

# Principles of Web Coating and Drying

## About the Seminar:

Web Coating & Drying is designed to further skills in selection and application of equipment for improving manufacturing processes and assuring efficient production of coated papers, films and other web substrates. Two major topics are featured: coating of webs by various means and, the drying or curing of these substrates. All major commercial coating processes used today are discussed along with their benefits for use in specific manufacturing applications, while considering the raw materials used to produce finished product. All major forms of convective and radiant methods of heat transfer for drying and/or curing are presented. Though theory is included, emphasis is placed on practical problem solving techniques for the plant engineer. This popular and informative course has been attended by hundreds of students.

## Who Should Attend:

Anyone working with web processing and converting machinery can benefit from this unique course. This includes product/process designers, process engineers, QA, sales/service, maintenance and lead operators. Those converters involved in the manufacture of release liners, pressure sensitive tapes and labels, presentation media and graphics arts films and papers, photo-based and resist films, and specialty and premium coated papers and laminates will find this course useful as to how to best coat, cure, handle and convey their base web materials from an unwind through the coater and dryer to the winder. The course is vital to manufacturers and converters of web products and also extremely useful for machine builders, component suppliers and material suppliers.

## Benefits of Attending

- ▶ Identify which coating method is best for your application
- ▶ Learn how to match equipment needs to process requirements
- ▶ Learn how to properly select and specify new equipment
- ▶ Improve runnability, production and efficiency of existing systems
- ▶ Understand common coating defects and how to prevent them
- ▶ Learn the physical properties of coatings and substrates
- ▶ Analyze the critical components of web coating and learn how to control them
- ▶ Learn when and how a lab scale coating line can be profitable
- ▶ Know when you have reached diminishing returns on investments

## Concepts Covered

- ▶ Coating application and quality problems and their solutions
- ▶ Upgrading older coating lines: limits and traps
- ▶ New technologies and state-of-the-art coating lines
- ▶ Advantages and disadvantages of various commercial coating methods
- ▶ Knife coaters / blade coaters / die coaters
- ▶ Drying process control and flotation drying
- ▶ Infrared dryers
- ▶ Dryer sizing



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## Course Syllabus

### DAY 1

#### Coating

- Rod Coating
- Knife Over Table Or
- Knife Over Roll
- Simple Roll Coating
- Three Roll Coating
- Reverse Roll Coating
- Gravure Coating
- Reverse Gravure
- Slot Coater
- Slide Die Coaters

#### Process Considerations:

- Set-up
- Reproducibility
- Stability

#### Operator Considerations:

- Ease of Use
- Maintenance
- Ability to See What is Happening
- How Many Operators and Helpers?

#### Drying

- Basic Industrial Drying
- Basic Drying Agenda
- Defining the Process Requirements
- Basic Information for Drying Applications: Helpful Line Data
- Basic Information for Drying Applications: Substrate Data
- Basic Information for Drying Applications: Coating Data

#### Conventional Technologies

- A Dryer is a "Heat Exchanger"
- Drying Heat Loads
- Defining Convection
- Convection Dryer Head Loads
- Impingement Dryers
- Convection Air Drying Mechanics
- Factors that Impact Heat Transfer by Impingement
- Impingement Dryer Advantages
- Impingement Negatives

#### Flootation Dryers

- Coanda Effect
- Flootation Mechanics
- Flootation Nozzle Array
- Flootation Dryer Advantages
- Flootation Negatives
- Through Air Drying Systems
- Through Air Dryers
- Through Air Advantages
- Through Air Negatives

### DAY 2

#### Microwave Drying Overview

- Strengths and Weaknesses of Microwave Drying
- Where it is Used
- Costs

#### Radiant Heating

- Electromagnetic Energy Spectrum
- Defining Industrial Process Infrared
- Infrared Spectrum
- Stefan Boltzmann Law to Determine Infrared Power
- Determining Wavelength
- Infrared Advantages
- Infrared Negatives

#### Which Drying Method is the Best for the Application??

- Answer: No Single Method is Best
- Comparison of Drying Technologies

#### Computer Aided Drying

- Basic Issues of Computer Modeling for Drying
- The Physics of Drying
- Computer-Aided Dryer Design
- Flootation
- Heat Transfer
- Mass Transfer
- Product Information
- Limitations
- Equipment Options
- Computer-Modeled Results
- Example of Computer Based Dryer Design
- First Iteration
- Second Iteration
- Third Iteration
- Fourth Iteration

#### Another Unique Nozzle Geometry