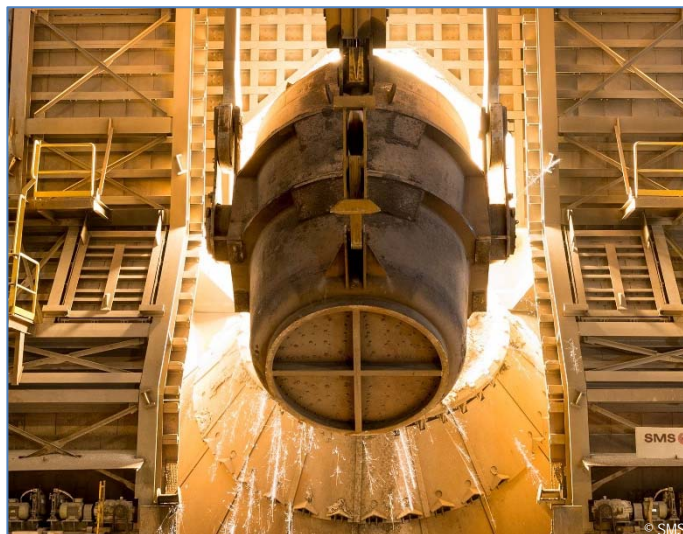


## 4<sup>th</sup> international Seminar

# Oxygen Steelmaking

The converter today and tomorrow

11 - 13 June 2024  
Duisburg, Germany



## CHAIRMEN

Karl-Heinz Spitzer, TU Clausthal  
Jochen Schlüter

## TARGET GROUP

Two thirds of the world's crude steel production runs through the converter. The converter will also take its place in future CO<sub>2</sub>-neutral steel production in combination with direct reduction and the OBF. In addition to this new future role, the current challenges and trends of the converter will of course also be content of this seminar: scrap qualities, tramp elements, modelling and CFD as well as refractory technology. The programme will be rounded off with the most important fundamentals such as thermodynamics, reaction kinetics and heat and mass balance.

Our target groups are:

- Steel shop operating staff
- Employees in R&D and transformation

## REGISTRATION FEE

EUR 1090,00\* registration fee VAT-free plus  
EUR 269,00 conference package (total EUR 1.359,00\*)

EUR 1.290,00 registration fee VAT-free plus  
EUR 269,00 conference package (total EUR 1.559,00)

\* for employees of member companies and individual members of the Steel Institute VDEh. Scientific staff of universities gets a 50 % off.

+++ as part of the VDEh young talents promotion also employees up to 35 years of VDEh member companies receive a 50% off +++

The conference package includes food and beverages during the seminar (incl. 19 % VAT). A free withdrawal from the seminar is possible until 2 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.

## CONTENT

- History, developments and types and of oxygen converters
- Thermodynamic and kinetic basics in the converter process
- Tramp elements
- Hot-metal pretreatment
- Computational Fluid Dynamics in the converter
- Design and construction of modern oxygen converters
- Chemical reactions kinetics:
  - Refining reactions and slag forming in the BOF process
- Mass balance and heat balance
- Converter process modelling
- Steel scrap for the converter
- Refractory materials for BOF
- Comparison of different converter operation practices:
  - US – Europe – Japan
- Environmental aspects: Dedusting
- Process of CO<sub>2</sub> neutral steelmaking
- The role of the converter in CO<sub>2</sub> neutral steelmaking

## ORGANISATION

Steel Academy • Steel Institute VDEh  
Peter Schmieding  
Sohnstraße 65, 40237 Düsseldorf, Germany  
Fon +49 211 6707-458  
[training@vdeh.de](mailto:training@vdeh.de) / [www.steel-academy.com](http://www.steel-academy.com)

## VENUE / SEMINAR HOTEL

Intercity Hotel Duisburg  
Mercatorstr. 57  
47051 Duisburg, Germany

The Steel Academy will automatically make a room booking for the participants at the Intercity Hotel Duisburg from 10 – 13 June 2024 for a special rate of EUR 108,00 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.

