

## About the Program

The goal of the conference is to give attendees the knowledge and background to assess and understand the condition of their combustion system equipment. Attendees will also be given exposure to the latest techniques for the upgrade and optimization of their systems to improve energy performance and reduce emissions. The workshop will highlight the opportunities for sensors and controls to achieve tighter control of temperature zones, better adjusting of thermal systems, and increased process throughput and energy savings. The use of sensors and diagnostics, computational fluid dynamics modeling and visualization, techno-economic evaluations, and advanced energy optimization techniques such as thermal recovery and use of pure oxygen, as well as selection of refractory materials, will be covered. The conference will also cover decarbonization-related topics such as the use of low-carbon fuels and energy sources, use of electrotechnologies, and the application of innovative energy efficiency solutions.

## Who Should Attend

This training seminar is designed for supervisors, engineers, and technicians who are directly involved in the operation, maintenance, design or installation of combustion equipment in steel mills. Other attendees who would benefit from this seminar include risk managers, safety personnel, utility personnel who manage fuels utilization, purchasing personnel who procure utilities and environmental engineers who are responsible for air quality. This training would also benefit the energy engineers/managers who are responsible for energy efficiency and optimization on-site.

## Registration Fees

Advance registration by 6 February 2023: Member US\$895, Non-member US\$1,140. Registration fee after 6 February 2023: Member US\$995, Non-member US\$1,240. Registration fee includes Tuesday reception, Tuesday–Thursday continental breakfast and lunch, plant tour with bus transportation, and a course workbook or flash drive including presentations.

## Hotel Accommodations

A block of rooms has been reserved at the Drury Plaza Hotel Cleveland Downtown. Please call the hotel at +1.216.357.3100 by 28 February 2023 to secure the AIST discount rate of US\$154 per night for single/double occupancy.

## Professional Development Hours

This course may qualify for up to 14 Professional Development Hour (PDH) credits. Each attendee will receive a certificate listing the quantity of PDH credits earned for the course. This course is not approved for PDH credits in New York, Florida, North Carolina and Oklahoma.

## Attention Non-Members

Non-member registration fees include membership in AIST through 31 December 2024. Membership is not automatic. A completed membership application must be returned to AIST.

## Organized By

AIST's Energy & Utilities Technology Committee.



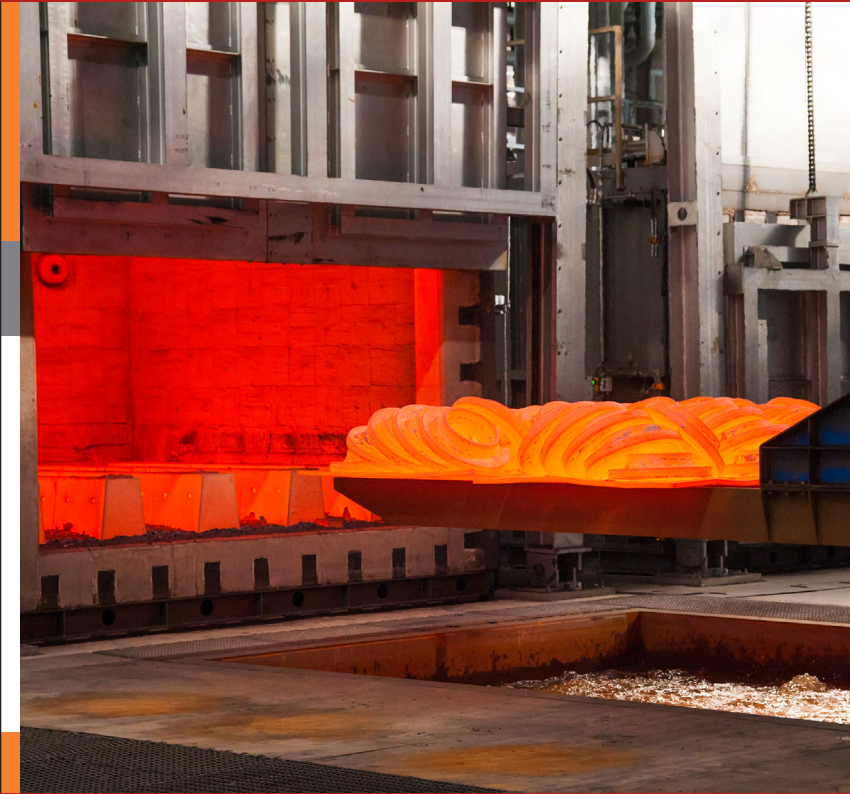
Association for Iron & Steel Technology  
186 Thorn Hill Road  
Warrendale, Pa., 15086-7528 USA  
+1724.814.3000 | Fax +1724.814.3005 | AIST.org

