

# Marking-Out Tools

Marking out is the preliminary work of providing guidance lines and centres before cutting and machining. The lines are in 3-D and full-scale. The workpiece can then be cut or machined to the required shapes and sizes. The common tools used for marking out are as follows:

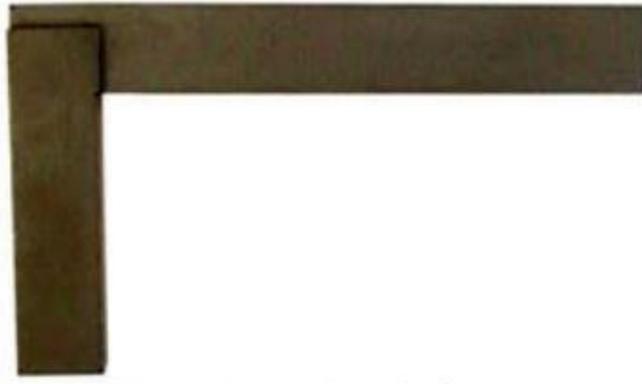
## Scriber

A scriber is used for scratching lines onto the workpiece. It is made of hardened tool steel.



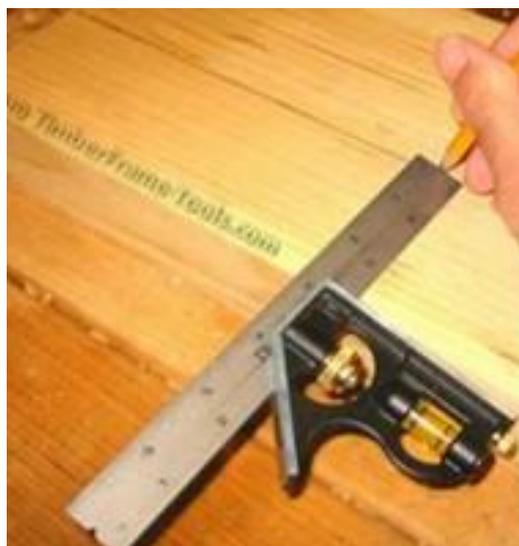
## Engineer's Square

Engineer's square is made of hardened tool steel. It is used for checking the straightness and the squareness of a workpiece. It can also be used for marking perpendicular lines onto a workpiece.



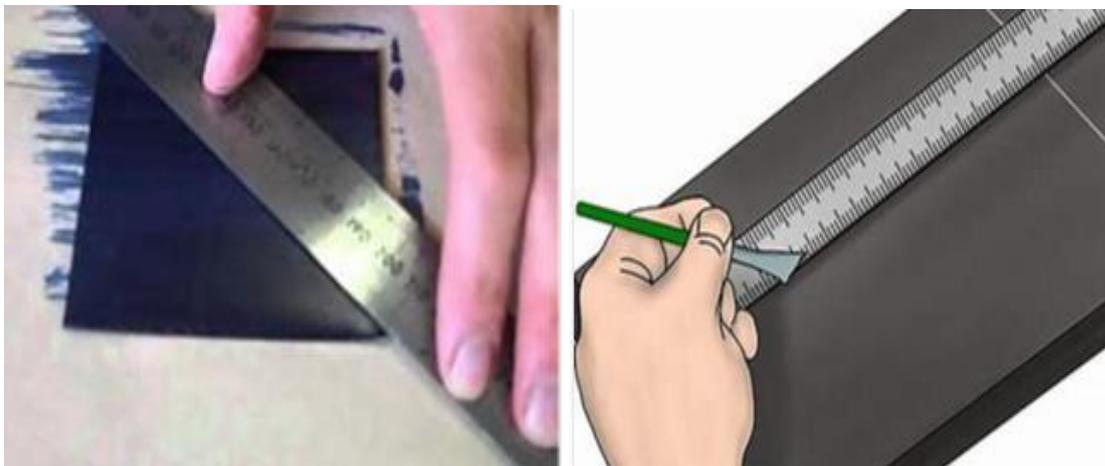
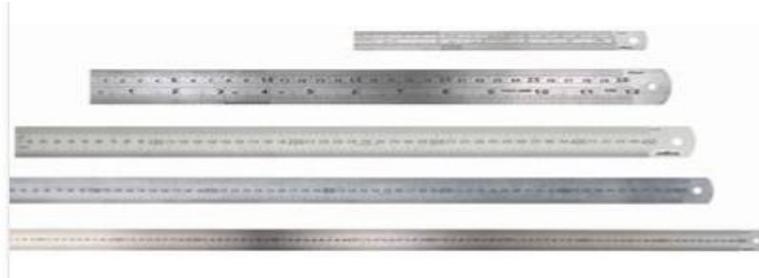
## Combination square

