Injection Moulding
Certified Training Courses
Progressive, structured and relevant training courses

Introduction
Sumitomo (SHI) Demag UK (SDUK) has developed a range of injection moulding courses to address the skills shortage seen within the plastics industry. We train not only our customers, but also anyone who wishes to further enhance their knowledge of the injection moulding process to make financial gains.

The SDUK core training programme delivers high quality process training. The courses are designed to be modular and offer a logical progression from basic setting to advance process engineering.

For anyone with existing injection moulding experience who may wish to join the programme at a later stage, please speak to our training department who can advise on the appropriate course level.

The latest brochure and calendar are available on the training section of our website: http://uk.sumitomo-shi-demag.eu/

Benefits For Your Company
• Increased productivity
• Higher profits
• Faster cycle times
• Improved OEE
• Improved quality
• Reduced skills gap
Introduction to Injection Moulding - IIM

This course is designed to deliver an understanding of the fundamental principles of the injection moulding process and associated ancillary equipment to ensure safe working practices.

Ideal delegates for attendance

• Injection moulding operators
• Maintenance and Toolroom personnel
• Material handlers
• Product designers
• Managers, Supervisors and Team Leaders

Course duration: 3 days
1 day theory, 2 days practical
09:00 to 16:00hrs

Day 1 Theory

• Injection moulding machine and moulding cycle
• Clamp unit functions
• Injection unit functions
• Mould tool technology
• Cold and hot runner technology
• Ejection methods
• Mechanical and hydraulic core movement
• Thermoplastic and thermosetting
• Polymer handling, preparation and regrind
• Colouring plastics and why use additives
• Common moulding faults

Days 2 & 3 Practical

• Delegate to enter parameters into the machine from a given parameter setting sheet
• Machine safety checks
• Melt and mould temperature checks
• Optimise mould safety
• Optimisation of the injection, holding and cooling phase
The MMount course is aimed at individuals new to injection moulding and mould changing with a focus on the potential hazards, safety requirements and responsibilities with mould changing. To demonstrate the critical safety requirements required delegates will conduct actual mould changes, (whilst under tutor guidance) with continuous feedback through the actual mould change process. The last day of the course the delegates will sit a MMount theoretical assessment.

**Ideal delegates for attendance**
- Progression for injection moulding operators new to mould changing
- Any other personnel involved with mould changing as part of production requirements or mould tool trials.

**Course duration: 3 days**
1 day theory, 2 days practical
09:00 to 16:00hrs

**Please note:** Safety shoes are required during mould changes.

---

**Day 1 Theory**
- Items to be considered before a mould change
- The use of lifting equipment and the Safe Working Load (SWL)
- Basic fundamentals of Single Minute Exchange Die (SMED)
- Mould clamping and methods available
- Toggle and direct locking mechanisms advantages and limitations
- Basic mould design and mould maintenance procedures
- Sprue bush and nozzle relationship
- Ancillary equipment and fluid services connected to the mould
- Checking and optimising mould safety
- Machine safety checks

**Days 2 & 3 Practical**
- Preparation checks to ensure mould fitment
- Using basic SMED principles before commencement of a mould change.
- Conduct a mould change safely and efficiently under tutor guidance
- Run the machine in dry cycle mode with consideration given to:
  - Mould opening and closing speeds
  - Ejection
  - Electrical cables, hydraulic pipework and water pipes are free to move
- Check and optimise mould safety
- Machine start up and shut down in a safe and efficient manner with respect to production
- Conduct machine safety checks
- Theoretical assessment
Toolsetting Technology (TSett)

A course designed to give delegates the fundamental principles involved in the injection moulding environment and safety requirements. Following on from Mould Mounting course (MMount) TSett covers machine, mould and material with theoretical teaching and machine practical exercises. The learning will be measured pre-course and post-course via multiple choice question paper.

