

Understanding & Optimizing Extrusion Seminar (3-Day), Sept 10-12, 2018

About the Seminar:

“Eliminate the art – work smart”. With this seminar you can become the smartest extrusion person in your company and make your company a world-class producer.

What attendees will learn:

- How to use a high-speed DAS (HS-DAS)
 - to analyze pressure and melt temperature variation in the extruder
 - to optimize the barrel temperature profile
 - to quantify extrusion process stability
- How to obtain data on viscosity versus shear rate from a lab extruder
- How to determine the melt fracture behavior of your polymer
- How to measure melt temperature correctly
- How to measure melt pressure correctly
- How to perform QC on incoming raw material
- How extruder screws and dies can be designed for optimum performance
- How to make your manufacturing operation more cost effective
- How to make sure you have the right extrusion equipment
- How Industry 4.0 can be applied to extrusion operations

Who should attend:

- Extruder operators
- Set-up technicians
- Process engineers
- Quality control personnel
- Floor supervisors
- Plant managers
- Production managers
- Technical service personnel
- Extruder manufacturers
- Maintenance personnel

Introduction to extrusion (Day 1)

- Basic extruder components
- Screw, barrel, and feed system
- Grooved feed extruders
- High speed extruders
- Screw drive systems
- Breaker plate and screens
- Gear pumps
- Heating and cooling
- Instrumentation and control

Important polymer properties

- Melt flow properties
- Thermal properties
- Viscous heat generation
- Optimizing process conditions
- How to set process conditions

Functional aspects of extrusion (Day 2)

- Solids conveying
- Plasticating
- Melt conveying
- Degassing
- Mixing
- Energy efficiency

Extruder screw design

- Standard extruder screw
- Barrier type extruder screws
- Multi-stage screws for venting
- Mixing screws
- Screw manufacturing

Extrusion die design

- General rules and guidelines
- Methods of flow balancing
- Types of extrusion dies
- Analysis of dies
- Coextrusion dies
- Case studies of die design

Optimizing the Extrusion Process (Day 3)

- Assess efficiency of an extrusion operation
 - Yield
 - Scrap rate

- Process capability
- Etc.
- Efficient machine design
 - Screw design
 - Die design
 - Hopper and feed housing design
 - Heating and cooling of the extruder
- Efficient machine operation
 - Methods of feeding
 - Why cooling should be minimized
 - Close-loop control
 - Total line control
 - Startup and shutdown procedures
- Efficient machine setup
 - Preventive maintenance
 - Instrumentation and process monitoring
 - Data acquisition capability
 - Statistical process control
- Product changeover and purging
 - Machine design for quick changeover
 - Running resins with different viscosities
 - Running resins with different colors
 - Purging techniques
 - Purging compounds
- Reducing material cost
 - Low cost filler
 - Recycled plastic
 - Foamed plastic
 - Polymer processing aids
- Reducing energy consumption
 - Quantify extruder energy efficiency
 - Preheating in drier
 - Discharge melt temperature
 - Thermal insulation of machine parts
- Optimizing extruder barrel temperatures
 - Design of experiments
 - One-at-a-time experiments
 - Dynamic optimization
- Flexible manufacturing methods, examples
 - Quick-change extrusion systems
 - Adjustable calibrators
 - Continuous die gap adjustment
 - Internal pipe cooling

○ LABS

- **Day 1:** startup of extruder, string up of tubing, get tubing to specified dimensions
- **Day 2:** run slit die viscometer, demonstration of melt indexer, DSC, and TGA, how to get viscosity data from the extrusion process
- **Day 3:** demonstration of high speed DAS, pressure feedback control, IR melt temperature measurement, effect of screw design on process and product stability, quick barrel change and feed housing change, how feed port design can affect process stability

See registration form below:

The course fees are:	Through Aug 10, 18	After Aug 10, 18
Understanding & Opt. Extrusion (Sept 10-12, 2018)	\$1250.00	\$1350.00
Troubleshooting Extrusion (Sept 13, 2018)	\$450.00	\$550.00
If taking both Seminars - Discount	-\$100.00	-\$100.00
3 rd attendee discount (5%):		
Total:		

- A 5% discount will be given for the 3rd and up attendees from the same company. The course fees include lunch for each day and the handout material.
- **Cancellations:** A refund, less \$150.00 cancellation fee, will be made if the registration is cancelled in writing by or on Aug 10, 2018 REE 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.

Scan registration and email to: Sietske@rauwendaal.com
or register on-line at www.rauwendaal.com

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Additional attendee name:			
Credit Card	If you use this form you can use the "custom payment box" on the front of our website to use a credit card. Be sure to check "not a PayPal member" put in your total and write me a note that you faxed your registration form. If you have a problem call the phone number on the back of your card.		



10556 Combie Rd # 6677. Auburn, CA 95602-8908