

1. Materials; Metals		
Ferrous Metals		These Metals Contain IRON (Fe).
1	Iron	Machine Bases, Metalworking Vices
2	Tool Steel (Carbon Steels)	Screwdrivers, Hammers, Saws
3	Stainless Steel	Sinks, Rules, Cutlery
4	High Speed Steel	Drill Bits, Lathe Tools
Non-ferrous Metals		Metals which do not contain IRON.
5	Copper	Plumbing & Electrical Components
6	Aluminium	Cooking Foil, Sauce Pans, Ladders
7	Zinc	Coatings On Steel Products
8	Tin	Coating On Food Cans
9	Lead	Weather Proofing For Roofs
10	Titanium	Jewellery, Surgical Implants.
Alloys		A mixture. of two or more metals.
11	Brass	Plumbing Accessories
12	Bronze	Boat Propellers

**Smart Materials** - materials which have properties that can be significantly changed in a **controlled fashion** by external stimuli, such as heat, moisture, electric or magnetic fields, light.

3. Materials; Ceramics		
1	Tungsten Carbide	Cutting Tool Tips
2	Glass	Windows, GRP, Fibre Optics - Broadband.
3	Ceramic Bearing Material	Electric motors, applications under water, aerospace

4. Materials; Composites		
A material made from <b>two or more</b> different materials that, when combined, are stronger than those individual materials by themselves.		
1	Glass Reinforced Plastic (GRP)	Car / Boat Bodies, Bike frames
2	Carbon Fibre	Bicycle Frames, Sports equipment
3	Concrete	Constructional applications

5. Materials; Smart & New Materials		
1	Shape-memory Alloys	Dental Braces, surgical implants, fire prevention.
2	Thermochromic Materials	Thermometers for rooms, refrigerators, aquariums, and medical use.
3	Shape-memory Plastics	Smart fabrics, intelligent medical devices and self-disassembling mobile phones
4	Quantum Tunnelling Composite (QTC)	Switches on mobile phones, pressure sensors and speed controllers
5	Nanotechnology	Sunscreen, cosmetics, food packaging, and clothing

2 Materials; Polymers		
Thermoplastics		Can be remoulded numerous times with the application of heat.
1	Acrylonitrile - butadiene-styrene (ABS)	Appliance casings
2	Polyethylene	Pipes, Buckets, Toys
3	High Impact Polystyrene (HIPS)	Vacuum Forming, electronics casings
4	Polyvinyl Chloride (PVC)	Water Pipes, Chemical Tanks
5	Nylon	Curtain Rails, Hinges, Clothes
6	Polycarbonate	Safety Goggles, Bullet Proof Windows.
7	Polypropylene	Medical Equipment, Food Containers.
Thermoset Plastics		Polymers which cannot be remoulded once set in shape.
8	Polyester Resin	Used in GRP - Car/ Boat bodies
9	Urea-formaldehyde	Electrical fittings, Door Handles.
10	Epoxy Resin	Glue, Casings, Coatings.
11	Phenol-formaldehyde	Heat resistant saucepan handles

<https://www.bpf.co.uk/polymer-zone/sustainability/how-much-do-you-know-quiz.aspx>

## 6. Properties Of Engineering Materials

1	<b>Malleability</b>	Is capable of being extended or shaped by beating with a hammer or by the pressure of rollers.
2	<b>Ductility</b>	The ability of a material to be drawn out into wire or thread without losing strength or breaking.
3	<b>Conductivity</b>	Measure of a material's ability to conduct an electric current.
4	<b>Resistivity</b>	A measure of the resisting power of a specified material to the flow of an electric current.
5	<b>Hardness</b>	The measure of the resistance of a material to surface indentation, abrasion, or scratching.
6	<b>Machinability</b>	A characteristic of a metal that makes it easy to drill, shape, cut, grind, etc. Materials with good machinability can be cut with relatively little power and low cost.
7	<b>Corrosion Resistance</b>	How well a metal can withstand damage caused by oxidization or other chemical reactions.
8	<b>Elasticity</b>	The ability of a metal to resume its normal shape after being stretched or compressed.
9	<b>Plasticity</b>	Is the ability of a metal to undergo permanent deformation, a non-reversible change of shape.

## 7. Tools & Equipment



Steel Ruler



Engineers Square



Odd legged Callipers



Dividers



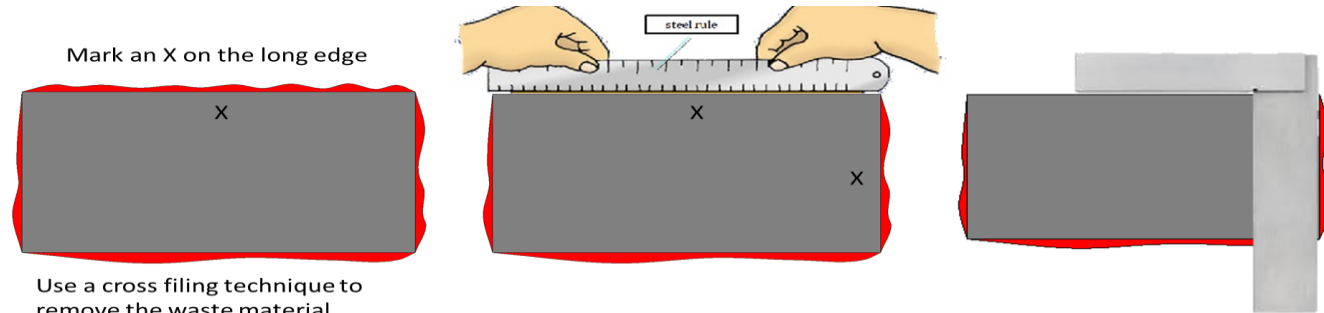
Scribe



digital vernier callipers

## 8. Datums

An engineering datum used in Engineering is a feature on an object used to create a reference system for measurement. In engineering and drafting, a *datum* is a reference point, surface, or axis on an object against which measurements are made.



Mark an X on the long edge

Use a cross filing technique to remove the waste material,