

Seminar

Secondary Metallurgy of Steel

2 - 4 September 2025,
Duisburg, Germany



AIM

The aim of this theoretical and practical seminar is to provide participants with an in-depth understanding of the processes involved in secondary metallurgy. Building on special fundamentals, the individual reactors for secondary metallurgical treatment and their tasks will be explained in detail. There will also be an outlook on hydrogen-based green steel production. Discussions and teamwork exercises will round off the range of lectures.

CHAIR

Dr.-Ing. Helmut Lachmund, Dillingen

ORGANISATION / REGISTRATION

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REGISTRATION FEE

EUR 1090.00* Seminar fee, VAT-free plus
EUR 274.00 conference/catering flat rate incl. 19 % VAT
EUR 1290.00 Seminar fee, VAT-free plus
EUR 274.00 conference/catering flat rate incl. 19 % VAT

* special rate for employees from member plants and personal members of the Steel Institute VDEh / university staff
=> for becoming a personal VDEh member click [HERE](#)

+++ Within the framework of the VDEh promotion of young talent, young engineers (≤ 30 years, personal VDEh member or employees of member companies) also receive the 50% discount +++

Cancellation of the seminar is possible free of charge up to two weeks before the start. After that 25% of the seminar fee must be paid. In the event of non-attendance or cancellation after the first day of the event, the entire participation fee is due. Cancellation fees of the conference hotel are to be borne by the participant.

CONTENT

- Tasks of modern secondary metallurgy
- Materials technologies impact on process metallurgy
- Chemistry crash course: How to read phase diagrams
- Thermodynamic and kinetics for secondary metallurgy
- Fluid dynamics in the ladle
- Temperature control using self-learning AI
- Mechanism and kinetics of special reactions
- Deoxidation and calcium metallurgy
- Metallurgy of: ladle furnace, ladle degassing plant, RH plant, VOD and AOD process and of special melting processes
- Special melting processes, especially ESR
- Inclusions and their reduction
- Hydrogen-based CO₂-neutral steel production
- **Discussion:** Does hydrogen-based steel production pose new challenges for secondary metallurgy?
- **Teamwork exercise:** Steel plant layouts for different types/grades of steel

VENUE / SEMINAR HOTEL

IntercityHotel Duisburg
Mercatorstr. 57
47051 Duisburg
Germany
duisburg@intercityhotel.com
www.intercityhotel.com

HOTEL INFORMATION

Unless otherwise requested, the Steel Academy will automatically make a reservation for the participant at the IntercityHotel Duisburg (room rate € 108.00 per night). The rooms are reserved for three nights from the evening before seminar's starting, i.e. from September the 1st. The room costs are not included in the seminar fee and are payable on site at check-out.

PROGRAMME

TUESDAY, 2 SEPTEMBER 2025

- 08:30 **Introduction**
Peter Schmieding
- 09:00 **Tasks of modern secondary metallurgy**
Helmut Lachmund
Basic operations of secondary metallurgy / Plants and processes / Maximum contents of accompanying elements
- 09:30 **How to read phase diagrams**
Helmut Lachmund
- 10:15 Coffee break
- 10:45 **Trends in materials technology and their impact on process metallurgy**
Wolfgang Bleck
Crystallography / Microstructure, phase transformations / Accompanying elements / Relationship between chemical composition, microstructure and mechanical properties
- 12:30 Lunch
- 13:45 **Fluid dynamics in the ladle**
Jens Kempken
Momentum-, buoyancy- and energy flow in fluid mechanics / Axially symmetric free jets / Energy dissipation and turbulence / Mixing and dissolution
- 14:45 **Temperature control using self-learning AI**
Sebastian Hilterscheid
Temperature losses / Savings potential / Model variants / Model integration / Limits of applicability
- 15:45 Coffee break
- 16:15 **Hydrogen-based CO₂-neutral steel production**
Jochen Schlüter
Direct reduction with natural gas and hydrogen / DR-EAF route versus DR-smelter-converter route / Slags from CO₂-neutral steel production
- 17:15 **Discussion: Does hydrogen-based steel production pose new challenges for secondary metallurgy?**
- 18:00 End of 1st day / common diner

WEDNESDAY, 3 SEPTEMBER 2025

- 08:30 **Kinetics of special reactions in secondary metallurgy**
Jens Kempken
Degradation curves and mass transfer / Aluminum melting loss / Marangoni effect / Kinetics of deoxidation

- 09:15 **Deoxidation**
Helmut Lachmund
Deoxidation equilibria / Nucleation and growth / Co-agulation / Deposition / Oxide metallurgy
- 10:45 Coffee break
- 11:15 **Metallurgy of the ladle furnace**
Stefan Kraskes
Plant technology / Components and necessary peripherals / Heating rate / Buffering / Metallurgical possibilities / LF heat balance
- 12:45 Lunch
- 14:00 **Metallurgy of ladle tank degassing**
Helmut Lachmund
Plant design and process engineering / Vacuum deoxidation / Decarburization / Denitrification / Hydrogen decomposition / Metal-slag reactions / Slag emulsification / Reactions with refractory materials / Stirring strategy
- 15:30 Coffee break
- 16:00 **Metallurgy of RH degassing**
Thomas Eichert
Variants of RH treatment: Vacuum carbon deoxidation, natural and forced decarburization / Plant design / Treatment process and cycle times / Comparison of ladle tank degassing and RH process
- 17:30 **Inclusions and their reduction**
Helmut Lachmund
- 18:15 End of 2nd day / common diner

THURSDAY 4 SEPTEMBER 2025

- 08:30 **Metallurgy of VOD and AOD processes**
Leandro Schöttler
Thermodynamics and kinetics / Vacuum generation and vacuum control / Layout of VOD lances / Exhaust gas analyses and process modelling / Duplex and triplex processes
- 10:00 Coffee break
- 10:30 **Teamwork exercise: Planning of steel plant layouts for different steel grades**
- 12:30 Lunch
- 13:30 **Special melting processes, especially ESR**
Alexander Scheriau
Reactions, solidification, ingot defects and plant concepts for electros slag remelting
- 15:00 **End of seminar**

SPEAKER: Prof. Dr.-Ing. Wolfgang Bleck, RWTH Aachen • Dipl.-Ing. Thomas Eichert, SMS Group, Düsseldorf • Dr.-Ing. Helmut Lachmund, Dillingen • Dr.-Ing. Jens Kempken, SMS Group, Düsseldorf • B.E. Sebastian Hilterscheid, ArcelorMittal Duisburg, Duisburg • M. Sc. Stefan Kraskes, Deutsche Edelstahlwerke Siegen/Hagen GmbH & Co. KG, Siegen • DI Alexander Scheriau, INTECO melting and casting technologies, Bruck a.d. Mur • Dipl.-Ing. Jochen Schlüter, Dortmund • Dipl.-Ing. Leandro Schöttler, Swiss Steel - DEW Specialty Steel GmbH & Co. KG, Witten // Organisation: Peter Schmieding, Stahl-Akademie, Stahlinstitut VDEh