Ideal delegates for attendance

- Injection moulding operators
- Maintenance and Toolroom personnel
- Material handlers
- Product designers
- Managers, Supervisors and Team Leaders

Course duration: 3 days
1 day theory, 2 days practical
09:00 to 16:00hrs

Please note: Day 2 Introduction to health and safety before machine practical

Day 1 Theory

- Moulding cycle
- Clamp unit functions
- Injection unit functions
- Mould tool technology
- Cold and hot runner technology
- Ejection methods
- Mechanical and hydraulic core movement
- Thermoplastic and thermosetting
- Polymer handling and preparation
- Regrinding
- Colouring plastics
- Common moulding faults

Days 2 & 3 Practical

- Delegate to enter parameters into the machine from a given parameter setting sheet
- Complete safety checks on the machine
- Melt and mould temperature checks
- Optimise mould safety
- Optimise injection speed
- Conduct gate freeze off procedure
- Optimise cooling time
Process Technician (PTech)

A course designed to give delegates in-depth knowledge of the injection moulding process. PTech also involves an end of course assessment.

Following on from TSett course, PTech is designed to provide deeper knowledge and understanding of the machine, mould and material, through theoretical teaching and machine practical exercises. Delegates will gain the ability to set a machine from zero to producing components to a given specification, in an efficient and timely manner.

Ideal delegates for attendance
- Toolsetters who have recently attended TSett course
- Maintenance and Toolroom personnel
- Product designers
- Managers, Supervisors and Team Leaders

Course duration: 3 days
1 day theory, 2 days practical
09:00 to 16:00hrs

Day 1 Theory
- Specific pressure and screw relationship
- Structured guide to setting the clamp and injection unit from zero
- Process and troubleshooting technology
- Mould design technology
- Plastic materials technology

Days 2 & 3 Practical
- Setting of the clamp and injection unit
- Calculate projected area for the specific mould tool being used
- Machine safety checks
- Check and optimise mould safety
- Measure actual values for melt and mould temperature
- Optimise the moulding cycle to achieve a given specification
- Verify optimisation through statistical process control
A course designed to give delegates in-depth knowledge and understanding regarding the five variables that are required to control the moulding process and how they interact with each other.

### Ideal delegates for attendance
- Technical staff responsible for injection moulding processing and who wish to further enhance their processing knowledge.

### Course duration: 3 days
1 day theory, 2 days practical
09:00 to 16:00hrs

### Troubleshooting (TShoot)

#### Day 1 Theory and Practical

**Theory:**
- The five variables controlling the process and how they interact with each other
- Initial setting of the process parameters
- Deductive reasoning with a systematic approach to rectifying process faults
- Injection moulding process related faults resulting from; material, mould and machine
- Options available to reduce injection moulding process faults before the cutting of mould steel

**Practical:**
- Optimise the clamp and injection unit from initial poorly set parameters
- Calculate projected area for the specific mould tool being used
- Complete daily machine guard checks and use safe working practices throughout the practical session
- Check and optimise mould safety
- Measure actual values for melt and mould temperature
- Diagnosed a range of injection moulding faults and rectify them in a logical and systematic manner
- Achieve a given quality specification
- Verify optimisation through statistical process control

#### Days 2 & 3 Practical

- Review of day 1 practical using tutor observations and delegates findings
- Delegates start working on their group presentations
- Diagnosing of injection moulding process faults
- Delegates finalise their findings and present to the rest of the attending delegates
Advanced Injection Moulding (AIM)

Following on from PTech, the AIM course is designed to use a mathematical and scientific approach to optimising the injection moulding process to an advanced level.

