

Plastic Injection Molding: Robust Process Development & Scientific Molding



HYBRID TRAINING
16 & 17 July 2025 (Wed & Thu)



**Remote Online Training (Zoom) &
OTC TRAINING CENTRE SDN BHD,
Gelugor, Penang (Physical)**

**** Choose either Zoom OR Physical Session**

INTRODUCTION:

14 HOURS ZOOM & PHYSICAL PROGRAM

Scientific Injection Molding is typically used in the production of complex parts and components where small variations in molding variables can severely impact the process or finished product. Therefore, the goal of Scientific Injection Molding is twofold:

1. Develop a process that produces repeatable results with minimal variation.
2. Optimize dimensional or mechanical characteristics of a molded part.

When developing a molding process using Scientific Injection Molding, key inputs such as time (fill, pack/hold, etc.), temperature (melt, barrel, etc.), and pressure (hydraulic, injection melt, cavity, etc.) are meticulously monitored, adjusted, and controlled, to ensure that process robustness is achieved, and a good part is consistently produced. A process can be robust or on the other hand must be changed frequently. A robust process ensures repeatability and a wide processing window for better quality & cost.

COURSE OBJECTIVES:

1. Material properties that affect processing
2. The importance of drying
3. Explains specific rules for controlling the plastic during processing
4. Injection molding machine selection
5. Provides thorough overview of injection molding and troubleshooting techniques.
6. Exercise greater control over the molding process
7. Reduce rejects and scrap
8. Improve part quality
9. Increase productivity
10. Robust parameter optimization

COURSE OVERVIEW

INTENDED AUDIENCE:

This 14 hours / 2 days workshop has been designed for all Managers, Section Heads, Engineers and Senior Technicians who are involved in the process of Plastic Injection Molding and want to make their workplace more productive & optimized. Following groups of people will benefit from this training:

1. Tool makers
2. Manufacturing engineers
3. Production engineers
4. Any technical personnel involved with plastic injection moulded parts

METHODOLOGY:

1. Participants will inform the organizer their top 6 issues to be discussed during the Troubleshooting section.
2. Interactive and action based with personal examples.
3. Participants are strongly encouraged to prepare their statistical software of choice for DOE simulation.

PREREQUISITE :

Participants are expected to have a basic understanding in Plastic Injection Moulding with a minimum of 2 years experience.



COURSE CONTENT

DAY 1 (9.00am—5.00pm)

1. Handling Semi Crystalline & Amorphous Polymers

- i. Shrinkage
- ii. Mel temperature
- iii. Mold filling speed
- iv. Mold temperatures
- v. Barrel Heat Profile
- vi. Screw recovery speeds
- vii. Nozzle temperature
- viii. Cooling times
- ix. Mechanical properties
- x. Optical clarity

2. Plastic drying

- i. Degradation
- ii. Drying time
- iii. Drying temperature
- iv. Types of dryers
- v. Moisture measurement
- vi. Overdrying effect

3. Injection moulding machine selection

- i. Clamp force
- ii. Machine platen size
- iii. Shot size
- iv. Screw diameter
- v. Compression ratio
- vi. Types of screws
- vii. Check ring importance

DAY 2 (9.00am—5.00pm)

4. Process optimization

- i. Optimization of injection phase
- ii. Cavity balance
- iii. Pressure drop
- iv. Process window
- v. Gate seal time
- vi. Cooling time
- vii. Screw speed & back pressure

5. Mold qualification flowchart

- i. Mold qualification checklist
- ii. Waterline diagrams
- iii. Mold temperature maps
- iv. Setup instructions

6. Mould cooling, venting & regrind management

- i. Mould cooling
- ii. Mould venting
- iii. Regrind

7. DOE to develop robust injection molding parameters

8. Troubleshooting common issues at customer location

- i. Short molding – consistent and inconsistent
- ii. Flash