**AIST Members**  
US\$895 Before 6 February  
US\$995 After 6 February

**Non-Members**  
US\$1,140 Before 6 February  
US\$1,240 After 6 February



SCAN FOR MORE  
INFORMATION



## Steel Mill Combustion and Thermal Systems

21–23 March 2023

Cleveland, Ohio, USA  
Drury Plaza Hotel Cleveland Downtown

Plant Tour: Fives North American Combustion Inc.

AIST.org

## Monday, 20 March 2023

4–6 p.m. [Registration](#)

## Tuesday, 21 March 2023

7 a.m. [Registration and Breakfast](#)

8 a.m. [Conference Opening Remarks](#)

8:05 a.m. [Combustion and Burner Fundamentals, Anup Sane, Air Products](#)

This introductory talk will cover combustion basics, types of fuels, burner types and their use in the steel industry. The basics of hydrogen combustion will also be covered. An introduction will be provided to energy and heat recovery methods used in steel furnaces.

8:45 a.m. [Blowers and Fans, Dan Banyay and James Conway, New York Blower](#)

This presentation provides technical insight into proper specification, selection, installation, maintenance and operation of fans in combustion systems.

9:30 a.m. [Break](#)

9:45 a.m. [Flow Meter Selection Process and Tools to Ensure Measurement Certainty, Michael Walsh, Emerson Automation Solutions](#)

With so many available technologies to measure flow, how does one determine which is the best fit for a specific application? Once a meter type is selected, what are the best practices for installation to make sure it will deliver on its specifications? And finally, how can the latest tools be used to create measurement certainty over the lifespan of the meter? The presentation will delve into these questions.

11 a.m. [Fuels and Fired Equipment Safety – New 2023 Code Changes That Will Make a Difference in Your Operations, John Puskar, CEC Combustion Safety](#)

Noon [Lunch](#)

1 p.m. [Combustion System Maintenance, Ted Jablkowski, Fives North American Combustion Inc.](#)

1:45 p.m. [Combustion Control Components/Hardware/Burner Management Systems, Ted Jablkowski, Fives North American Combustion Inc.](#)

2:45 p.m. [Break](#)

3 p.m. [Solving Your Burning Problems: Combustion Sensors and Diagnostics, Markos Ubiria, Fives North American Combustion Inc.](#)

Measuring the proper process variables to diagnose combustion systems is critical for ensuring that the system operates safely and efficiently. This presentation will cover important process variables and related devices needed to evaluate and diagnose combustion systems. The presentation will also discuss how to use the equipment to control the combustion process and how to diagnose and solve potential problems.

4 p.m. [Environmental Emissions, Keenan Cokain, Bloom Engineering Co. Inc.](#)  
This session will cover regulated emissions with a focus on NOx.

5–6 p.m. [Reception](#)

## Wednesday, 22 March 2023

7 a.m. [Breakfast](#)

8 a.m. [Opening Remarks](#)

8:05 a.m. [Industrial Process Heating: Energy Efficiency Opportunities and DOE's MEASUR Tool, Sachin Nimbalkar, Oak Ridge National Laboratory](#)

Process heating accounts for about 70% of all process energy (energy applied to convert material into manufactured products) used in the U.S. manufacturing sector. During this session, the audience will learn practical tips on process heating maintenance, how to improve the energy efficiency of furnaces and how to use the Department of Energy's MEASUR tool (Process Heating Assessment module). MEASUR helps survey furnaces and heaters, identify major energy-using equipment, prioritize improvement opportunities, and assess available methods to improve thermal efficiency in industrial plants.

