



CelSian – NCNG International Glass Technology Course

**for the
Glass Industry in North & South America**

**Toledo, Ohio USA
4 – 8 June, 2018**

In cooperation with:



Introduction & Summary

CelSian Glass & Solar B.V. organizes on regular basis a five-day highly technical, comprehensive Glass Technology training course focused on industrial glass production. This course is developed in cooperation with the NCNG (National Committee Netherlands Glass industry).

The next course is scheduled on **Monday, 4th June till Friday 8th June 2018** (5 days) in Toledo Ohio, a center of glass manufacturing in North America. The course is open for the employees of the North and South American glass producing industry and related suppliers.

The training course is hosted by Libbey Glass in Toledo, Ohio.

This in-depth course covers many aspects of glass and glass production: from raw materials to formed product, including glass structure & properties and glass melting technology. Since 1990, this course has been given to more than 1500 employees from glass industries worldwide. All presentations will be formatted in PowerPoint, and will be in the English language. All participants will receive a comprehensive text book (800 pages), and a PDF copy of the slides used during the course.

This five-day training course is being offered for € 3200,- per participant. The fee for employees of Glass Trend member companies is € 2500,-. These costs include an introductory e-learning course by internet, lunches and drinks during the breaks, two dinner invitations, and excluding taxes/duties, hotel accommodation and travel costs.

In addition, all attendants will receive access to our interactive e-learning course, allowing the viewing of 11 short films online (trailer available on www.glasstrend.nl, Tab Events & Agenda). The movies are accompanied by multiple choice questionnaires accessible to the participants in a period of 2 weeks preceding the classical course, for an evaluation on a self-test basis. The required time to take this introductory course is around 2 hours.

Cancellation fee:

- Before April 27th, 2018: free of charge
- April 27th – May 17th, 2018 50% of the registration fee will be charged
- May 18th – June 3rd, 2018 75% of the registration fee will be charged.
- No show: full registration fee will be charged.

The tentative program can be found on page 4 & 5, with more details on the content per subject on pages 6 & 7.

Target group

The course is meant for experienced engineers in the glass industry to receive a more detailed understanding of the glass production, entrants in the glass producing industry and related suppliers and young glass technologists and scientists. Level: high technical and academic.

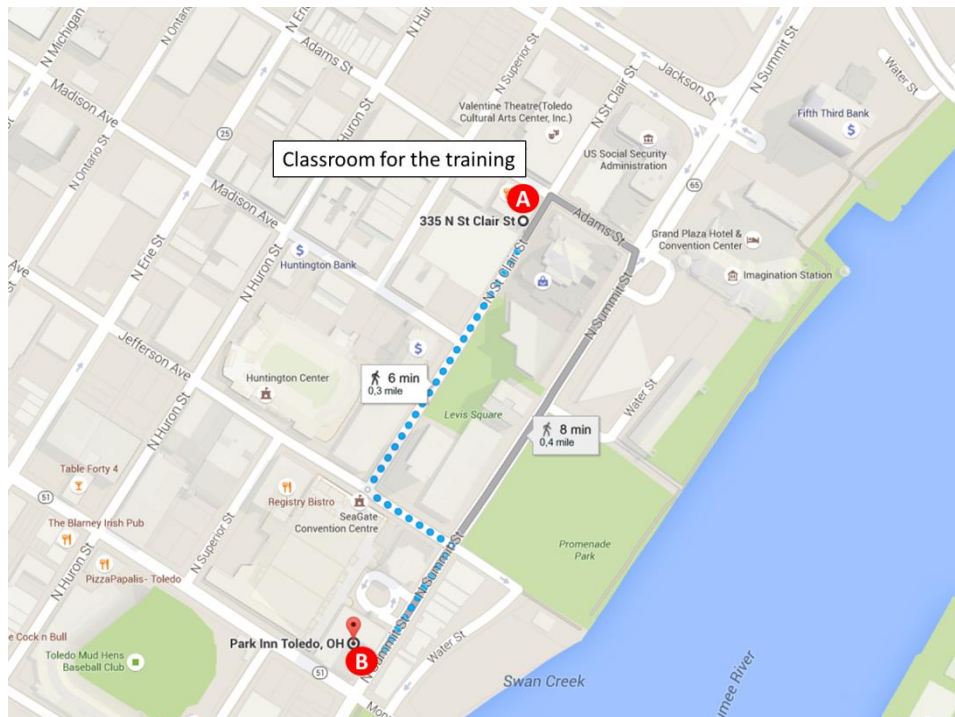
Registration is open (online registration only)

Click [here](#) for the online registration

The number of places available is limited to 25.