# PROGRAMME

## Tuesday, 11 June 2024

- 8.45 a.m. **Introduction to the seminar**  
Peter Schmieding
- 9.30 a.m. **History, design and types of converters**  
Jochen Schlüter  
Design of Bessemer-, Thomas-, LD- and OBM-converters
- 10.45 a.m. coffee break
- 11.15 a.m. **Thermodynamic and kinetic basics in the converter process**  
Karl-Heinz Spitzer  
Reactions and transport in the converter / Basics of a model on thermodynamics and kinetics / Slag structure
- 12.45 p.m. lunch
- 2.00 p.m. **Tramp elements**  
Wolfgang Bleck  
Importance and impacts of Phosphor, Nitrogen, Copper etc
- 3.30 p.m. coffee break
- 4.00 p.m. **Hot-metal pretreatment**  
Jochen Schlüter  
Reactions and processes for the removal of silicon, phosphorus and sulphur / HMD / DDD / Injection technology / KR
- 5.15 p.m. **Steel scrap for the converter**  
Marco Knepper  
Scrap types for the converter / Scrap qualities / Scrap handling
- 6.00 p.m. end of 1<sup>st</sup> day  
=> afterwards: common dinner

## Wednesday, 12 June 2024

- 8.45 a.m. **Chemical reaction kinetics – refining reactions and slag forming in the BOF process**  
Helmut Lachmund  
Oxidation of C, Si, Mn, P, S, Fe and their interactions / Achievable contents in the crude steel / Gas reactions (CO, CO<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub>) / Slag: forming, reactions, properties
- 10.45 a.m. coffee break
- 11.15 a.m. **The process of CO<sub>2</sub>-neutral steelmaking**  
Jochen Schlüter  
Hydrogen-based direct reduction / EAF / OBF-converter

- 12.15 a.m. **Future demands in hydrogen-based CO<sub>2</sub>-neutral steelmaking and the role of the converter**  
Helmut Lachmund / Jochen Schlüter
- 12.45 p.m. lunch
- 2.00 p.m. **New developments of oxygen converters**  
Gerald Wimmer
- 3.15 p.m. coffee break
- 3.45 p.m. **Mass balance and heat balance**  
Dieter Senk  
Heat of reactions in refining and slagging / Kinetics of scrap melting / Kinetics of DRI melting / Post combustion
- 5.15 p.m. **Global comparison of converter operation practices: US – Europe – Japan – China**  
Jens Kempken  
=> **Open discussion**
- 6:00 p.m. end of 2<sup>nd</sup> day => common dinner at the harbour

## Thursday, 13 June 2024

- 9.00 a.m. **Refractory materials for BOF**  
Jochen Schlüter  
Interaction metallurgy, slags and refractory materials / Wear mechanism / Failures
- 10.00 a.m. coffee break
- 10.30 a.m. **Computational fluid dynamics in the converter**  
Norbert Vogl  
Transport equations / Physical (water modelling) and numerical simulation (CFD) / Specific flow phenomena
- 12.00 a.m. lunch
- 1.00 p.m. **Converter process modelling**  
Bernd Kleimt  
Dynamic models for online monitoring and control of oxygen refining processes / Examples for BOF, AOD, VOD
- 2.00 p.m. **Environmental aspects: dedusting**  
Rüdiger Deike  
Dust formation in the BOF process / Typical dust composition / Dust cleaning systems / Behavior of Na, K and Zn
- 3.15 p.m. **end of seminar**

**SPEAKERS** Prof. Dr.-Ing. Wolfgang Bleck, RWTH Aachen University ■ Prof. Dr.-Ing. Rüdiger Deike, University Duisburg-Essen ■ Dr.-Ing. Jens Kempken, SMS group GmbH, Düsseldorf ■ Dr. Marco Knepper, Hüttenwerke Krupp Mannesmann, Duisburg ■ Dr.-Ing. Helmut Lachmund, Dillingen ■ Prof. Dr.-Ing. Hans-Jürgen Odenthal, SMS group GmbH, Düsseldorf ■ Dr. Bernd Kleimt, VDEh-Betriebsforschungsinstitut, Düsseldorf ■ Dipl.-Ing. Jochen Schlüter, Dortmund ■ Peter Schmieding, Steel Institute VDEh, Düsseldorf ■ Prof. Dr.-Ing. Dieter Senk, Department of Ferrous Metallurgy, RWTH Aachen University ■ Prof. Dr.-Ing. Karl-Heinz Spitzer, Institute of Metallurgy, Clausthal University ■ Dr.-Ing. Gerald Wimmer, Primetals Technologies Austria, Linz