

# Steelmaking Course 2020

## Curso de Fabricación de Acero 2020

5th and 6th March 2020, Madrid (Spain)

Días 5 y 6 de Marzo 2020, en Madrid

*'Practical knowledge to apply in your company'*  
"Conocimiento práctico para aplicar en su empresa"

### EN - Outline Programme and Contents

#### **5th March 2020:**

**10:00 – 12:00**

1. Introduction to Steelmaking BOS / EAF / Ladle / Casting  
Inc. Science in Steel Video (~ 25 mins)
2. Steelmaking Process Chemistry  
Theory 101 / Primary Steelmaking / Deoxidation / Removal of Sulphur  
/ Removal of Phosphorus / Removal of Hydrogen / Removal of Nitrogen /  
Homogenization and Stirring / Inclusion Control / Temperature adjustment
3. Refractories - Overview

**12:00 – 12:15 – Coffee break**

**12:15 – 14:15**

4. BOS
  - a. Steelmaking facilities
  - b. Hot metal pre-treatment / Desulphurisation
  - c. The converter processes  
Overview / O<sub>2</sub> blowing and oxidation / fluxes and V ratio / silicon oxidation /  
decarburisation / phosphorus removal / blowing control / charge balance  
model / sub-lance sampling TSC and TSO / bath agitation
  - d. Tapping the converter  
tapping and slag control / slag splashing
  - e. Refractories

**14:15 – 15:15 – Lunch**

**15:15 – 16:30**

5. Concast Product Quality
  - a. Introduction
  - b. Cleanness  
Non-metallic inclusions / SEN design / Curved vs. Vertical Casting Machines
  - c. Surface Quality  
Longitudinal Cracking / Transverse Cracking / Mould Oscillation (EMS and EMBR) / Mould Powders / Chemistry
  - d. Internal Quality  
Solidification / 'Mushy' zone, Segregation (inc, V segregates) / Mini-ingotism / Strand deflection / Soft Reduction / Chemistry / Inclusions

**16:30 – 16:45 Coffee break**

**16:45 – 18:00**

6. BOS Charge Balance Model – workshop
7. Characterization of Slab Quality – workshop
8. Steel University Simulations – workshop  
Choice of BOS and / or Continuous Casting

**6<sup>th</sup> March 2020:**

**9:00 – 11:00**

9. EAF
  - a. Introduction
  - b. Electrical power supply  
Electrical Inputs 101 / Delta Closure / Transformers / Water Cooled Flexible Cables / Electrode Mast and Arms// Current and Voltage 101 / Simplified Electrode Regulation
  - c. Furnace Engineering and Design  
Oxygen lances / Burners / Solid Material Injectors / Commercial Systems
  - d. Melting
  - e. Refining
  - f. Tapping
  - g. Electrodes
  - h. Refractories

**11:00 – 11:15 – Coffee break**

**11:15 – 13:15**

10. Secondary or Ladle Steelmaking
  - a. Introduction
  - b. Slag Control  
Carry over slag / Slag treatments

- c. Deoxidation and Alloying  
Introduction / Class 1 & 2 alloys / Value in Use / Alloy yield, pick up and fade / Residual control / Bulk additions / Wire feeding / Injection / Calcium treatment
- d. Homogenisation  
Gas stirring / Electro-magnetic stirring
- e. Temperature Control  
Increase / Decrease / Conservation / Process effects
- f. Degassing / Decarburisation  
Control of gases / Removal of gases / RH & Tank Degassing
- g. Conclusion
- h. Refractories

**13:15 – 14:15 – Lunch**

**14:15 – 15:30 – Coffee break**

- 11. EAF Scrap Types and Least Cost Mix – workshop
- 12. Direct Reduced Iron
  - a. Cold DRI / Hot Briquetted Iron / Hot DRI
  - b. Thermal balance / Oxygen practice / Feed rate / Temperature drift / Transformer requirements / Electrode requirements

**15:45 – 17:00**

- 13. Steel University Simulations – workshop  
Choice of EAF and / or Ladle Steelmaking

## Location and hotel

This course will take place in Madrid, the 5<sup>th</sup> and 6<sup>th</sup> March 2020, in the

Hotel NH Príncipe de Vergara  
C/ Príncipe de Vergara 92  
28006 Madrid  
SPAIN

Location: <https://www.nh-hoteles.es/hotel/nh-madrid-principe-de-vergara/mapa>

To register, please fill in the registration form and send it to [info@atecid.com](mailto:info@atecid.com), send us an e-mail, or use our [contact web page](#), so we can reserve a site and let you know when you define the hotel where you will have place and we will communicate as soon as possible.

# STEELMAKING COURSE – BOOK A SEAT

## CURSO DE FABRICACIÓN DE ACERO (ACERÍA) – RESERVA TU PLAZA

(Curso en inglés, con traducción continua a español / English spoken course)

MADRID (SPAIN), 5<sup>th</sup> - 6<sup>th</sup> MARCH 2020 MADRID, 5 - 6 MARZO 2020

Hotel NH Príncipe de Vergara. C/ Príncipe de Vergara, nº92. 28006 Madrid. [Ubicación/Location](#)

Nombre / Name:

Empresa / Company:

Puesto / Position:

Nº Móvil / Mobile Phone No:

E-mail:

Quiero Traducción a español / I need Spanish translation

Rellenar aquí y enviar a [info@atecid.com](mailto:info@atecid.com)  
fill in here and send to [info@atecid.com](mailto:info@atecid.com)

Este curso es parcialmente bonificable por FUNDAE (Fundación Tripartita), pregúntenos por ello, This course is partially rewarded for Spanish companies, ask us about it



## Precios y descuentos / Prices and discounts

El precio varía con la fecha de pago y número de asistentes / Price varies depending on payment date and number of attendees

Pago posterior al 20 de enero y antes de la entrada, 1180 € por persona / Payment after 15th February and before entrance, 1180 € per person

### **Pago antes del 20 de enero / For payments before 20<sup>th</sup> January**

- Una persona / One person: 1150 € (si es una persona por empresa – in case it is one person per company)
- Dos personas de una misma empresa / Two attendees from the same company: 950 € cada persona / each person
- Tres o más personas de una misma empresa / Three or more attendees from the same company 890 € cada persona / each person