A combination square is a multi-use measuring instrument which is primarily used for ensuring the integrity of a 90° angle, measuring a 45° angle, measuring the centre of a circular object, find depth, and simple distance measurements. It can also be used to determine level and plumb using its spirit level vial.



## Steel Rule

A steel rule can come in various lengths, the most common are 150mm (6inch) or 300mm (12 inch) they can have both metric and imperial increments, they also are available in different widths and thicknesses. They can be used for measuring and marking straight lines, the thin ones can be used for marking out on curved surfaces.



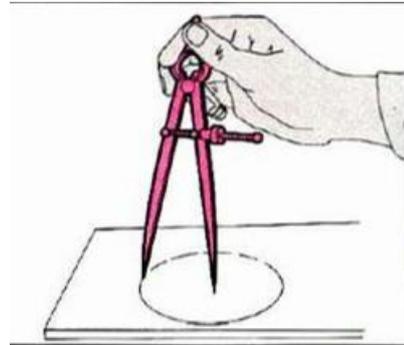
## Tape Measure

For longer measurements a steel tape measure would be used.



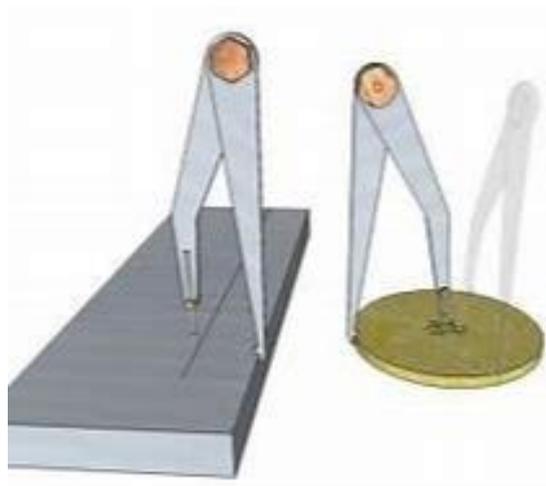
## Spring Dividers

Spring dividers are made of hardened tool steel. The legs are used for scribing arcs or circles onto a workpiece.



## Odd-leg Calipers

Odd-leg Calipers (sometimes called Hermaphrodite or Jenny Calipers) are used mainly to scribe lines parallel to the edge of metal (or plastics)



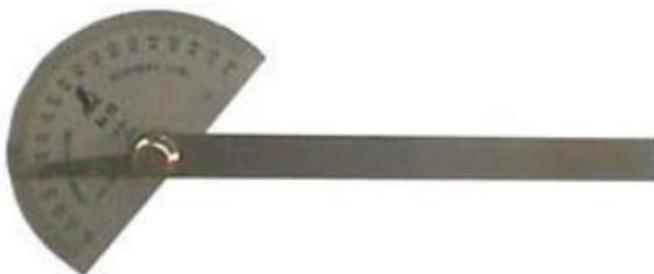
## Centre Punch

There are two types of punch namely the Centre Punch and the Dot Punch. A dot punch has a point angle of  $60^\circ$  and it is used for making of small dots on the reference line. The centre punch has a point angle of  $90^\circ$  as shown in figure 16 and it is used for making a large indent on a workpiece for drilling. Both punches are made of hardened tool steel.



