



WORKSHOPS 2009

June 11-12



WS 01: Structural Properties of Laminated Glass

**Presenters: Stephen J. Bennison & Ingo Stelzer,
E.I. DuPont de Nemours & Co. Inc.**

**WORKSHOP LOCATION:
UNIVERSITY OF TAMPERE, PINNI B
KANSLERINRINNE 1**

Course Summary

The understanding of the structural performance of laminated glass has made great advances over the past decade. The progress made to date has laid the foundation for objective structural design with laminated glass.

The aim of this course is to provide participants with a framework to assess the structural performance of laminated glass in common loading/support, conditions encountered in architectural applications. Methodologies will be presented to determine the strength, deflection and creep performance of laminated glass. Especial emphasis will be placed on the role of interlayer properties on structural behavior enabling the participant to assess the best choice of interlayer for a given application. Case studies will be presented showing the approach and analysis tools used to derive a laminated glass solution for a specific application.

Participants who complete this course should be able to carry out basic analyses of laminated glass performance for common design cases.

Bullet Point Summary

- Interlayer properties
- Key concepts in the mechanical properties of glass
- Stress analysis of laminate beams and plates
- Available software tools for analysis
- Established and developing standards and codes of practice
- Design methodologies: facades, overhead glazing, flooring, balustrades, frameless glazing
- Case studies of design solutions with high-performance laminated glass



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Course timetable

9.00	Welcome and course outline	12.00	Lunch
9.30	Interlayer properties <ul style="list-style-type: none"> • Time and temperature effects Key concepts in the mechanical properties of glass <ul style="list-style-type: none"> • Statistical effects • Design strength • Role of load duration 	13.00	Post glass breakage properties of laminated glass <ul style="list-style-type: none"> • Role of fragmentation • Role of interlayer properties Analysis methods: post glass breakage <ul style="list-style-type: none"> • Effective medium description Glazing systems effects and attachment methods
10.00	Coffee/tea & informal discussions	14.00	Coffee/tea & informal discussions
10.30	Stress analysis of laminate beams and plates <ul style="list-style-type: none"> • Analytic methods • Finite element methods Analysis methods: pre-glass breakage Established and developing standards and codes of practice	14.30	Design examples <ul style="list-style-type: none"> • Facades • Overhead glazing • Frameless glazing • Balustrades • Flooring • Novel attachment systems
		16.00	Course ends

Registration for Workshops at www.gpd.fi





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THURSDAY 11 June

Structural Properties of Laminated Glass

Presenters: S. J. Bennison & I. Stelzer,
E.I. DuPont de Nemours & Co. Inc

Milestones to better understand the Flat Glass Business (history - today - tomorrow)

Presenter: B. Savaëte, BJS. Différences

Industrial Glass Coating Technologies and systems powered by nanotechnology (Beneq)

Presenter: M. Saikkonen, Beneq Oy

Glass Tempering Process (level1): Fundamental steps in tempering and machine test runs

Presenters: V-J. Kuusiniemi & T. Pesonen & M. Äppelqvist & S. Suominen, Glaston Finland Oy

Glass Bending & Tempering process: Theory and machine test runs

Presenters: V-J. Kuusiniemi & T. Pesonen & M. Äppelqvist & S. Suominen, Glaston Finland Oy

Laminating of Heat treated and other speciality glass

Presenters: M.P. Verleyen, Solutia Europe; M. Rantanen & J. Ala-Savikola, Glaston Finland Oy; R. Giovannini, Glaston Italy; A. Uusikartano, Suomen Turvalasi Tambest; C. Bostick, Consulting Architects; J. Gilleeney, Independent Glass

Glass processing basics for Solar industry specialists

Presenters: R. Nieminen, Glaston America Inc.; I. Hiekkanen & T. Pesonen, Glaston Finland Oy

Understanding glass strength, stress analysis and design methodologies for architectural glass

Presenter: Dr. L. Jacob, Jacob & Associates Pty Ltd.

FRIDAY 12 June

Cutting, Grinding, Washing: Three fundamental steps in Float Glass Processing

Presenters: P. Pokoern, Bohle AG; M. Emonds, ACW

Coated Glass - Applications and markets

Presenter: S. Nadel, Applied Materials

Seeing Through Glass Design

Presenter: C. Bostick, Consulting Architects

Basics of Glass Coating Processes and Coated Glass

Presenters: P. Vuoristo & T. Mäntylä,
Tampere University of Technology

Digital Printing on Glass

Presenters: Y. Ninyo & T. Salenius, DIP Tech Ltd.

Glass Tempering Process (level2): Glass Factory profitability and tempering technology know-how

Presenters: V-J. Kuusiniemi & T. Pesonen & M. Äppelqvist, Glaston Finland Oy; F. Serruys, Saint-Gobain Glass Solutions

Profitability of a Glass Processing Factory

Presenter: K. Heikkilä, Glaston Singapore

Solar Power - Opportunities for the glass industry

Presenters: R. Nieminen, Glaston America Inc.; I. Hiekkanen, Glaston Finland Oy; M. Rajala, Beneq Oy; A. Karpinski, Kuraray Europe GmbH; O. Mal, AGC Flat Glass; B. Szyszka, Fraunhofer IST; S. Byers, Ritec International Ltd.; V. Geyer, Scheuten Solar; G. Strij-Hipp, BSW Solar

New trends in the Infrared Non-contact Temperature Measurement for the glass industries

Presenters: R. Gärtner & E. Drews, Raytek GmbH

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