**Ideal delegates for attendance**
- Injection moulding technicians and process engineers.

**Course duration: 3 days**
1 day theory, 2 days practical
09:00 to 16:00hrs

**Day 1 Theory**
- Theory of polymer materials: Amorphous and Semi Crystalline
- Melt temperature preparation
- Calculate projected area
- Optimise injection phase
- Optimise Holding Phase
- Mould Cooling Phase
- Metering Phase
- Taguchi analysis (basic understanding)

**Days 2 & 3 Practical**
- Initial value settings using a structured guide to set the injection unit
- Calculate projected area for the specific mould tool being used
- Machine safety checks
- Measure actual values for melt and mould temperature
- Optimise the three phases of the moulding cycle using the AIM document
- Check and optimise mould safety
- Optimise the metering phase using screw surface speeds
- Rheology study to identify optimum filling speeds
- Calculate gate shear rate
- Calculate barrel usage based on 1D to 4D
- Calculate the residence time
- Optimise the cooling phase by calculating the theoretical cooling time
- Verify optimisation through statistical process control
A course designed to give delegates theoretical and practical fault finding experience on NC5. This course covers hydraulic, electrical control and mechanical systems of both the direct and toggle lock machines.

**Ideal delegates for attendance**
- Maintenance Engineers and Maintenance Technicians with basic maintenance knowledge.

**Course duration: 2 days**
09:00 to 16:00hrs (practical)

**Days 1 & 2 Practical**
- Differences in direct and toggle lock machines
- Sumitomo Demag numbering code and function chart
- Types and control system
- Basic hydraulics
- Familiarisation and theoretical operation of hydraulic circuitry including symbols
- Further setting of NC5 controls and use of dry cycle as a means for fault finding
- Introduction to Sigmatek processor (types and layout)
- Use of IBED as a maintenance aid
- Hardware layout
- Finding essential voltages
- Fault finding tasks
- Lubrication and general maintenance tasks
- Navigation of electrical diagrams
Course Lecturers

Darren Vater-Hutchison
Process Engineering and Training
Darren’s career in plastics started at Link Plastics as a trainee toolsetter, finally progressing to senior technician. From Link Plastics he moved to Plastic Omnium as a technician in the technical department. He then moved to the British Polymer Training Association (BPTA) where he spent 11 years, as a technical consultant. Following the close of BPTA he joined Epson, taking a senior position within the injection moulding department. During a period of three years he achieved a high accolade, a ‘silver award’ in the 37th global Epson injection moulding competition in Japan. Darren was the first British person to enter such competition for Epson since manufacturing began in May 1999.

He then rejoined the Polymer Training & Innovation Centre (PTIC, formerly the BPTA) in 2012 and completed his Masters in Polymer Engineering Design at the University of Wolverhampton.

Darren has worked within the injection moulding industry for 30 years with exposure to trade moulding, automotive and IT consumables.

James Hines
Process Engineering and Training
James completed his apprenticeship at Linpac Automotive Southend where he obtained a Degree in Polymer Science. He then moved to G&A Moulding Technology and spent six years working for John Goff, progressing to Process and Training Manager. Before starting at Sumitomo (SHI) Demag UK Ltd he spent six years working for AST Technology (UK) Ltd as their Process and Training Manager.

James has been in the industry for 20 years and has a wealth of knowledge in the Automotive, Telecoms and Pharmaceutical industries.

Rob Keers
Maintenance and Fault Finding
Rob has been with Sumitomo (SHI) Demag UK Ltd for over 20 years. During that time he has built up a wealth of practical maintenance experience, covering NCII, NCIII, NC4 as well as our current NC5 product range; Systec, EL-EXIS and IntElect machines.
Bespoke Courses and Other Services

SDUK is also able to offer bespoke training courses, either at our training centre or onsite. Please call with your requirement and we can tailor a package to suit you.

Other services

- Plastics material course
- Plastics preparation and handling course
- Evaluation of training requirements for individuals

Contact

Email: training.uk@dpg.com
Tel: 01296 739505
Sumitomo (SHI) Demag Moulding Academy
Unit 1 – Stephenson Close, Daventry, NN11 8RF

The latest brochure and calendar are available on the training section of our website:
http://uk.sumitomo-shi-demag.eu/

To book your course, contact:
Email: training.uk@dpg.com
Tel: 01296 739505