of a cupola.

## Table of Contents

### I. Cupola Design

- What Is an Efficient Cupola Design?
- Operating at the Optimum Blast Air Rate
- Oversized or Undersized Cupolas for Melt Demand
- Stack Gas Concentrations

### II. Troubleshooting

- Out-of-Control Temperatures
  - o Immediate Checks
  - o Corrective Action
  - o Determine Approximate Coke Bed Height
  - o Long-Term Action
  - o Specific Situation: Cold Iron after an Unscheduled Shutdown
- Chill Test Changes
  - o Chill Too High: Hard Iron
  - o Chill Too Low: Soft Iron

### • Cupola Bridging

- o Immediate Checks
- o Corrective Action
- o Further Checks
- o Further Action
- o Potential Situation: Frozen Cupola

### • Excessive Windbox Pressure

- o Common Excessive Windbox Pressure Indications
- o Further Checks
- o Further Action

### • Excessive Refractory Consumption

- o How to Determine Excessive Refractory Consumption
- o Further Checks and Action

### III. Changing the Cupola State

#### • Melt Rate Control

- o Cupola Utilization
- o Increasing the Melt Rate by 10% or Less
- o Melt Rate Increase of 25% or More
- o Decreasing the Melt Rate by 10% or Less
- o Melt Rate Decrease of 20% or More

#### • Carbon Control

- o Suggestions for Lowering Carbon
- o Suggestions for Increasing Carbon

