



Technical Education Sessions

OCTOBER 4 – MAINTENANCE – ROOM 120

TIME: 8:00 am – 8:35 am
TITLE: Greener Heat Treating With Improved Furnace Linings
PRESENTER: Mark Rhoa – Chiz Bros

There is a large push right now for the industrial sector to “go green” and reduce our carbon footprint. While that isn’t 100% realistic for our industry, there are lots of things that can be done to help take steps in that direction with regards to furnaces. The goal will be to help educate attendees on various ways that can meet these new requirements. This could include utilizing more thermally efficient materials, switching to electric heating, and adopting best practices for furnace lining maintenance. Presentation will cover lowering gas/power usage for furnaces, preventing heat loss, and reducing your carbon footprint.

Key Take a Ways:

- Understanding of best ways to keep furnaces efficient.
- New options to lower their carbon foot print.
- How to keep the Feds(EPA) off their back!

TIME: 8:50 am – 9:25 am
TITLE: Improved Predictive Maintenance Using SCR Power Controllers
PRESENTER: Tony Busch – Control Concepts

This presentation features an in depth look at how digital SCR power controllers can help with predictive maintenance. There will be a tutorial on how digital SCR power controllers function, followed by how there are new and improved features which can help prevent unscheduled down time BEFORE it happens. Intelligent power control includes embedded algorithms with teach function to calculate data and predict what is likely to happen next in the life of a heating element. This capability can determine partial load loss, resistance change, and complete load loss. As a result, it can help improve productivity of a process with less wasted materials caused by failed or weakened heating elements.

Key Take a Ways:

- Introduction to digital SCR power controllers.
- Introduction to why heaters may fail prematurely.
- Introduction to the digital features which can help prevent down time.
- How to better protect themselves against unexpected down time to heater failures.
- Learn about how beneficial it is to be able to monitor and record valuable predictive data over their network.

TIME: 9:50 am – 10:15 am
TITLE: The Effects of Ceramic Coatings on Furnace Efficiencies & Product Quality
PRESENTER: Greg Odenthal – ITC-International Technical Ceramics

Furnace fuel consumption, constant refractory maintenance and unscheduled downtime are significant cost drivers for the heat-treating industry. Failing furnace refractories and poor furnace temperature uniformities, negatively affects the quality of parts. Increasing furnace efficiencies and reducing unscheduled down times will lead to better product quality and increased production.

Key Take a Ways:

- How to reduce fuel consumption
- A means to reduce the high cost of refractory maintenance
- How to increase refractory longevity
- Ways to improve furnace efficiencies
- Improvements to product quality
- A path to a greener, more energy efficient production.

TIME: 10:30 am – 11:05 am
TITLE: Vacuum Furnace Leaks – What you Need to Know
PRESENTER: Matt Clinite - Ipsen

What is a vacuum furnace leak rate and why does it matter? Keeping your vacuum furnace leak free will minimize maintenance costs, prolong hot zone life and produce better quality parts. This presentation will address finding true leak rates, common sources of leaks, clean-up cycles, and best practices for maintenance.

Key Take a Ways:

- What is an acceptable leak up rate?
- How to find your true leak up rate
- How to identify leaks vs outgassing
- How to generate a tailored burnout recipe
- How to keep your furnace leak free for longer hot zone life and cleaner work



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OCTOBER 4 – EQUIPMENT – ROOM 121

TIME: 8:00 am – 8:35 am
TITLE: Mesh Belt Technology for Continuous Austempering Heat Treating
PRESENTER: Can-Eng Furnaces International

As the demand for high performance automotive and machine technology advances, manufactures of system critical components are pushing furnace OEMs to design extremely capable austemper heat treatment systems. This presentation discusses challenges with traditional furnace technology and how mesh belt developments optimize quality, reduce downtime, and help the bottom line.

Key Take a Ways:

- Current demands OEM Furnace suppliers are faced with for austempering requirements
- Challenges for manufactures with traditional Furnace technology
- How mesh belt technology addresses these challenges manufactures face

TIME: 8:50 am – 9:25 am
TITLE: Multi-Chamber OR Single-Chamber Vacuum Furnaces for Tool Processing
PRESENTER: Patrick Weymer – Thermal Processing Systems

A number of factors are considered when determining the appropriate furnace to use for processing. They include demand, cycle time, part loading, furnace capabilities and availability. Let's analyze hardening and tempering tool steels in single and multi-chamber vacuum furnaces, examine the pros of each and their role in furnace selection.

