Training Workshop

Celsian & ARCVs Technology Conducting Training workshop on

Glass -Melting & Conditioning

By J Lotter, S Stelwagen

Celsian Academy is renowned institute from Netherland on Glass technology.

For more details visit -https://www.celsian.nl/academy/

OR

www.arcvsprojects.com

Website : www.arcvsprojects.com. Email-id: info@arcvsprojects.com, sales@arcvsprojects.com Contact : +91-9968935937,9108291740.
BRANCH OFFICE : 118 B, *Suncity Trade Center, Sec 21, GURGAON, HARYANA 122016.*

PRETEXT

The most expensive risk in your plant is:

"The person who has never been trained."

In float-glass manufacturing, most breakdowns, furnace stress issues, and quality deviations don't come from equipment, they come from operational decisions made without proper technical understanding. Skill gaps silently increase defects, energy loss, and downtime.

A Real-World Case: When Training Prevented a Major Breakdown

In a recent float-glass plant review, a series of furnace temperature fluctuations and batch carry-over issues led to product distortion and higher reject rates. The root cause was not equipment, but insufficient process understanding among the shift team.

After introducing structured technical training, the plant recorded a 38% drop in defects, 27% improvement in furnace stability, and a measurable reduction in cullet generation within weeks.

This improvement came without any capital investment—only through capability building.

Training Cost Is Not an Expense—It Is a Profit Multiplier

Industry data shows that plants investing consistently in technical training gain long-term returns through:

- Reduced energy losses and improved combustion efficiency
- Fewer furnace wear issues and longer refractory life
- Lower scrap/rejects due to better process discipline
- Faster troubleshooting and better decision-making
- Higher line uptime and operational continuity

For every unit of currency invested in structured technical training, global benchmarks indicate a 5x–11x return in improved yield, reduced breakdowns, and increased production

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stability. In an industry where margins are tight, training is one of the most reliable ROI-generating levers.

What Top Glass Manufacturers Are Doing

Leading global companies—Saint-Gobain, AGC, Guardian, NSG, and others—allocate 3–5% of their annual operational budgets to structured training programs. They have dedicated in-house academies and continuous upskilling calendars because they recognize that furnace performance, melting efficiency, and product quality depend more on people capability than on equipment alone.

Their competitive edge is simple: highly trained teams produce consistently high-quality glass with lower operational risk.

"Plants don't fail because of bad machines—they fail because of un-trained people operating them

Let's Explore the Training program details in next pages

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PROPOSED TIME SCHEDULE

Sr.no	Description
	Day 1
1	Introduction
2	Glass composition
3	Raw materials and melting
4	Fundamentals of Furnace Operations
	Day 2
5	Refractory, Corrosion, and Evaporation
6	Energy Efficiency and combustion
	Day 3
7	Forehearth basics
8	Annealing
9	Wrap up

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INTRODUCTION

- General introduction about Glass.

GLASS COMPOSITION

- Definition of glass state: concepts of supercooled liquid and glass transition.
- Definition of devitrification and liquidus temperature.
- Influence of the glass components on the structure (network formers, network modifiers).
- Link between structure and properties of glass: viscosity, chemical durability, electrical conductivity, expansion coefficient…

RAW MATERIALS AND MELTING

- Classical raw materials (sand, soda ash, limestone, dolomite, alumina carriers), origin, and processing.
- How to select raw materials: particle size, contamination, sustainability…
- Advantages and drawbacks of cullet use.
- What is carry-over and how to avoid it.
- A good melt comes from a well-mixed batch. Concept of segregation and how to avoid it.
- Role of water on batch handling and melting.
- Energy balance of the batch-to-melt conversion, and ideas on how to save energy.

FUNDAMENTALS OF FURNACE OPERATION

- Basic principles furnaces and boosting
- Definition of electricity, Ohm's law, Power and Energy
- Introduction to electrical boosting

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REFRACTORY, CORROSION, AND EVAPORATION,

- Key requirements (temperature stability, corrosion resistance, compressive strength, thermal shock resistance) for refractory materials depending on their position in the process (glass contact, combustion space, high and low positions in the regenerator).
- Interaction between glass and AZS, flue gases, the crown, and the regenerator.
- Condensation of evaporating species and reactions with refractories.

ENERGY EFFICIENCY AND COMBUSTION

- Basics of combustion
- Orders or magnitude: how energy intensive is glass production, what parts are the most energy demanding, and how much energy can be saved depending on the actions taken?
- Focus on the energy balance of the melter. Benchmark of furnaces.
- Energy savings: flue gas losses and recovery systems

FOREHEARTH BASICS

- Main role of forehearth
- Cooling and heating combined
- Effectiveness of different cooling methods
- Relevant glass properties
- Combustion in forehearth
- Combustion Space Atmosphere
- Influence on cooling behavior of a forehearth
- Thermal homogeneity

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ANNEALING

- What is a Lehr
- Annealing Theory
- Lehr Setup and Operation
- Stress Measurement
- Stress Targets/Edge Stress

WRAP UP

- Wrap up of training, survey, Certificate of participation

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