

# Refractory selection, maintenance and related defects

## Introductory training

duration  
4 half days

date  
May 13 - 16

location  
Online or Eindhoven,  
The Netherlands

The refractory materials used in industrial melting furnaces are a huge investment for the glass manufacturer. Choosing the correct refractories is key in improving furnace lifetime, reducing energy costs, and minimizing refractory-related defects. The course will provide you with insight into why different parts of the furnace, including melter, refiner, working end, forehearth channels, and regenerator chambers, require different refractory types with specific chemistry and properties. The course will also provide you with some maintenance techniques that can be used to increase the furnace lifetime and reduce the risk of refractory failures..

### Contents

- Key refractory materials, requirements and properties
- Interaction mechanisms of refractories in contact with the glass melt and in contact with flue gases
- Exercises on:
  - Refractory selection for different furnace parts
  - Thermal insulation of refractory walls
- Refractory testing and on-line monitoring techniques
- Preventive maintenance of the furnace structure
- Corrective maintenance and hot repair of the furnace structure
- Identifying and understanding refractory related solid defects and cords
- Exercises on:
  - Refractory defect identification
  - Technique for furnace maintenance

### 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 advanced beginners to skilled professionals willing to deepen their knowledge.

### Investment

Training costs € 2.190,- per participant. This is the equivalent of 4 tons of glass. Price excludes tax and duties. The 6th participant from the same company can join for free.

### After the training

- You have an overview of chemistry and properties of refractory types for the different parts of furnaces and the purpose of their use.
- You understand the corrosion mechanisms of refractories in contact with the glass melt, in the superstructure/crown and in the regenerators.
- You have knowledge of techniques for testing, monitoring and controlling the thickness of refractory walls.
- You understand the defect types that can originate from different refractories in the furnace.
- You will have some techniques for preventive and corrective maintenance of the furnace structure.

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.