Key Take a Ways:

- Understanding the definition of a single chamber batch vacuum furnace and a multi-chamber continuous vacuum furnace
- Understanding major furnace design differences
- Recognizing the pros and cons of each furnace style – process perspective
- Recognizing the pros and cons of each furnace style – operator perspective
- Ability to analyze furnace selection

TIME: 9:50 am – 10:15 am
TITLE: A Cleaner, Safer and Greener Vacuum Oil Quench Furnace
PRESENTER: Bob Hill – Solar Atmospheres of Western PA

A newly designed vacuum oil quench furnace was recently commissioned this year at Solar Atmospheres facility in Hermitage PA. Competitive advantages include zero surface contamination, work thermocouples will be employed, and CO2 emissions and safety features will be compared to traditional endothermic atmospheric integral quench furnaces.

Key Take a Ways:

This newly designed vacuum oil quench furnace features:

- Enhanced safety
- Eco compatibility
- Precise temperature measurements per AMS standards
- Eliminates surface contamination

TIME: 10:30 am – 11:05 am
TITLE: Thermocouples for use in Hydrogen to 2300C
PRESENTER: Herbert E. Dwyer - Nanmac

As heat treating temperatures and atmospheres increase or change over the next few years to match the "new" material demands, thermocouples covering the range from 300C to 2300C become more critical. Hear about the latest material issues and calibration certification over this temperature range and a "new" Type C wire.

Key Take a Ways:

- Critical choices on key material systems and the furnace atmospheres
- SAT thermocouple(s) that are less costly and still accurate and reliable
- Direct comparison calibration techniques that are repeatable and can reach 2300C
- New sheath materials, insulators and Type C thermocouple wires and what the impact of these have on reducing existing failure modes
- How to use these refractory metal TCs in performing SATs and continuous monitoring and control of the furnace
- Discussions of the design trade-offs of sheath materials for use in graphite and non-graphite based furnaces
- Calibration curves and comparisons at temperatures above 1650C up to 2300C using a NIST traceable pyrometer and direct measurement thermocouple systems.



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OCTOBER 4 – ENERGY – ROOM 122

TIME: 8:00 am – 8:35 am
TITLE: Comparing the Emissions, Utilities, & Carbon Footprint of Various Neutral Hardening Methods
PRESENTER: William J. Bernard III – Surface Combustion, Inc.

Heat treatment service providers are being asked more and more frequently about their carbon footprint. The neutral hardening process is an ideal baseline for comparing atmosphere and vacuum equipment emissions & costs. This topic compares calculations to collected data, regarding various equipment.

Key Take a Ways:

- An understanding of the typical carbon footprint of different furnaces based on energy source, furnace construction and atmospheres used.
- What things business owners can do right now to reduce their carbon footprint and prove it to their customers.

TIME: 8:50 am – 9:25 am
TITLE: The Future of Gas Heating – Clean, Green, and Efficient
PRESENTER: Steven Mickey – WS Thermal Process Technology

This presentation will discuss modern burner and radiant tube technology prepared for the future of green fuels. It will discuss the challenge to provide both high efficiency and low NOx emissions and will present how modern combustion technology can provide a solution for the use of green hydrogen.

Key Take a Ways:

- Burner and Radiant Tube Types
- Efficiency vs. NOx Emissions
- Flameless Combustion
- Green Fuels
- Hydrogen Combustion

TIME: 9:50 am – 10:15 am
TITLE: Saving Energy & Money in Your Heat Treat Plant
PRESENTER: Joern Rohde – Rohde Schutzgasofen GmbH

How can you reduce heat treatment costs and protect the environment? You need to determine first the consumption of the individual components of your plant. You will learn about the savings potential of a heat treatment plant regarding energy consumption but also regarding the recovery of your quenching salts.

Key Take a Ways:

- Energy efficiency, environmental protection, increased component quality, cost savings, savings potential for energy and quench salts
- Create an awareness of which components of their heat treatment facility cause high consumption.

- Once you have determined these, then you can transfer the results obtained to your own plant technology and thus sensibly save energy and raw materials.
- This not only protects the environment, but also reduces heat treatment costs, increases component quality and boosts your company's sales.
- When comparing energy-efficient plants and less energy-efficient plants, the presentation shows real consumption of plants under operating conditions in a hardening shop in Germany.
- Regarding the recovery of quenching salts, you will see that there is also a huge savings potential.

