



# WORKSHOPS 2009

June 11-12



## WS 15: Basics of Glass Coating Processes and Coated Glass

**Presenters: Petri Vuoristo & Tapio Mäntylä, Tampere University of Technology**

### Course Summary

The short course will deal with the basics of deposition technologies, coating processes and properties of coated glass. The main technologies of glass coating including on-line type pyrolytic and chemical vapour deposition and off-line type physical vapour deposition are reviewed in detail with the main focus on the process basics and principles. Emerging technologies such as liquid flame spraying and other surface modification technologies will also be introduced. Basic principles and functions of different coating materials and coating structures and their manufacturing are shown in order to the participant to learn the basics of these topics. Processing of coated glass as well as a review of industrial applications will also be included in the short course. The course is recommended to participants, who wish to learn more about the basics of glass coating processes and properties of coated glasses.

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

### Bullet Point Summary

#### Introduction to glass coating processes and coated glasses

- Overview of coatings for glass
- Review of coating technologies

#### Physical vapour deposition technologies

- Basics of sputter deposition
- Magnetron sputtering
- Reactive sputtering
- Industrial sputtering processes

#### Chemical deposition methods

- Pyrolytic processes
- Sol-gel technology
- Chemical vapour deposition

#### Types of coatings for glass and their properties

- optical coatings
- low-E coatings
- solar control coatings
- self-cleaning, anti-fogging, antibacterial coatings
- durability
- processing of coated glass applications of coated glass products

### Course timetable - Friday 12.6.2009

9.00 Introduction to glass coating processes and coated glass PVD Technologies

9.45 Break

9.50 PVD Technologies

10.30 Coffee/tea

10.50 CVD Techniques

11.30 Break

11.40 Coatings, their properties and defects in processing

12.30 Lunch

**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-Savikota, 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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