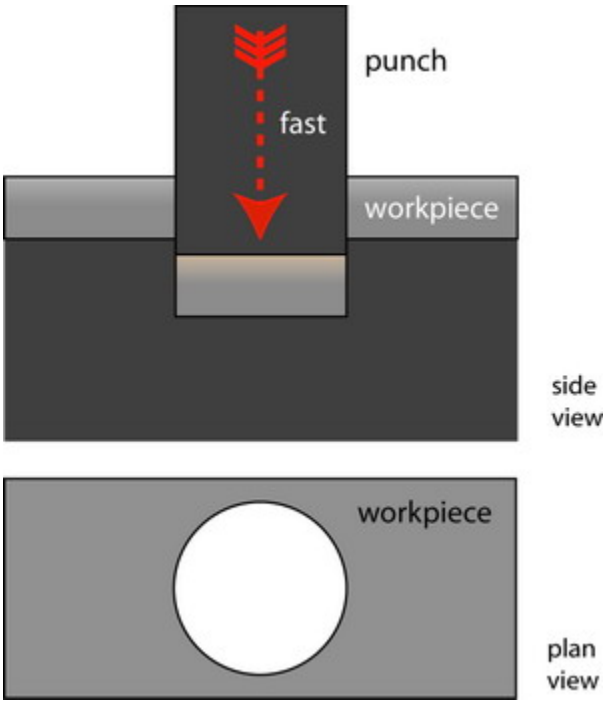
Other Processes in Deformation

Stamping

Stamping is used to make high volume parts such as aviation or car panels or electronic components. Mechanical or hydraulic powered presses stamp out parts from continuous sheets of metal or individual blanks. The upper die is attached to the ram and the lower die is fixed. Whereas mechanical machinery transfers all energy as a rapid punch, hydraulic machinery delivers a constant, controlled force.

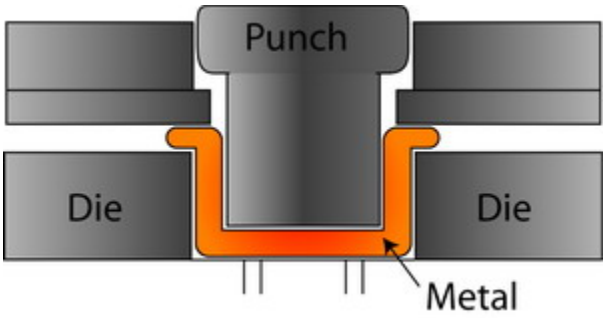


Stamping

Deep Drawing

For deep drawing, the starting sheet of metal is larger than the area of the punch. A pressure plate, fixed to the machine, prevents wrinkling of the edges as the plug is drawn into a top die cavity. The outer parts of the sheet are drawn in towards the die as the operation proceeds. The process is limited by the possibility of fracture occurring during drawing; the maximum sheet width is rarely more that twice the die diameter.

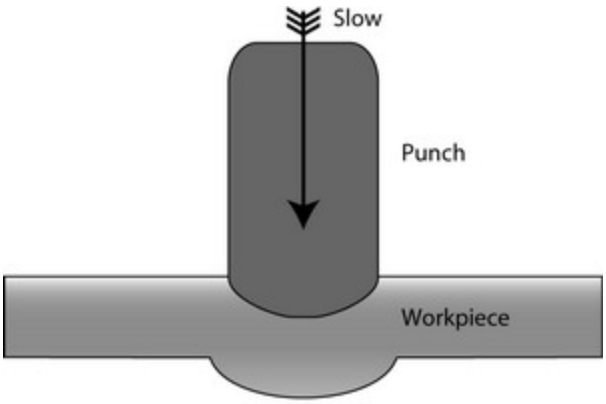
Many shapes are possible including cups, pans, cylinders and irregular shaped products.



Deep drawing

Pressing

A sheet of metal is deformed between two suitably shaped dies usually to produce a cup or dish shaped component. A thick pad of rubber may replace one of the dies, giving reduced tooling costs and allowing larger deformations to be imposed.

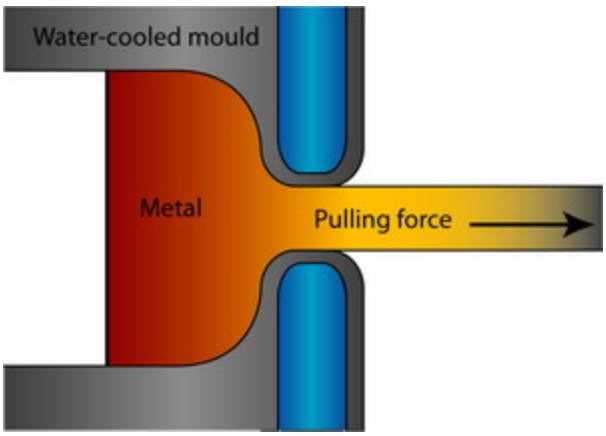


Pressing

Drawing :

Drawing is the pulling of a metal piece through a die by means of a tensile force applied to the exit side. A reduction in cross-sectional area results, with a corresponding increase in length. A complete drawing apparatus may include up to twelve dies in a series sequence, each with a hole a little smaller than the preceding one. In multiple-die machines, each stage results in an increase in length and therefore a corresponding increase in speed is required between each stage. This is achieved using “capstans” which are used both to apply the tensile force and also to accommodate the increase in the speed of the drawn wire. These speeds may reach 60 ms–1.

Dies must be very hard so they tend to be made from steel or chilled cast iron. However, tungsten carbide and even diamond are increasingly used because of their greater ability to retain shape. A typical lubricant used for drawing is tallow, a soap/fat paste-type material that has a formulation of 5 wt% soap, 25 wt% oil, 25 wt% water, and 45 wt% solids.



Drawing

Metals can be formed to much closer dimensions by drawing than by rolling. Shapes ranging in size from the finest wire to those with cross-sectional areas of many square centimetres are commonly drawn. Larger artefacts may be may be drawn to square, round and even irregular cross sections. Drawn products include wires, rods and tubing products. Large quantities of steel and brass are cold drawn. Seamless tubing can be produced by cold drawing when thin walls and very accurate finishes are required.

Source: http://www.doitpoms.ac.uk/tlplib/metal-forming-2/other_processes.php