TIME: 10:30 am – 11:05 am
TITLE: Understanding Power Inefficiencies in Electrical Heating – How to Save on Energy Costs
PRESENTER: David Pridmore – RoMan Manufacturing

A clean energy revolution is taking place across America. IGBT's reduce the congestion in power delivery which results in a smooth electrical delivery and reduces energy costs. This presentation takes a deep dive into understanding the power inefficiencies (and solutions) in a typical vacuum furnace used for heat treatment.

Key Take a Ways:

- Evaluate typical electrical characteristics in a vacuum furnace
- Break down the system by components and discuss the electrical inefficiencies
- Discuss limitations of the predominant power supply technology
- Present solutions offered by IGBT type power supplies
- Review Inefficiencies and solutions in a typical furnace model



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OCTOBER 4 – COMPLIANCE – ROOM 123

TIME: 8:00 am – 8:35 am
TITLE: Keys to AMS 2750F/G Compliance
PRESENTER: Andrew Bassett – Aerospace Testing & Pyrometry

2021 and 2022 have brought on numerous changes to the 2750 specification. In this presentation, you will learn the key elements of change, potential findings and areas where heat treaters will want to put focus on with audit compliance.

Key Take a Ways:

- Key changes in 2750 F & G
 - Areas of focus to ensure audit compliance
 - Key areas where findings happen the most
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TIME: 8:50 am – 9:25 am
TITLE: DFARS, NIST 800-171, & CMMC 2.0 Cybersecurity...What You Need to Know
PRESENTER: Joe Coleman – Bluestreak Consulting

In this presentation, we will discuss what is DFARS 252.204-7012, NIST 800-171, & CMMC 2.0, the relationship between them and the basic compliance requirements for each. Also, review which heat treaters will need to be compliant and how it may affect your relationship with your current and future customers.

Key Take a Ways:

- What is DFARS 252.204-7012?
 - What is NIST SP 800-171?
 - What is CMMC 2.0?
 - Who Needs To Be DFARS 7012 & NIST 800-171 & CMMC 2.0 compliant?
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TIME: 9:50 am – 10:15 am
TITLE: Documented Information/Root Cause Analysis & Corrective Action
PRESENTER: John M. Hauerwas - Radyne

This talk will center on the importance of teamwork and cooperation between intercompany departments when gathering relevant data during the investigative stage of a root cause analysis. In addition it will focus on the importance of making a corrective action also preventative throughout your organization.

TIME: 10:30 am – 11:05 am
TITLE: NIST SP 800-171 & CMMC 2.0 Requirements/Details
PRESENTER: Joe Coleman – Bluestreak Consulting

In this presentation, we will discuss each of the NIST 800-171 cybersecurity control areas and what is involved in a heat treater becoming compliant. It will also include information on POA&Ms (Plan Of Action with Milestones), your SSP (System Security Plan), and new Policies, Procedures, & Documentation.

Key Take a Ways:

- NIST 800-171 framework consists of the following requirements that must be met in order to become compliant
- Documentation needed for compliance
- Timeframes for implementing DFARS 7012, NIST 800-171, & CMMC 2.0.
- Review DFARS Interim Rule.
- Rulemaking and timeline for CMMC 2.0



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OCTOBER 4 – THE FUTURE – ROOM 124

TIME: 8:00 am – 8:35 am
TITLE: Heat Treat Robotics...The Present, The Future
PRESENTER: Dennis Beauchesne – ECM USA

ECM Robotics will be presenting information on innovative ways that heat treaters are able to address the shortage of personnel in the marketplace. This discussion will highlight how solutions are being offered for loading and unloading of furnaces of multiple part loads can be done with similar robotic installations.

Key Take a Ways:

- Available robotic solutions for heat treaters
 - Opportunities on how Robotics and automation can help profitability
 - Incorporating vision systems how and why to facilitate robotics
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TIME: 8:50 am – 9:25 am
TITLE: Is Industry 5.0 Hype or Could it Transform Manufacturing?
PRESENTER: Peter Sherwin - Eurotherm

Technology companies have used industry 4.0 (and IIoT) over the past decade to lead a revolution in the technical possibilities within manufacturing. Industry 5.0 is looking to expand on this technological focus to support people development and sustainability practices. This presentation attempts to outline the basis of Industry 5.0 and how it extends the focus of the previous industrial revolutions and offers suggestions for applications in the metals and heat treatment industries.

