Mould & Part Design Considerations for Scientific Moulding

Programme Overview
To provide the participant with a well-rounded understanding of how to design for mouldability.

Duration
5 hours of pre-requisite online training
16 hours classroom instruction and practical exercises
Written test on the last day

Who will Benefit
This training course will benefit anyone involved with mould design, part design, mould trials and product development. Participants will learn a large amount of practical information they will be able to apply directly to their workplace or facility. Even the most advanced engineer will learn new information which they can apply to their facility.

Pre-Requisite Online Training Content
i. Establishing a Scientific Injection Moulding Process
ii. Mould Design: Injection Mould Fundamentals
iii. Mould Design: Runners, Filling Software & The Mould Design Process
iv. Part Design: Product Development & The Prototype Process
v. Part Design: Mechanical Behavior of Polymers

Pre-Requisite Online Training Objectives
i. Establishing an efficient Scientific Moulding process
ii. Understanding Scientific Moulding Inputs and Outputs for:
   a. 1st Stage Filling
   b. 1st Stage to 2nd Stage Transfer
   c. 2nd Stage Pack
   d. Screw Delay
   e. Screw Recovery
   f. Screw Decompression
   g. Cooling Time
   h. Mould Opening
   i. Part Ejection
   j. Mould Closing
   k. Clamping

iii. The four basic functions of an injection mould
iv. Part design considerations
v. Material considerations
vi. Moulding machine considerations
vii. Parting line determination and considerations
viii. Core and cavity block configuration
ix. Cooling line and ejection layout
x. Additional mould components
xi. Mould filling analysis capabilities
xii. The development & prototype process
xiii. Product development steps
xiv. Computer simulations for design
xv. Rapid prototyping and tooling processes
xvi. The mechanical behavior of polymers
xvii. Stress/strain curves
xviii. Visco-elastic behavior of polymers
xix. Creep and stress relaxation

Day 1: Classroom Discussion Topics
i. Scientific Moulding – Scientific Moulding Review
ii. Scientific Moulding – Scientific Process Considerations
iii. Scientific Design – Part, Mould, & Process Development
iv. Scientific Design – Proper Mould Trial Considerations

Day 1: Practical Skill Development
i. Scientific Moulding – 1st Stage Injection Speed
ii. Scientific Moulding – 1st Stage Injection Transfer
iii. Scientific Moulding – 2nd Stage Packing Pressure Optimization
iv. Scientific Moulding – 2nd Stage Packing Time Optimization
v. Scientific Moulding – 2nd Stage Clamp Force Optimization
vi. Scientific Moulding – Process Documentation

Day 1: Skills & Learning Objectives
i. Proper development of processing parameters and their importance during mould trials:
   a. 1st Stage Filling
   b. 1st Stage to 2nd Stage Transfer
   c. 2nd Stage Pack
   d. Screw Delay
   e. Screw Recovery
   f. Screw Decompression
   g. Cooling Time
   h. Mould Opening
   i. Part Ejection
   j. Mould Closing
   k. Clamping
ii. Basic process development techniques critical to any design evaluations
iii. The importance of good housekeeping and machine safety
iv. Understanding the importance of process inputs and outputs
v. Scientific Design considerations to help design for processing
vi. Proper design review techniques are discussed
vii. The importance of tooling design and specifications are discussed

Training Day 2: Classroom Discussion Topics
i. Scientific Design – Initial Part Design Considerations
ii. Scientific Design – Common Part Design Complications
iii. Scientific Design – Initial Mould Design Considerations
iv. Scientific Design – Common Mould Design Complications
Day 2: Practical Skill Development
i. Scientific Design – Practical Part Design Review
ii. Scientific Design – Practical Mould Design Review

Day 2: Skills & Learning Objectives
i. Part & Mould design considerations include:
   a. Material Selection
   b. Gating Locations
   c. Parting Line Location
   d. Simulation Considerations
   e. Filling considerations
   f. Packing considerations
   g. Dimensional considerations
   h. Construction techniques
   i. Assembly and disassembly concerns