

NT
K+D AG

Plastics & sealing technology
3D printing



Injection moulding

For high-volume or small-series production



Introduction

In injection moulding, an elastomer (rubber) or a thermoplastic is injected into a mould. This process is particularly suitable for producing items that are needed in batches of 500 or more, or when items of soft elastomer (typically < 85 Shore A) cannot be produced by other means.

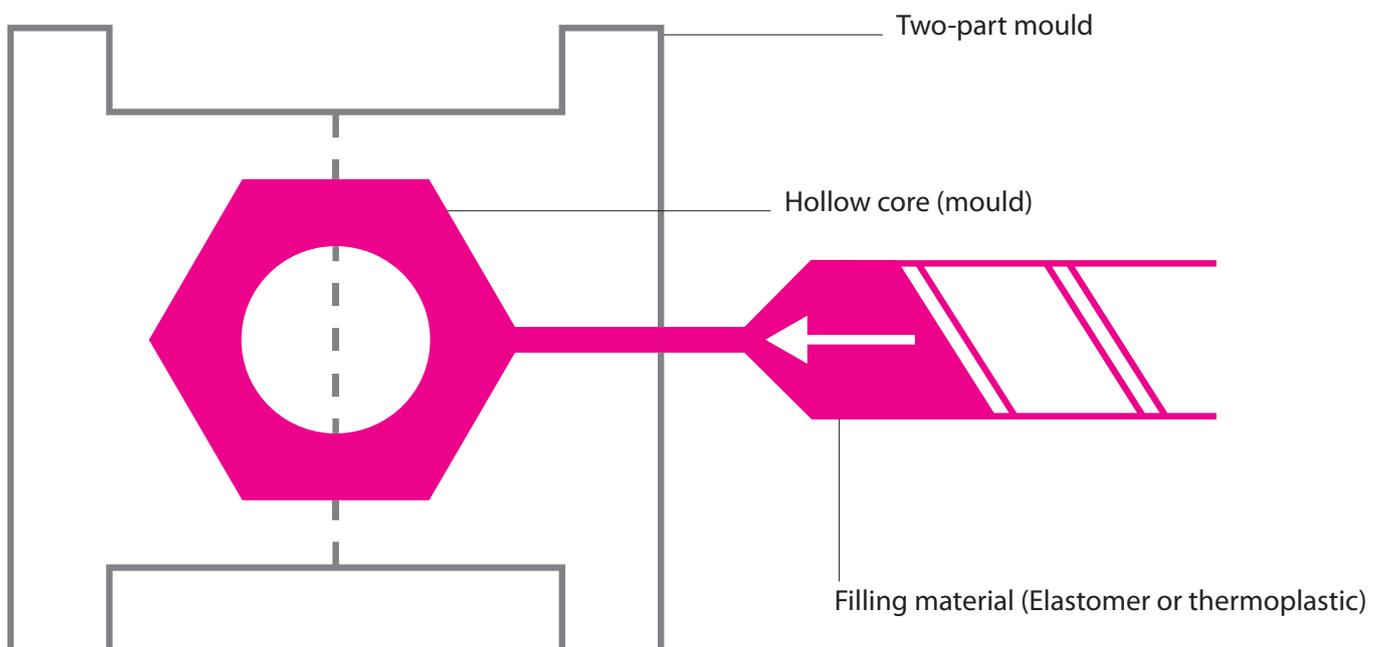
As many customers know, the fabrication alone of the moulds required for small parts can easily cost CHF 5000 or more, but that doesn't have to be the case. With us, pricing of moulds for producing prototypes starts at about CHF 250, and pricing of moulds for conventional injection moulding starts at around CHF 600 per mould.

It is often the case that injection-moulded items can take up to 15 weeks to supply, so a quicker alternative can be extremely helpful. 3D printing presents an excellent alternative in many cases, offering the possibility to produce batches of several thousand items within a week. And, since it is possible to manufacture the items from the same plastic as would be used in the injection-moulding process, 3D printing can be used to produce the first batch of an item that will thereafter be produced by injection moulding. This can enable the item's functionality to be tested before further units are fabricated, and save time and mould fabrication costs – especially if mould adaptations are found to be required.

Thanks to our worldwide network of suppliers, we can meet all your requirements – with top quality, high precision and excellent value for money.

NT K+D AG also provides you with any certification you may require for your application.

Basic injection-moulding process



Conventional injection moulding

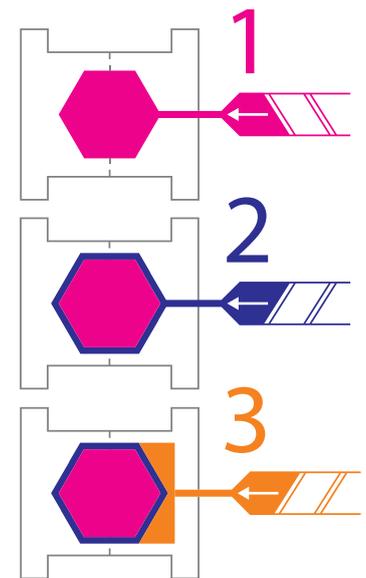
We injection-mould rubber and plastic products of various materials for a wide variety of purposes. These include all types of sealing strips, rubber stoppers, rubber pads, buttons, housings and numerous other product groups. These are widely used, for example, in the food, pharmaceutical, sanitary and manufacturing industries.