Key Take a Ways:

- Overview of Industry 4.0
 - Introduction to Industry 5.0
 - Investment in your workforce with digital tools and techniques
 - Understanding of Scope 1, 2, 3 reporting
 - Methods and practices for minimizing energy waste and reducing emissions
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TIME: 9:50 am – 10:15 am
TITLE: Plant Scheduling and AI, a Perfect Match?
PRESENTER: Brent Halonen – Steelhead Technologies

In this presentation by Steelhead Technologies, attendees can expect to begin thinking about plant scheduling in a completely different way. Scheduling of heat treatment is not necessarily complicated, but it certainly can become complex in a hurry! AI and advance computing can quickly and automatically consider millions of potential production schedules, looking for the best one! In one fell swoop, this technology can reduce management overhead and improve scheduling efficiency. In this session, we will cover the technical nature of the problem and the solution. We will also cover technical trends in simulation, AI, and statistical methods.

- An understanding of what Artificial Intelligence is
- An understanding of how AI can be applied to scheduling in Heat Treatment
- What types of plants will see the highest value with predictive scheduling
- Enterprise value of a predictive scheduling
- Statistical methods of optimization
- Advanced computing and simulation, applied to a focused and practical industrial application

TIME: 10:30 am – 11:05 am
TITLE: Diffusion Bonding...It's Prime Time for This Joining Technology
PRESENTER: Thomas Palamides – PVA TePla America

The commercial use of diffusion bonding is coming into its prime. It is an unique joining process mainly used by the advanced energy industry, the semiconductor industry, and the aerospace industry. Select materials can be joined void free, and impurity free. Joint structural integrity rivals that of the base metal.

Key Take a Ways:

- Why diffusion bonding works
- Uses of diffusion bonding technology
- The evolution of vacuum furnace technology to include diffusion bonding
- This is "next generation" technology for the commercial processing of materials



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OCTOBER 5 – QUENCHING – ROOM 120

TIME: 8:00 am – 8:35 am
TITLE: Clean, Green Quenching & Molten Salt
PRESENTER: Michael Coburn – AFC-Holcroft

Quenching in salt is a greener way to obtain the tighter tolerances demanded by the evolving world of EV. This presentation will provide the general audience with an overview of salt quench hardening, the pros and cons of working with salt, the benefits of salt quenching, and some of the various processes as well as types of equipment used when working with salt quench applications. We will answer the question, “why salt?” by comparing it to traditional oil quench applications.

Key Take a Ways:

- A general overview of salt quench hardening and how it differs from oil quench hardening.
- The features and benefits of salt quenching, such as distortion control, operating temperature range and phase transformation.
- Using TTT diagrams, and the bainite, martensite and ausferrite phases.
- Process capabilities available with salt, such as austempering, marquenching, and neutral hardening with salt.
- The “GREEN” side of salt and the economics of salt reclamation.

TIME: 8:50 am – 9:25 am
TITLE: “Single Layer” Distortion Control for EV Components
PRESENTER: Volker Heuer – ALD Vacuum Technologies

Heat treat distortion from the case hardening process is a key factor for the costs of manufacturing of E-Drive components. Control of distortion is significantly improved by new vacuum furnaces applying “single layer treatment”. The paper shows new results of distortion control with single layer treatment on different gear components.

Key Take a Ways:

- Learn what distortion-values can be achieved with modern vacuum case hardening
- Learn about the potential to reduce distortion of gears and shafts aiming to reduce costs in gear manufacturing
- Learn an interesting side effect, vacuum furnaces are electrically heated; therefore, the CO₂-footprint of manufacturing can be reduced

TIME: 9:40 am – 10:15 am
TITLE: Understanding the Quenchant Report...Safety, Performance, & Oxidation
PRESENTER: Donald Scott MacKenzie – Quaker Houghton

Care and maintenance is critical to insuring that the quench oil remains consistent, and provides trouble-free operation. This tutorial covers the three critical testing areas for a typical quench oil: Safety; Performance; and Oxidation.

Key Take a Ways:

- Learn to understand quenchant report
- Learn 3 categories of testing: Safety, Oxidation, and Performance
- Understand the vital importance of minimizing water content
- Learn and understand the importance of oxidation to oil performance and part staining.
- Understand how quenching performance is performed

OCTOBER 5 – FERRITIC NITROCARBURIZING – ROOM 121

TIME: 8:00 am – 8:35 am
TITLE: Ferritic Nitrocarburizing of Quenched and Tempered Steels – Compound Layer Phase Composition Profiles
PRESENTER: Richard D. Sisson, Jr. – Center for Heat Treating Excellence

Ferritic Nitrocarburizing (FNC) is a surface treatment process used to improve the wear and corrosion resistance of quenched and tempered steels. In this presentation the effects of Nitriding and Carburizing potentials (KN and KC) on the phase composition of the compound layer will be discussed.

