

OUTLINE FOR COURSE ON ADVANCED EXTRUSION

Rauwendaal Extrusion Engineering, Inc., Auburn, CA 95602-8908

Day 1, morning

*** Introduction**

*** Hardware components of an extruder**

- Main components
 - Screw and barrel
 - Feed hopper and feed housing
 - Grooved feed vs. smooth bore
 - Breaker plate and screen pack
 - Motor and reducer
 - Heating and cooling
- Materials handling (Conair)
 - Storage and conveying
 - Drying
 - Blending
 - Heat transfer
 - Size reduction
- Instrumentation and control
 - Melt temperature
 - Melt pressure
 - Other important parameters
 - Pressure feedback control
 - Temperature control
 - Data acquisition systems

Day 1, afternoon

*** Polymer properties**

- Melt flow properties
 - How to measure melt flow properties
 - How to interpret melt flow data
- Thermal properties
 - How to measure thermal properties
 - How to interpret thermal data
- How properties affect extrusion
- Viscosity data directly from an extruder
- Demonstration CAMPUS database

*** Functional analysis of the extrusion, mechanisms and theories**

- Solids conveying,
 - Flood feeding vs. starve feeding
- Plasticating,
 - Contiguous vs. dispersed solids melting
- Melt conveying, effect of shear thinning on pumping behavior
- Devolatilization,
 - Diffusion vs. bubble devolatilization
- Mixing,
 - Distributive vs. dispersive mixing
- Computer programs to analyze various extruder functions

Day 2, morning

*** Screw design**

- Standard extruder screw
 - Using theory to optimize geometry
- Barrier type extruder screws
- Mixing screws, engineering analysis

- Multi-stage screws for venting
- Computer aided screw design
- Screw manufacturing
 - Screw materials
 - Coatings & surface treatment
 - Rebuilding screws

*** Extrusion downstream equipment (Conair)**

- Sizing tanks
- Cooling tanks
- Pullers
- Cutters and saws
- Accessories

Day 2, afternoon

*** Troubleshooting extruders**

- Requirements and methodology
- Machine related problems
 - Wear
 - Poor screw design
 - Poor die design
- Material related problems
 - Degradation
 - Segregation
- Functional problems
 - Conveying
 - Melting
 - Mixing
- Computer based troubleshooting
- Practical examples and case studies

Day 3, morning

*** Die Design**

- General rules and guidelines
- Methods of die flow balancing
- Various types of extrusion dies
 - Sheet and flat film dies
 - Blown film dies
 - Pipe and tubing dies
 - Profile dies
- Analysis of dies
- Case study of die design
- Computer aided die design
- Die flow instabilities
- Coextrusion dies

Day 3, afternoon

*** Twin screw extruders**

- Twin vs. single screw extruder
- Co-rotating twin screw extruders
- Counter-rotating twin screw extruders
- Co- versus counter-rotating extruders
- Non-intermeshing twin screw extruders
- Screw design for twin screw extruders
- Computer simulation of twin screw extruders

The course fees are:		Prior to Mar 8	Mar 8-21	After Mar 21
Advanced Extrusion:		\$895.00	\$995.00	\$1095.00
3rd attendee discount 5%:				
Polymer Extrusion Bk \$75.00	<input type="checkbox"/>			
Polymer Mixing Bk \$55.00	<input type="checkbox"/>			
Total:				

A 5% discount will be given for the 3rd and up attendees from the same company. The course fees include lunch for first two days and the handout material.

Cancellations: A refund, less a \$100.00 cancellation fee, will be made if the registration is cancelled in writing by or on March 7, 2008. Rauwendaal Extrusion Engineering, Inc. reserves the right to cancel one or more seminars or substitute instructors. Should this occur the attendees will be notified. We do not take any responsibility for penalty fees or any other cost that may be incurred due to cancellation. We recommend that you book travel with refundable fares. Registrants who fail to attend are liable for the fees of the course registered for.

Fax Registration to 530-269-1084

Name:			
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