

MOULD & DIES

DIES

Dies are typically made by [tool and die makers](#) and put into production after mounting into a [press](#). The die is a metal block that is used for forming materials like sheet [metal](#) and [plastic](#). For the [vacuum forming](#) of plastic sheet only a single form is used, typically to form transparent plastic containers (called [blister packs](#)) for merchandise. Vacuum forming is considered a simple [moulding thermoforming](#) process but uses the same principles as die forming. For the forming of sheet metal, such as [automobile](#) body parts, two parts may be used: one, called the *punch*, performs the stretching, bending, and/or blanking operation, while another part that is called the *die block* securely clamps the work piece and provides similar stretching, bending, and/or blanking operation. The work piece may pass through several stages using different tools or operations to obtain the final form. In the case of an automotive component there will usually be a shearing operation after the main forming is done and then additional crimping or rolling operations to ensure that all sharp edges are hidden and to add rigidity to the panel.

Die components

The main components for die tool sets are:

- Die block – This is the main part that all the other parts are attached to.
- Punch plate – This part holds and supports the different punches in place.
- Blank punch – This part along with the blank die produces the blanked part.
- Pierce punch – This part along with the pierce die removes parts from the blanked finished part.
- Stripper plate – This is used to hold the material down on the blank/pierce die and strip the material off the punches.
- Pilot – This will help to place the sheet accurately for the next stage of operation.
- Guide, back gauge, or finger stop – These parts are all used to make sure that the material being worked on always goes in the same position, within the die, as the last one.
- Setting (stop) block – This part is used to control the depth that the punch goes into the die.
- Blanking dies – See blanking punch
- Pierce die – See pierce punch.
- Shank – used to hold in the presses. it should be aligned and situated at the center of gravity of the plate.

MOULDS

Mould or **die** are the common terms used to describe the tool used to produce plastic parts in moulding.

Since moulds have been expensive to manufacture, they were usually only used in mass production where thousands of parts were being produced. Typical moulds are constructed from

hardened steel, pre-hardened steel, aluminium, and/or **beryllium-copper** alloy.^{[12]:176} The choice of material to build a mould from is primarily one of economics; in general, steel moulds cost more to construct, but their longer lifespan will offset the higher initial cost over a higher number of parts made before wearing out. Pre-hardened steel moulds are less wear-resistant and are used for lower volume requirements or larger components; their typical steel hardness is 38–45 on the **Rockwell-C scale**. Hardened steel moulds are heat treated after machining; these are by far superior in terms of wear resistance and lifespan. Typical hardness ranges between 50 and 60 Rockwell-C (HRC). Aluminium moulds can cost substantially less, and when designed and machined with modern computerised equipment can be economical for moulding tens or even hundreds of thousands of parts. Beryllium copper is used in areas of the mould that require fast heat removal or areas that see the most shear heat generated.^{[12]:176} The moulds can be manufactured either by CNC machining or by using **electrical discharge**.