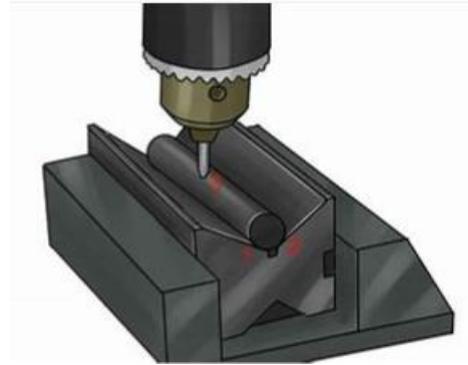
## Engineer's Protractor

Engineer's protractor is a general-purpose tool used for the measuring /checking of angles e.g., the angle of drill head, angle of cutting tool, and even for the marking out of angles on a component part.



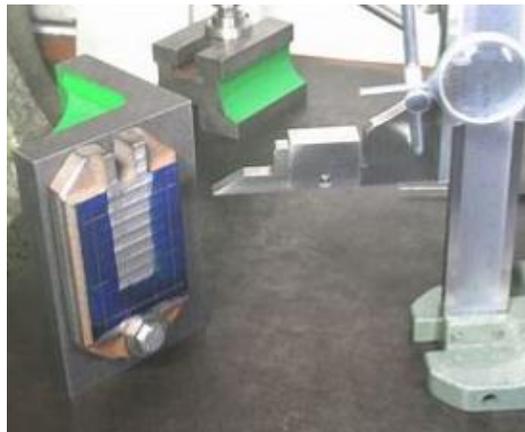
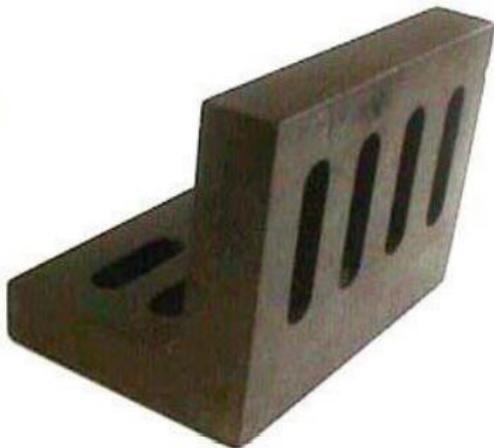
## Vee blocks

Vee blocks usually in a pair are made of cast iron or steel in casehardening. They are generally used for holding circular workpiece for marking out or machining.



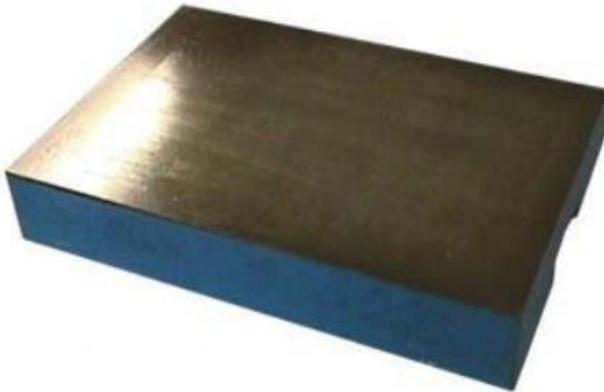
## Angle plate

An angle plate is used for supporting or setting up work vertically and are provided with holes and slots through which securing bolts can be located. It is made of cast iron and ground to a high degree of accuracy.



## Surface plate

A surface plate is made of malleable cast iron. It has been machined and scraped to a high degree of flatness. The flat surface is being used as a datum surface for marking out and for measuring purposes. If it can stand on the floor, it is called surface table.



## Vernier Height Gauge

A vernier height gauge (figure 5) is used for measuring height of an object or for marking lines onto an object of given distance from a datum base, this is usually used in conjunction with the surface plate.



## Safety

**It is important, that at all times, when working in an engineering environment, safety glasses, steel toe cap boots, overalls and ear defenders,**

**ARE WORN AT ALL TIMES**