



SI PROTECH

KNOWLEDGE PORTAL

# Injection Moulding Explained

## Understanding plastic injection moulding

How the process works, its applications, and why it remains a preferred choice across various industries.

01

DESIGN & MOULD  
CREATION

02

MATERIAL PREPARATION

03

INJECTION & PRESSURE

04

COOLING &  
SOLIDIFICATION

05

EJECTION

## INTRODUCTION

# Understanding plastic injection moulding

Plastic injection moulding is a widely used manufacturing process, ideal for producing high volumes of consistent, high-quality parts. This guide explains how the process works, its applications, and why it remains a preferred choice across various industries.

At SI Protech (UK) Ltd, injection moulding is one of our core services. Learn more about our capabilities at [siprotech.co.uk](https://siprotech.co.uk).

## What is injection moulding?

Injection moulding is a manufacturing technique primarily used to produce plastic components in large quantities. While it can accommodate various materials, it is most commonly used with thermoplastic and thermosetting polymers.

### COMMON APPLICATIONS

Injection moulded parts are found in nearly every industry. Typical applications include:

- |                         |                      |                         |
|-------------------------|----------------------|-------------------------|
| ◇ Packaging             | ◇ Toys               | ◇ Medical equipment     |
| ◇ Electrical appliances | ◇ Agricultural tools | ◇ Automotive components |
| ◇ Lighting fixtures     | ◇ Telecom devices    | ◇ Building products     |

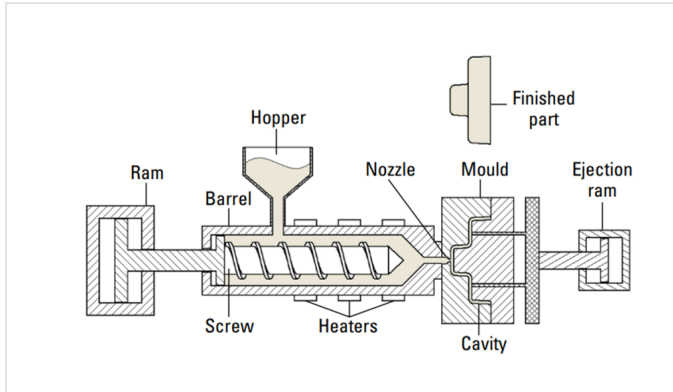
This process is ideal for industries requiring high-volume production with minimal customisation.



MOULD TOOLING AT SI PROTECH

## THE PROCESS

# How the process works



INJECTION MOULDING MACHINE

- 1 **Design & Mould Creation**  
A precision-machined metal mould is created based on the part design. Moulds may have one or multiple cavities.
- 2 **Material Preparation**  
Plastic pellets are fed into a heated chamber, where they melt before being injected into the mould.
- 3 **Injection & Pressure Application**  
The molten plastic fills the mould cavity. Additional pressure is applied to ensure complete filling.
- 4 **Cooling & Solidification**  
The plastic cools rapidly, solidifying into the desired shape.
- 5 **Ejection**  
Once solidified, the part is ejected using ejector pins or manually removed.

## MACHINES

# Types of injection moulding machines

Machines vary based on their drive systems:

|                  |                 |                |              |
|------------------|-----------------|----------------|--------------|
| 01<br>Mechanical | 02<br>Hydraulic | 03<br>Electric | 04<br>Hybrid |
|------------------|-----------------|----------------|--------------|

Moulds can be mounted horizontally or vertically. Hot runner systems improve mould fill but increase cost, while cold runners are more economical.

The injection unit size and screw diameter determine the machine's capacity and the maximum shot weight of plastic.

## — MOULDING CYCLE

## Step-by-step process overview

01

**Clamping**

Mould halves are securely closed.

02

**Injection**

Molten plastic is injected into the mould.

03

**Dwelling**

Additional pressure ensures complete cavity fill.

04

**Cooling**

Plastic solidifies quickly upon contact with the mould.

05

**Opening**

Mould opens to reveal the finished part.

06

**Ejection**

The part is removed using rods or air blasts.

## — ADVANTAGES

## Advantages of injection moulding



Highly cost-effective for large production runs



Consistent part quality



Fast cycle times



Reliable and efficient



Minimal post-processing required

## Why it's ideal for mass production

Injection moulding is largely automated, requiring minimal human intervention. Machines can operate unattended for extended periods, reducing labour costs. Once the mould is created, it can be reused repeatedly, ensuring consistent results and low per-unit costs.

While the initial tooling investment can be significant, low-cost tooling options are available for prototyping and small batch production.

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**TECHNIQUES**

# Types of injection moulding techniques

**TECHNIQUE 01****Thermoplastic Injection Moulding**

Uses thermoplastics that can be remelted and reshaped.

**TECHNIQUE 02****Insert Moulding**

Combines multiple components by injecting plastic around a pre-placed insert.

**TECHNIQUE 03****Overmoulding (Two-Shot Moulding)**

Applies a second material—often rubber or TPE—over a moulded part for added durability.

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## Developing a new product or **scaling up?**

Whether you're developing a new product or scaling up production, our team at SI Protech (UK) Ltd is here to help. Visit [siprotech.co.uk](https://siprotech.co.uk) to learn more or get in touch with our experts.



# SI PROTECH

— GET IN TOUCH —

## Reputation is **Key**

Injection moulding is one of our core services. Talk to our team about design, manufacturing and assembly for your next project.

### CALL

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### VISIT

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### LOCATION

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