

INJECTION MOULDING

Proto Labs' Injection Moulding offers low- to mid-volume part production from real engineering-grade thermoplastic and liquid silicone rubber in less than three weeks.



Injection Moulding is often used for prototyping, short-run manufacturing up to 10,000+ plastic parts and bridge tooling before customers move to large-scale manufacturing. Along with plastic injection moulding, liquid silicone rubber (LSR) moulding processes produce quantities of 25 to 5,000+ LSR parts.

By using advanced aluminium alloy moulds, we're able to eliminate the costly and time-consuming custom engineering that normally goes into the development of injection-mould tooling. Injection moulding supports an ever-increasing maximum part size and complexity, and continues to introduce new injection moulding processes that help designers and engineers make better products.

DESIGN CONSIDERATIONS*

Size.

The maximum part outline that can be moulded is approximately 480mm by 770mm with a maximum part volume of approximately 967cc. A part may have a maximum depth of 101mm from the parting line with 3 degrees of draft, or 202mm total, if the parting line can pass through the middle of the part, inside and outside. Deeper parts are limited to a smaller outline.

Materials.

Injection Moulding stocks hundreds of thermoplastic resins that offer a variety of benefits for different applications and industries. Liquid silicone rubber provides additional material options. Here are some of our more frequently used injection-moulding materials:

- ABS
- Acetal
- Acrylic
- HDPE
- LDPE
- Nylon
- PBT
- Polycarbonate
- Polypropylene
- TPE
- TPU
- PEEK
- PEI
- Liquid Silicone Rubber

Draft.

A taper applied to the faces of the part that prevent them from being parallel to the motion of the mould opening is called draft. This keeps the part from being damaged due to scraping as the part is ejected out of the mould. Recommended draft:

- 0.5 degrees on all vertical faces is strongly advised.
- 2 degrees works very well in most situations.
- 3 degrees is minimum for a shuto (metal sliding on metal).
- 3 degrees is required for light texture (PM-T1).
- 5 or more degrees is required for heavy texture (PM-T2).

QUICK STATS*

VOLUME:

25 to 10,000+ parts

SPEED:

Shipped in 1 to 15 days

QUESTIONS?

Your automated interactive Quote® will address potential mouldability issues and offer suggestions directly on your 3D CAD model. If any additional guidance is needed, our Customer Service Engineers are always available at +44 (0)1952 683047 to discuss your design.

Learn more about our injection-moulding service at protolabs.co.uk/Injection-Moulding

*Design specifications, volumes, turnaround and cost for LSR moulding vary slightly, and can be found online at protolabs.co.uk/Injection-Moulding.

Wall thickness.

With injection-moulded parts, observing proper (and uniform) wall thickness helps parts avoid potential issues such as sink marks and warpage. Recommended thicknesses vary by material (ranging from 0.5mm to 25.4mm) and can be found online at protolabs.co.uk/resources.

Tolerances.

Typically, tolerances of +/- 0.08mm + 0.005mm/mm depending on resin selection, are expected and achieved on well-designed parts.

Surface finishes.

A number of standard finishes are available for injection moulded parts at Proto Labs. Our current finishes include non-cosmetic and low cosmetic finishes; bead-blast texturing; and up to SPI-A2 mould polishing.

Overmoulding.

This is a two-part injection moulding process where a flexible thermoplastic or thermoset material is overlaid on-to a second substrate part. Multiple colours and multiple materials are available that are not only cosmetically appealing but functional. It is the customer's responsibility to ensure that the overmould design uses an adequate mechanical bond between materials.

