

# Burners, Combustion, NOx emissions & Introductory Combustion Decarbonisation

## Introductory training

duration  
2 days

date  
Nov 23 - 24

location  
Eindhoven (NL) and/or Online

Fossil fuel combustion is still a key element affecting glass furnace emissions and energy consumption. Combustion settings and burner types influence heat transfer and formation of aggressive and polluting species such as NOx. In addition to explaining the various mechanisms responsible for pollution, the course will explain how to reduce emissions both from the perspective of primary (process-integrated) and secondary (end-of-pipe) techniques. As a new segment of the course these same techniques will be applied to look at decarbonisation. From combustion of liquid and gaseous biofuels to hydrogen.

### Contents

- Combustion mechanisms
- Emissions sources and legislation
- Glass furnace energy balance
- Radiation and heat transfer
- NOx formation
- Burner types
- Staged combustion
- Carry-over and evaporation
- Impact of combustion on redox
- Combustion monitoring & control
- Abatement technologies
- Introduction to decarbonisation
- Bio gas and Bio Fuels
- Hydrogen Combustion

Cancellation fees apply. 1 week before training 50%; no show, full price. In case of an unexpected event, we are happy to look for rescheduling or voucher options. CelSian reserves the right to cancel up to two weeks prior to the training, proposing new dates or refunds. Are you registering as a group? You are entitled to a 15% discount on all courses: for 5 registrations, the 6th participant can join for free.

### Training methods

We offer a blended learning approach by mixing e-learning, lectures, open discussions, exercises, and case studies in teams or individually. The number of participants per course is between 8 and 20 to maximize your learning experience. Participants always receive the presentations and a training certificate.

### Level of seniority

This training is meant for novice to advanced beginners who would like to improve their understanding and apply the knowledge during practical cases.

### Investment

Training costs **€ 2190** per participant. When onsite, price includes 2 lunches and 1 dinner. It excludes tax and duties. The 6th participant from the same company can join for free.

### After the training

- You realize the mutual interaction between batch components & combustion atmosphere on one hand and glass quality & furnace lifetime on the other hand.
- You are trained to find industrially feasible emission limits for different glass and furnace type.
- You are familiar with techniques to reduce emissions.
- You can diagnose causes of emissions and define measures to reduce them.