Key Take a Ways:

- Control of FNC compound layer phase composition
 - Kinetics of FNC compound layer growth
 - Porosity development mechanisms in compound layer
-

TIME: 8:50 am – 9:25 am
TITLE: Optimizing Preoxidation for Your Nitriding Process
PRESENTER: Chuck Thomas – Super Systems

Preoxidation enhances nitride initiation in low alloy steels leading to a more uniform nitride initiation, higher nitrogen concentrations, and potentially increased surface hardness. Gaseous nitriding cycles with variations in preoxidation temperature, time, and atmosphere were performed to understand if there is an optimal process setup for nitride initiation and development.

Key Take a Ways:

- How preoxidation temperature affects the nitride initiation.
 - How preoxidation time affects the nitride initiation.
 - How preoxidation atmosphere affects the nitride initiation.
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TIME: 9:40 am – 10:15 am
TITLE: Improvement of Corrosion Resistance with Modified Ferritic Nitrocarburizing and Post-Oxidation Processes
PRESENTER: Jack A. Kalucki – Nitrex Metal, Inc.

This presentation provides a deep insight into the control of ferritic nitrocarburizing processes specifically modified to improve corrosion resistance. We will address process control and key aspects of the AMS 2759/12 norm, how process control and design can be further improved while reducing process time, consumption, and environmental impact.

Key Take a Ways:

- Control of ferritic nitrocarburizing
- Understanding process control
- General explanation of key aspects AMS 2759/12
- Factors of increased corrosion resistance (nitrocarburizing, process control, porosity, post-oxidation)
- Common applications
- Gains in process time and reduction of environmental impact

OCTOBER 5 – PRODUCTIVITY – ROOM 122

TIME: 8:00 am - 8:35 am
TITLE: Combustion Valve Trains...Safety, Fundamental Tips
PRESENTER: Bob Sanderson – Rockford Systems

This presentation outlines requirements for safety train equipment, component functions and purposes, and engineering tips. Attendees will gain a perspective on valve trains, their components, integrating the components into a comprehensive, safe design. Design and engineering criteria for selection and usage will be reviewed along the way.

Key Take a Ways:

- Component purposes, functions and arrangements
- Code compliance
- Safety Venting
- Control Valve Options
- Sizing for Performance
- Selecting for Safety

TIME: 8:50 am – 9:25 am
TITLE: LPC Simulation Tools: Bridging the Gap to Low Pressure Carburizing
PRESENTER: Don Marteeny – SECO/VACUUM Technologies

Gas carburizing is the accepted standard in case hardening techniques. While robust, it is a dirty process that poses specific safety hazards. Low Pressure Carburizing is a viable alternative, but the transition from gas carburizing can be challenging. Thankfully, process simulation tools can assist with this transition are available.

Key Take a Ways:

- The gap between gas carburizing and LPC is not as wide as perceived by the experienced heat treater.
- LPC simulation tools provide an effective method to bridge the gap between gas carburizing and LPC through assistance in recipe generation.
- Gas carburizing is controlled through the gas phase carbon content or carbon potential while LPC is controlled through the sequence of carbon source gas boost phases and diffusion phases (atmosphere process vs. a low-pressure process).
- Key factors in the control of LPC include carbon source gas (acetylene) flow, material, carburizing temperature, and carburized surface area.
- Application of LPC simulation tools allows LPC to be applied to a range of furnace charges and materials comparable to gas carburizing.

TIME: 9:40 am – 10:15 am
TITLE: Maximizing the Work Zone with Creative Fixtures
PRESENTER: Robert Kornfeld – Hi-Tech Furnace Systems

This presentation will answer such questions as: How to get the most value from a furnace? How to meet production requirements with a batch furnace? How to keep operating costs a minimum? What is the common answer to the 3 questions? We will discuss how to process as many parts as possible in each batch with creative fixtures.

Key Take a Ways:

- Usage and properties of different materials for fixtures: fabricated alloy, cast alloy, ceramics, graphite, CFC, refractory metals.
- New options that didn't exist years ago.
- Material incompatibilities (eutectics).
- Lessons from over 40 years of heat treating experience.