Multi-stage injection moulding

A typical toothbrush has soft bristles and a hard plastic handle with some rubber coating to improve grip. Several steps are required to manufacture this by means of injection moulding. First, the hard plastic handle is produced using a first mould. Then, the handle is placed in a second mould to be provided with rubber coating where required.

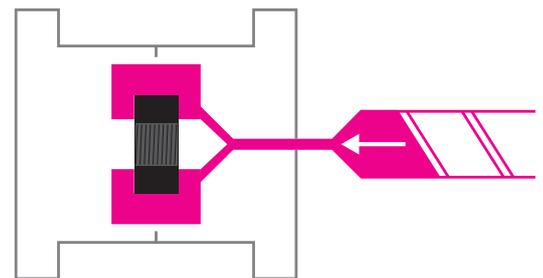
This requires the hard plastic handle to be provided with a vulcanisation coating, to enable the injected rubber material to bond properly to the handle. Further materials may then be applied as required.

In general, multi-stage injection moulding requires a mould to be created for each material used and a corresponding vulcanisation coating to be applied before each new injection.



Plastic-coating of metal parts

This process involves the adding of plastic or an elastomer to a metal part where required. As with multi-stage injection moulding, the metal part must first be prepared with a suitable coating as necessary to enable the injected material to bond properly with the metal part.



Materials

Plastics: PP, PA, POM, ABS, PEEK, HDPE, PE, PPSU, PPS, PS, LCP, PVC, PEI, PMMA, PES, PVDF, PFA, PI, PBI, PAI, FEP, PLA, PETG, ASA, PC, PC-ABS, Thordon, Rulon, HIPS,

Elastomers: NBR, EPDM, PU, TPU, TPE, NR, TPC, TPV, MVQ, Silikon, FPM, CR, H-NBR, FFKM, in a wide variety of hardness levels and colours.

Production of prototypes before injection-moulding series production

Complete production of prototypes by 3D printing

Before commencing mass production of a thermoplastic item by means of injection moulding, it is very often possible to use 3D printing for the production of prototypes. This enables the item to be tested and the suitability of the material to be confirmed relatively quickly and easily, before progressing to the use of injection moulding. However, this is only an option for materials that are not too soft for this process.

Items produced by injection moulding are usually somewhat more robust than the equivalent produced by 3D printing, so a positive evaluation of the 3D-printed prototype can give strong confidence that the injected version will also work well and can go into mass production.

Production of prototype's injection mould by means of 3D printing of type FDM

For production of the prototypes by injection moulding, creation of the moulds by means of 3D printing of the FDM (Fused Deposition Modelling) type is optimal in many cases as it can be done very inexpensively. We can do this for even very large items of dimensions 600 x 600 x 1500 mm or greater. Dimensional accuracies of +/- 0.2 mm can typically be expected for small items, and +/- 0.8 mm for large items.

If made from PEEK or ULTEM material, moulds created this way are generally also suitable for use in the series production of thermoplastic or elastomeric items by conventional injection moulding methods.

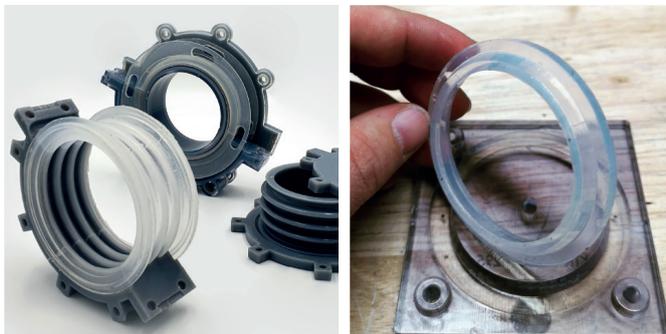
Production of prototype's injection mould by means of 3D printing of type PolyJet or MJF

Moulds produced using these types of 3D printing are a real wonder. Did you ever wish you could get the injection moulded parts you needed in just a week? This is possible if the moulds are produced using either of these types of 3D printing, and with tolerances of as little as +/- 0.1 mm.

If you prefer the actual injection moulding process to be carried out by an injection moulding shop with which you have worked before, that is no problem. You can simply ask the shop to contact us, and we will produce the mould according to its specifications and using the appropriate process, typically delivering the mould to the shop within three working days. Such a mould can generally be used to produce 100 specimens or more. The costs of moulds produced by these methods typically start at just 20% of the costs of moulds made of aluminium or steel.

Materials

For internal purposes, we inject silicone of hardness levels 22 or 45 Shore A, with food industry approval, into our moulds. At the customer's request, we can inject PU or various other media – just tell us what you need.



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Certified in accordance with ISO 9001



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