9 a.m. [Advanced Energy Optimization: Heat Recovery System Oxy-Fuel Combustion, David Toocheck, Bloom Engineering Co. Inc., and Anand Makwana, Air Products](#)

This presentation will explore existing techniques to enhance energy efficiency and an overview of fundamentals of oxy-fuel combustion. Additionally, comparison of oxy-fuel combustion to traditional air/fuel combustion system is presented.

10 a.m. [Break](#)

10:15 a.m. [Role of Refractory in Reheat Furnaces, Greg Odenthal, International Technical Ceramics LLC \(ITC\)](#)

An in-depth look at refractories, their properties and their role in a reheat furnace. This will include proper refractory selection per furnace zone, refractory maintenance tips to reduce downtime, and a means to reduce energy consumption and increase furnace efficiencies.

11 a.m. [Steel Mill Combustion – Case Studies, Kurt Johnson, Cleveland-Cliffs Research & Innovation Center](#)

Pragmatic troubleshooting exercises linked to previous topics which are used to highlight the practical use of training information in real-world examples.

Noon [Lunch](#)

1 p.m. [Plant Tour of Fives North American Combustion Inc.](#) 🏭

5 p.m. [Return From Plant Tour](#)

## Thursday, 23 March 2023

7 a.m. [Breakfast](#)

8 a.m. [CFD Simulations of Hydrogen and Other Low-Carbon Fuels in the Steel Industry, Chenn Zhou, Center for Innovation Through Visualization and Simulation, Purdue University Northwest](#)

Advanced computer simulation and visualization technologies are increasingly playing a key role for decarbonization and energy reduction in steel manufacturing. These technologies can provide coherent understandings of complex phenomena and processes, and enable faster and better decision-making for process design,

optimization, troubleshooting, scale-up, and training. The Steel Manufacturing Simulation and Visualization Consortium (SMSVC) has been formed with the mission to develop and implement innovative technical solutions, through the integration of advanced computer simulation and visualization technologies, for the value chain of U.S. steel manufacturing. Decarbonization and energy efficiency are major focuses in SMSVC research. To-date research outcomes include improved energy efficiencies and identification of decarbonization and energy reduction opportunities. This presentation will include an overview of the SMSVC, simulation and visualization technologies and methodologies, as well as high-impact project examples such as the utilization of hydrogen and other low-carbon fuels in the blast furnace, boiler, electric arc furnace, and reheating furnace.

9 a.m. [Low-Carbon Hydrogen Production, Storage, and Supply for Iron and Steel Industry, Nicholas Gould, Air Products](#)

Producing and supplying low-carbon hydrogen and capturing carbon dioxide at large scale will be key to supporting the decarbonization efforts of the iron and steel industry. This presentation will cover various options for producing and supplying low-carbon blue and green hydrogen and capturing carbon dioxide.

9:30 a.m. [Steelmaking Decarbonization Through Oxy-Fuel Combustion Technologies, Joe Maiolo, Linde](#)

Hydrogen for the decarbonization of steelmaking will require the development of new processing routes such as H<sub>2</sub>-based direct reduced iron/electric arc furnaces. Significant investment in CapEx and OpEx for such an industrywide transition as well as the limited supply of hydrogen are challenges that will take time to address. Hydrogen steelmaking is therefore a long-term proposition. This presentation will discuss how oxy-fuel technologies offer near- to mid-term decarbonization solutions.

10 a.m. [Break](#)

10:15 a.m. [Hydrogen Combustion, Alexis Omilion, Fives North American Combustion Inc.](#)

This presentation will focus on hydrogen combustion as a means to decarbonize the steel industry and will discuss both the advantages and challenges of hydrogen fuel. Topics covered include safety, combustion system design, and the impact hydrogen can have on emissions, process and performance.

10:40 a.m. [Alternative Fuels: Biomass and Biodiesel, David Schalles, Bloom Engineering Co. Inc.](#)

This presentation will look at options for fossil fuel substitutes other than hydrogen and direct electrification.

11:10 a.m. [Roundtable Discussion: Combustion and Energy Efficiency, Moderator: Kurt Johnson, Cleveland-Cliffs Research & Innovation Center](#)

12:10 p.m. [Conference Adjourn](#)



SCAN FOR MORE  
INFORMATION

