



Using engineering tools

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Files are used to remove material from stock form of metals and plastics. This is known as wastage.

Scribers are used to mark lines for cutting on materials such as metals and plastics.

Centre punch is a tool that is used to create a small depression in material prior to drilling. This helps locate the drill accurately on the material.

Tap and die sets are used to create threaded components. A tap is used to thread a hole and a die to thread a bar (i.e. a bolt).

Hacksaws are a framed saw used mainly to cut metal.

Rivet guns are used to place rivets in areas that are often accessible from one side. Traditional rivets use 'sets' to form the rivet on both sides of a joint.

An engineer's square is used in marking out material. It is set at 90° and is also used for parallel marking.

Callipers are used to scribe and measure on metals and plastics. Odd leg callipers can be used to scribe lines parallel to an edge, whilst straight leg callipers can be used to both mark equal distance sizes and produce arcs and circles.

Vernier callipers are used to measure a range of sizes such as length of material, depth of holes, internal openings, etc.

Micrometres are highly accurate measuring tools used to measure sizes, i.e. material width/thickness.

Reamers enlarge, smooth, or contour an existing drilled hole in a work piece for a precise fit when

installing fasteners or other parts in metalworking tasks.

Shears and snips are used to cut sheet metal. They may be straight or curved depending on the task.

Gauges are used in a variety of engineering manufacturing tasks such as centre gauges, which locate a centre on a metal bar, and thread gauges, which identify the size and pitch on a screw thread.

In addition to the examples above, tools can also include items used on items of equipment known as tooling:

Knurling tools are used to put a textured grip onto a metal bar using a lathe.

A **boring bar** is used to enlarge a drilled hole to a precise dimension. They are available for a lathe or a milling machine.

Parting tools are used on a lathe to form a narrow slot to assist in the removal of a work piece from the stock/waste material to remove.

Using engineering equipment

Commonly used items of equipment that you may find in a school workshop:

Centre lathe

- Facing off is the process of levelling off the end of the material
- Turning a taper causes a uniform change in diameter over a set length on a bar
- Applying a knurled finish
- Boring a hole
- Drilling along the centre axis line
- Cutting a thread onto a bar or into a hole.

Drilling machine

- Drilling holes using a range of drill bits
- Trimming off using a trimming tool, i.e. vacuum forming.

Miller

- End milling is used to create a profile in the work piece, including square end mills, ball end mills, finishing mills and corner rounding mills
- Slot milling involves using a cutter, which cuts slots or grooves into the material.

PCB tank

- Used to produce printed circuit boards for electronic circuits
- Uses a photographic and etching process and is used in combination with a UV light box to prepare the PCB artwork.

Vacuum forming:

- A process where a sheet of plastic is heated to a forming temperature, stretched onto a single-surface mould and forced against the mould by a vacuum.

