Blown Film Extrusion (Dr. Kirk Cantor)

About the Seminar

This two-day program provides a broad overview of blown film extrusion, including materials, hardware, and processing methods. The computer-based "Blown Film Extrusion Simulator" will be demonstrated during the program. Attendees are encouraged to bring laptops, as they will be provided exercises with which to use the software. Upon completion of this seminar, attendees will be able to:

- describe how all parts of an extrusion line interact with plastic material to affect final product performance and quality
- identify various polymer materials used to produce blown film and discuss important film properties
- discuss in detail the hardware specific to blown film processing, including screws and dies
- describe how bubble geometry creates the molecular structure that influences film properties
- troubleshoot both extruder and film problems
- operate the "Blown Film Extrusion Simulator"

What the attendees will learn:

- hardware systems on an extruder and the functions that the extruder performs on the plastic material
- various polymers used to produce blown film, including the rheological and solid state properties of these polymeric materials
- upstream and downstream hardware specific to blown film extrusion
- bubble geometry and the process parameters used to create specific bubble shapes
- control systems, both manual and automated, for maintaining product targets
- process/structure/property relationships in blown film: how bubble geometry affects molecular structure and film properties
- basic blown film coextrusion principles
- how to solve both extruder and film problems
- how to operate the "Blown Film Extrusion Simulator"

Who should attend:

- Operators
- Set-up technicians
- Process engineers
- Quality control personnel
- Floor supervisors
- Plant managers
- Film purchasers

Course Description	Continued...

• Introduction to Blown Film Extrusion
• Extrusion Fundamentals Overview
  o Hardware Systems
  o Functional Zones
• Introduction to Polymers
  o Polymer basics
  o Polymeric materials
  o Rheology – understanding flow
• Film properties
• Blown Film Hardware
  o Upstream (Solids Feeding)
  o Grooved Feed Throat
  o Screws for blown film
  o Blown Film Dies
  ▪ Side Fed Die
  ▪ Bottom Fed Die
  ▪ Spiral Mandrel Die
  ▪ Co-extrusion Dies
  ▪ Oscillating Dies
  o Bubble Geometry
  o Bubble Cooling
  o Bubble Stabilization
  o Collapsing Frames
  o Haul-off
  o Winders
  o Film Treatment
  o Line Control
• Blown Film Processing
  o Process Variables vs. Bubble Geometry
  o Simulator Exercise I
  o Process/Structure/Property Relationship
  o Simulator Exercise II
 	
Books authored by Kirk Cantor:
 	
• Blown Film Extrusion, includes "Blown Film Extrusion Simulator"
	• Co-extrusion
	  o Dies
	  o Interfacial Instability
	  o Applications
	• Troubleshooting
	  o Extruder Problems
	  ▪ Surging
	  ▪ High Melt Temperature
	  ▪ Excessive Cooling
	  ▪ Low Output
	  o Film Problems
	  ▪ Melt Fracture
	  ▪ Thickness Variation
	  ▪ Bubble Instabilities
	  ▪ Wrinkles
	  ▪ Die Lines
	  ▪ Gels
	  ▪ Low Mechanical Properties
	  ▪ Poor Optical Properties
	  ▪ Quality/Variation