13th International VDEh-Seminar

Electrical Engineering of Arc Furnaces

7 to 9 June 2017, Cologne, Germany

TARGET GROUP

Leading experts will present basic principles and new technologies of electric steelmaking for maintenance and operating personnel, supervisors responsible for plant and unit operations and managers. Steelshop installers, third party inspectors, and contract maintenance personnel will particularly benefit from detailed discussions on new developments and techniques.

CHAIRMAN

Prof. Dr.-Ing. Klaus Krüger, Max Aicher GmbH & Co. KG

SPEAKERS

Dipl.-Ing. Markus Abel, tripleS GbR, Durnach • Prof. Dr.-Ing. Detmar Arlt, University of Applied Sciences Düsseldorf • Dipl.-Ing. Arne Arnold, SGL Carbon GmbH, Meitingen • Christian Buchmaier, INTECO melting and casting technologies GmbH, Bruck a. d. Mur • Dipl.-Ing. Egon Kirchenmayer, Siemens AG, Nürnberg • Dr.-Ing. Bernd Kleimt, VDEh-Betriebsforschungsinstitut BFI, Düsseldorf • Prof. Dr.-Ing. Klaus Krüger, Max Aicher GmbH & Co. KG • Prof. Dr.-Ing. Herbert Pfeifer, RWTH Aachen University

PROGRAMME

Physics of Furnace-Arcs • Equivalent Circuit-Diagram of AC-Furnaces • Power Supply and Requirements of the Supply Network • Furnace Transformers • Design of the High-current System for AC-Furnaces • Electrical Layout of Electric Arc Furnaces • Energy Balance of the Electric Arc and the Arc Furnace • Graphite Electrodes for EAFs • Static Var Control • Power Control of AC Arc Furnaces • Electric Principles of DC-Furnaces • Energetic Modelling of the Electrical Arc Furnace Process • Foaming Slag Control • Tutorial: Calculation of circle diagrams of participant’s EAFs • ➞ new in programme: Ladle Furnaces

ORGANISATION / REGISTRATION

Steel Institute VDEh
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VENUE

art’otel Cologne
Holzmarkt 4
50676 Cologne
Germany
www.artotels.com

The Steel Academy will automatically make a room booking for the participants at the art’otel Cologne from 6 (evening prior to the seminar’s beginning) to 9 June 2017 for a special rate of EUR 99,00 per night incl. breakfast. The hotel room bill will be settled by you upon departure. Please advise at your registration, if you do not need a reservation or whether you would like to stay longer in the hotel.

PRICE

€ 1222,00* (€ 990* registration fee VAT-free plus € 232 conference package/full board)
€ 1422,00 (€ 1190 registration fee VAT-free plus € 232 conference package/full board)

* for employees of member companies and individual members of the Steel Institute VDEh

The conference package includes food and beverages during the seminar.

A free withdrawal from the seminar is possible until two weeks prior to the start. Then, 25% of the seminar fee must be paid. The total registration amount will be charged for no show or cancellation from the first day of the event. The participant also has to bear the cancellation costs of the seminar hotel.
PROGRAMME

WEDNESDAY, 7 JUNE 2017

08:30  Welcoming and Introduction
Peter Schmieding

09:30  Physics of Furnace Arcs
Klaus Krüger
Arc length and diameter / Steel bath impression / Arc characteristic / Instantaneous voltage and current / Arc deflection

10:30 Coffee Break

11:00  Equivalent Circuit-Diagram of AC-Furnaces
Klaus Krüger
Single phase and three phase circuit-diagram / Application of complex variables / Vector diagrams / Short circuit reactance

12:15 Common Lunch

13:30  Short Circuit and Operating Reactance
Klaus Krüger
Two and three phase short circuit test / Shift of the neutral point / Model and effect of the arc reactance

14:30  Circle Diagram of AC-Furnaces
Klaus Krüger
Calculation of circle and furnace power diagram

15:30 Coffee Break

16:00  Power Supply of Electric Arc Furnaces and Requirements of the Supply Network
Detmar Arlt
Influence of the power supply network of arc furnaces / Network disturbances / Reactive power compensation

at the same time: Tutorial: Calculation of Circle Diagrams of AC-Furnaces
Participants calculate circle diagrams of their AC-EAFs

19:00 Common Dinner

THURSDAY, 8 JUNE 2017

08:30  Furnace Transformers
Egon Kirchenmayer
Basic principles of a transformer / Furnace transformer with direct regulation / Booster-transformer / Voltage drop / Influence of the transformer- and system-impedances / Limits of voltage and power

10:15 Coffee Break

10:45  Energy Balance of the Electric Arc
Herbert Pfeifer
Electrical efficiency / Heat transfer from the arc to the melt / Energy balance of the electric arc / Parameters of the heat transfer / Fluid flow in slag and melt

11:45 Energy Balance of the Electric Arc Furnace
Herbert Pfeifer
Energy consumption / Efficiency / Sankey diagram of the EAF / Energy recovery / Scrap preheating

12:45 Common Lunch

14:00  Energetic Modelling of the Electrical Arc Furnace Process
Bernd Kleimt
Model-based analysis of the energetic efficiency of Electric Arc Furnaces / Dynamic modelling of energy and mass balance / Online calculation of the melt temperature

15:15 Coffee Break

15:45  Foaming Slag Control
Klaus Krüger
Effect of foaming slag / Possibilities of automated foaming slag detection and control

16:30  Ladle Furnaces
Christian Buchmaier
Electrical layout / System design / Applications

17:30  Static Var Control for Electric Arc Furnaces
Detmar Arlt

at the same time: Tutorial: Calculation of Circle Diagrams of DC-Furnaces
Participants calculate circle diagrams of their DC-EAFs

19:00 Common Dinner

FRIDAY, 9 JUNE 2017

08:30  Design of the High-current System for AC-Furnaces
Markus Abel
Transformer pins / Flex-strips / Connection through transformer wall / Power cables / Electrode arms

09:30  Electrical Layout of Electric Arc Furnaces
Markus Abel
Different electrical designs for various charge materials (scrap, hot metal, DRI) and for various grades of steel (carbon or stainless)

10:30 Coffee Break

11:00  Graphite Electrodes for Electric Arc Furnaces
Arne Arnold
Production, properties, current carrying capacity and handling of electrodes / Recent and future developments

11:45 Power Control of AC-Furnaces
Klaus Krüger
Control variables and control strategies of electrode position controls / Thermal based power control / Closed-loop reactor control

13:15 Common Lunch

14:00  Electric Principles of DC-Furnaces
Klaus Krüger
System design / Rectification / Power diagram / Closed-loop current and voltage control / Arc diversion

15:30 End of the Seminar