



# WORKSHOPS 2009

June 11-12



## WS 06: Glass bending & tempering process: Theory and machine test runs

**Presenters: Simo Suominen & Veli-Jukka Kuusiniemi & Tarmo Pesonen & Miika Äppelqvist, Glaston Finland Oy**

### Course Summary

With simple actions on the handling and processing of glass, the end product quality is improved. Special attention and care must be taken at every stage of processing, in particular before and during tempering.

In this course participants will learn the basics of the tempering process and different factors affecting the end product quality through a combination of theory and practise. Different quality problems in tempering process will be addressed and discussed with experienced glass processing experts. Course will provide a toolbox including information starting from handling of different glass types into solving different glass quality problems.

Workshop is divided into theory part in conjunction with glass tempering (level 1) workshop and practical bending & tempering demo where participants will learn the affect of pre-processing, handling and bending & tempering to end product in practise.

The course is targeted to persons who wish to have an introduction or more in depth look into tempering process through practical hands-on approach.

**WORKSHOP LOCATION:**  
GLASTON FACTORY  
VEHMAISTENKATU 5, TAMPERE

### Bullet Point Summary

- Flat glass bending & tempering
- Bending & tempering quality factors
- Solving quality problem
- Low-E tempering and handling
- Heat strengthening
- Discussion forum
- Practical demo

**glaston**  
seeing it through

### Course timetable - Thursday 11.6.2009

- 9.00 Glass tempering theory  
- Theory of heat transfer  
- Low-E glass tempering and handling  
- Pre-processing effect on tempering quality
- 10.30 Coffee/tea
- 10.45 Quality influencers  
- Different factors affecting the tempering quality  
- Quality problems discussion forum
- 12.30 Lunch

- 13.30 Bending & tempering technologies  
- Different methods of heat strengthening  
- Large sizes: thin and thick glass tempering, case approach
- 14.50 Coffee/tea
- 15.00 Bending & tempering demo in glass processing factory  
- Tempering process in practise  
- Quality defects: rollerwave, edge lift, glass bendings, coating burnings and marks, heat spots, white haze and hair cracks

**Registration for Workshops at [www.gpd.fi](http://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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