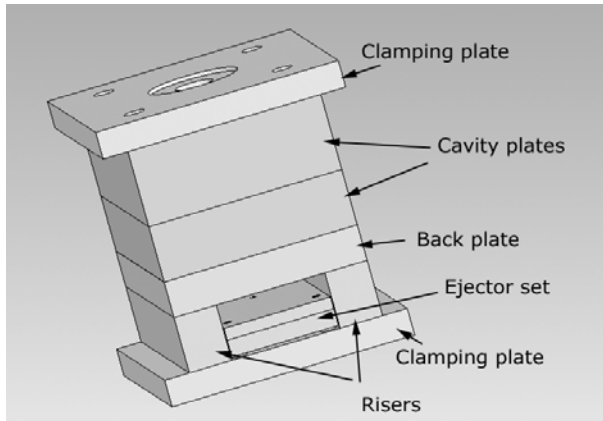


Introduction

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Usually a mould is fabricated to a standard mould set. The minimum standard mould set assembly consists of two cavity plates, in some constructions a back plate, two clamp plates, risers and an ejector set.



A standard mould set

Standard mould set

In addition to a standard mould set, there is a need for several functional mould parts including:

- cavity plate guides
- ejector plate guides
- ejectors
- ejector return pins
- mould cavity support pillars
- runner system parts: sprue bushing, centring flange, special gate inserts (for example tunnel gate) and hot runner systems
- different equipments and parts for moving cores: sliding core mechanism parts, springs, hydraulic and electric core pulling cylinders
- ejector bars and parts for fastening the ejector plates to the casting machine
- fittings, nozzles and baffles for the mould cooling and tempering lines
- insulating plates for the injection molding mould
- different mechanisms for example for molding threads and for two stage ejection, date stamps etc.

Functional parts

Standard mould sets and other mould parts are purchased from local sales agents. Some of the largest standard mould set and standard mould part manufacturers are listed in the following table.

Manufacturer	Products
Cumsa; http://www.cumsa.com	– Standard mould parts
D-M-E; http://www.dmeeu.com	– Standard mould sets and mould parts – Hot runner systems
FCPK Bytow; http://www.fcpk.pl	– Standard mould sets and mould parts
Hasco; http://www.hasco.com	– Standard mould sets and mould parts – Hot runner systems
Meusbürger; http://www.meusbürger.com	– Standard mould sets and mould parts
Rabourdin; http://www.rabourdin.fr	– Standard mould sets and mould parts – Hot runner systems
Strack; http://www.strack.de	– Standard mould sets and mould parts – Hot runner systems

Manufacturers

To be able to put a mould together from these parts, there is a need for different machining operations. The basic operations are:

- mould cavity and core machining
- runner and venting system machining
- tempering channels fabrication
- machining of the basic geometries for assembling the standard mould parts to the set

Machining methods

The most common machining methods used in the mold manufacturing operations are conventional and high speed milling, conventional and deep hole drilling, grinding and electric discharge machining (EDM). Mould cavity plates, cores and inserts are usually heat treated between rough and finish machining. The heat treated steel is best machined with an EDM or a high speed milling method. The applications of these methods are listed in the following table.

There are different finishing methods for the mould cavity surfaces. They are polished, texturised or left as they are after the EDM operations. Polished mould cavity surface produces shiny injection molded parts. Polished cavity is also essential in producing transparent parts. EDM methods leave small sinks to the mould cavity surface. The sink size depends on the electric charge intensity. Sometimes this is the desired situation, because these small sinks produce a decorative surface to plastic parts.

Cavity surface finishing

In pressure die casting the small EDM sinks are nucleation points for heat cracking and there is a need to completely remove the upper deformed mould surface. The pressure die casting moulds are not polished. A certain surface roughness is left to the cavity to help the release agent to wet the surface.

Machining method	Application
Conventional milling	<ul style="list-style-type: none"> - Geometries for assembling the mould parts and for fastening the mould to the machine tables - Mould cavity rough milling - Core rough milling - Ejector shaping
High speed milling	<ul style="list-style-type: none"> - Mould cavity finish machining - Core finish machining
Drilling	<ul style="list-style-type: none"> - Ejector hole machining - Fastening elements, thread holes
Deep hole drilling	<ul style="list-style-type: none"> - Mould tempering and cooling line drilling - Sensor holes
Grinding	<ul style="list-style-type: none"> - Parting surface finishing - Sliding surface finishing - Cavity surface finishing
EDM	<ul style="list-style-type: none"> - Mould cavity machining either as the only machining method or together with high speed milling
Wire EDM	<ul style="list-style-type: none"> - Ejector hole machining - Core pin hole machining - Ejector cutting and shaping - Core pin cutting and shaping
Laser sintering, chemical etching, etc.	<ul style="list-style-type: none"> - Cavity surface texturing and finishing
Polishing	<ul style="list-style-type: none"> - Cavity surface finishing

Machining methods