All the participants will receive:

- A 5-day classical course dedicated to glass technology for glass industries
- An introductory e-learning course by internet, in the 2 weeks-period preceding the classical course
- A comprehensive textbook on industrial glass production, glass properties and glass technology of about 800 pages
- The Power Point presentations (pdf formatted presentations)
- Lunches & classroom access
- 2x Dinner/evening events



Location A: Class room of the training course:

Showroom Libbey Glass
335 North St. Clair Street, Toledo, Ohio 43604, USA
Phone: 419-246-0512

Location B. Recommended Hotel (5 minutes walk from classroom). Hotel reservation should be made directly by student or her/his company.

Park Inn Toledo
101 North Summit St
Toledo, OH 43604
Tel.: + 1 419.241.3000
<http://www.parkinn.com/toledooh>

Preliminary Program Glass Technology Course

4/6 – 8/6 2017

Host: Libbey Glass

Place: Toledo, OH, USA

Location: Showroom, 335 North St. Clair Street, Toledo, OH 43604

Preliminary Program

Monday, 4 June 2018

08.30 – 09.15 hr	Welcome & Introduction
09.15 – 12.30 hr	Module on Glass Structure & Properties, part 1
12.30 – 13.30 hr	Lunch
13.30 – 17.30 hr	Module Glass Structure & Properties, part 2
18.30 – 21.30 hr	Dinner in Toledo downtown area (invited by CelSian Glass & Solar)

Tuesday, 5 June 2018

09.00 – 12.30 hr	Modules on Raw Materials, Batch Preparation & Glass Recycling
12.30 – 13.30 hr	Lunch
13.30 – 17.30 hr	Module on Melting & Fining Processes, part 1
18.00 – 20.00 hr	<i>Optional:</i> Tour at AGR (American Glass Research) followed by dinner (invitation AGR).

Wednesday, 6 June 2018

09.00 – 12.15 hr	Module on Glass Melting & Fining Processes, part II
12.15 – 13.00 hr	Lunch
13.15 – 15.00 hr	Visit Toledo Glass Museum (To be confirmed) Approx. 13.45 hrs departure to the Glass Pavilion at the Toledo Museum of Art.
15.30 – 17.30 hr	Visit of the Libbey Glass plant in Toledo Take safety shoes and protective clothing with you!

Thursday, 7 June 2018

09.00 – 12.30 hr	Module on Furnace Technology, part 1
12.30 – 13.30 hr	Lunch
13.30 – 17.30 hr	Module on Furnace Technology, part 2
18.30 – 21.30 hr	Dinner invitation for all course participants

Friday, 8 June 2018

09.00 – 12.30 hr	Module on Energy and Emissions
12.30 – 13.30 hr	Lunch
13.30 – 16.00 hr	Module on Glass Defects

Course will finish at ±16.00 hrs.

The arrangement of the different modules and the program of the visits may be subject to changes. The final program will be communicated to all the confirmed participants approx. one week prior to the beginning of the course.

More info about the content of the course can be found in the following pages.

Content of the course:

The course includes the following subjects:

1. Glass structure and Glass (melt) properties (1 day)
 - a. Glass Chemistry and Physics
 - b. Optical properties
 - c. Mechanical properties
 - d. Physical properties
 - e. Flow properties
 - f. Heat conduction
 - g. Chemical resistance of glass
 - h. Colouring of glass

2. Raw materials for glass (0.5 day)
 - a. Raw material evaluation
 - b. Selection criteria
 - c. Batch preparation and transport
 - d. Batch compositions

3. Melting processes in glass furnaces (3/4 day)
 - a. Melting and fusion of raw materials
 - b. Sand grain dissolution
 - c. Removal of gases (bubbles) – fining, foaming and refining
 - d. Redox chemistry and colour issues
 - e. Homogenisation

4. Glass furnace design, operation and control (1 day)
 - a. Furnace designs
 - b. Refractories and behaviour refractory in glass furnaces
 - c. Combustion systems
 - d. Furnace operation & control

5. Energy efficiency of glass furnaces & emissions (1/2 day)
 - a. Energy balances & Energy saving methods
 - b. Emissions and their sources
 - c. Chemistry of flue gases
 - d. Air pollution Control

6. Recycling of glass (1/2 day)
 - e. Purification of waste glass
 - f. Recycling technologies
 - g. Redox sensors & organic materials in recycled glass

7. Glass defects and glass quality (1/2 day)
 - h. Gas bubbles and their origin
 - i. Knots and their origin
 - j. Stones
 - k. Cords
 - l. Investigation methods for glass faults (defects)