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OCTOBER 5 – METALLURGY – ROOM 123

TIME: 8:00 am – 8:35 am
TITLE: Distinguishing Between Sigma Phases and Carbides in Component Failure
PRESENTER: Nicholas Hicks – Rolled Alloys

Failure analyses of heat resistant components sometimes misidentify carbide formation as sigma phase. This presentation will explain the differences and why it matters.

Key Take a Ways:

- Sigma phase is intermetallic of Fe and Cr. It only forms in stainless steels in a particular temperature band.
 - Carbide formation can occur in stainless stain and some nominal nickel alloys. It can have multiple different microstructures depending on mechanism of formation
 - Various microstructural photographs will be used to illustrate how to identify.
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TIME: 8:50 am – 9:25 am
TITLE: Reducing your Carbon Footprint with Cutting Edge Sustainable Combustion
PRESENTER: Brian Kelly – Honeywell Thermal Solutions

There is plenty of talk about environmental sustainability, decarbonization, electrification, hydrogen, etc... So how does that translate to thermal processing and heat-treating markets? In this session we will investigate the growing focus on carbon emissions (CO₂) as well as Nitrous Oxides (NO_x) emissions and possible solutions for reducing them.

Key Take a Ways:

- Growing Focus on Carbon Emissions
 - Solutions for CO₂ Reduction
 - The Gaining Importance of NO_x Emissions
 - Solutions for NO_x Reduction
-

TIME: 9:40 am – 10:15 am
TITLE: Induction Tempering and Furnace Tempering of Induction Hardened 4140 Steel Rods
PRESENTER: Richard D. Sisson – Center for Heat Treating Excellence

Induction hardening and induction tempering are cost effective heat treatment processes. For some applications induction hardening may be followed by furnace tempering. In this presentation a comparison between induction tempering and furnace tempering of induction hardened 4140 steel 38 mm round rods will be presented and discussed.

Key Take a Ways:

- A direct comparison of induction tempering and furnace tempering of induction hardened thick steel 4140 steel rods
- Microstructural changes during tempering
- Residual stress development during induction and furnace tempering

OCTOBER 5 – CLEANING – ROOM 124

TIME: 8:00 am – 8:35 am
TITLE: Solving the 4 Most Common Cleaning Challenges in Heat Treating
PRESENTER: Stefan Lukowski and Thomas Wingers – SAFECHEM Europe GmbH

The presentation explains the importance of cleaning in heat treat and provides solutions to the 4 most common cleaning challenges facing heat treaters: Residual contaminations leading to insufficient, hardening/nitriding/brazing/results, surface stains on the finished product, inconsistent cleaning processes, and high cleaning costs due to high consumption of cleaning agents.

Key Take a Ways:

- The importance of parts cleaning in heat treat
- The influence of contaminations in different heat treatment applications
- Major factors influencing the choice of the right cleaning chemistry
- How closed cleaning machines contribute to cost efficiency, safety and sustainability

TIME: 8:50 am – 9:25 am
TITLE: Understanding Alkaline Cleaners...Which One is Right for You?
PRESENTER: Greg Steiger - Idemitsu

Using the proper alkaline cleaner in a precleaning operation and in a post quenching operation is the key to getting clean parts after heat treating. This presentation will explain the differences between the numerous chemistries for alkaline cleaners available in today's marketplace.

Key Take a Ways:

- Why are cleaners necessary and how to manage them to achieve the highest quality and highest financial return
- Alkaline cleaner ingredients
- Selecting the best cleaner
- Efficiently operating your washer

TIME: 9:40 am – 10:15 am
TITLE: Using Hydrogen Atmospheres in a Newly Hydrogen-Centric Energy Market
PRESENTER: David Wolff – Nel Hydrogen

Many legacy metal thermal processing applications and an increasing number of new/emerging applications employ hydrogen-containing atmospheres. While the needs for hydrogen atmospheres are becoming widespread, the hydrogen supply market is undergoing massive changes, with hydrogen emerging as an energy carrier. These changes have important implications for thermal processing hydrogen users.

Key Take a Ways:

- Hydrogen atmospheres are critical to a wide variety of metal thermal processes
- There are a wide variety of competing uses for hydrogen across industries
- Hydrogen is emerging as the primary energy carrier in an increasingly decarbonized world
- The hydrogen market, previously in supply-demand balance, is going to enter a time of massive demand increase
- Thermal processors need to be aware of the hydrogen market gyrations to plan for hydrogen supply