



Knowledge of glass and glass products « VEPV »

This is a general training that can be given through a very complete version for glass engineers or through a more or less light version, depending on the requirements of the company. The total duration of this training could go from 3 to 15 days and adapt to the demands. Each of the topics of this training will be more or less developed, to adapt to the expectations of trainees.

➤ **Purpose of the training**

Giving complete knowledge on the glass industry as a whole, from material to glass products, all components of the glass industry: flat glass, packaging glass, technical glass, fiberglass, crystal.

➤ **Relevant staff**

Anyone involved in the production process of the glass world: fusion, manufacturing, processing, quality, research, supplier, customer.

➤ **Program** (adapted to the needs of the trainees)

○ Glass and properties

- General view

Economic presentation of the glass industry

History of glass and its manufacture

- The glass material

Glassy state, vitrification/de-vitrification, role of elements, phase diagram, main families and chemical compositions of silicate glasses (sodalime, borosilicate, lead glass, fiberglass, opal glass, vitro-ceramic)

- Colouring and decolourising of glass

Colouring mechanism, colouring, colour measurement

- Properties of glass

Viscosity, Density, Elasticity, Mechanical Strength, Electrical Conductivity, Thermal Expansion, Energy Transmission, Optical Properties

○ Raw material, recycling and glass melting

- Raw material

Presentation, role and criteria of choice of raw materials (chemical analysis, impurities, granulometry, humidity)

- Recycling glasses
- Calculating batch composition
- Batch house

Role, description, operation of the batch house

- Glass melting

Melting, refining

- Oxydo-reduction of the glass, calculating the redox number

○ Characteristics and conducting of furnaces and feeders

- Glass furnaces

Description of the various types of continuous furnaces, furnace design, heating-up, performance criteria

- Conducting of furnaces



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Glass technical training



Principle of conducting and monitoring furnaces, indicators (pressure, glass level, temperature), bath cover, convection currents

- Refractory materials

Presentation, features and use of electro-fused and sintered refractories

- Working tank and feeder
 - Types, role, feeder conducting
 - Principle of thermal exchanges by radiation

○ Heating furnaces, energy and environment

- Heating furnaces

Gas and fuel combustion

- Heat balance of tank furnaces
- Industrial gas and their use
- Environmental legislation on emissions from glass furnaces
- Electric boosting of furnaces

○ Manufacturing hollow glass

- Processes and machines for manufacturing hollow glass
 - Blow and Blow process, Press and Blow wide and narrow neck process, pressing process, paste mould press and blow process
- Mould: conception, materials
- Defects of hollow glass
- Presenting defects, notion of Quality and SPC
- Characteristics of packaging glass

○ Flat glass and glass fibers and their applications (building, transport, solar sensors)

- Flat glass manufacturing processes
- Products and use of flat glass (glazing, decoration, furnishing, automobile, solar sensor)
- Wool and fiber glass
- Thermal concept of building (RT 2012, thermal insulation, solar control, thermal design)

○ Heat treatment and glass surface

- Flat and hollow glass annealing
- Thermal tempering of glass
- Description of the glass surface, chemical durability
- Surface treatments for hollow glass
- Flat glass coated (pyrolytic and vacuum deposits)

➤ **Duration of the training**

From 3 to 15 days depending on the desired program

➤ **Place of training**

At your choice (your site or elsewhere)

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