Characteristics of materials

Metals

Non-ferrous

Colour
m.p.
Properties
Uses
Availability

Aluminium alloy

Silver white
700ºC
Soft, weak, light, ductile, easy to pour, cast and machine, conducts heat and electricity easily; easy to work by hand
Boats, aircraft, engine components, saucepans, foil for packaging, drinks cans, window frames
Ingot (pure aluminium comes in sheet, bar, rod, angle, tube)

Copper

Reddish pink / brown
1100ºC
Very malleable, ductile, tough; good conductor; dense; easy to work
Electrical cables and conductors, water pipes
Bar, rod, sheet, tube, ingot

Brass

Yellow
980ºC
Resists corrosion, dense, fairly hard, strong, malleable, good conductor, casts well, easy to machine
Locks, taps, castings, forgings, decorative metalwork
Bar, rod, sheet, tube, ingot, angle

Silver

Silver
960ºC
Soft, weak, dense, very malleable, high conductivity; easy to work by hand; very expensive
Jewellery, specialist electrical wiring
Wire, sheet, ingot

Ferrous

Mild steel

Grey
1400º C
Strong, ductile, tough, fairly malleable; cannot be hardened or tempered; very dense, poor electrical conductor; cheap
General purpose building work; nuts, bolts, screws, tubular furniture, car bodies
Wire, bar, tube, rod, sheet, angle, girders, nuts and bolts

Carbon steel

Dark grey
1400ºC
Very malleable, ductile, tough; good conductor; dense; easy to work
Tools
Small bars, rod and strips

Plastics

Thermoplastics

Common name (**Abbreviation)**
Properties
Uses
Availability

Low density polythene (LDPE)

Wide range of colours, flexible, soft, durable, translucent / waxy, weatherproof, tough at low temperatures, easy to process, cheap, excellent chemical resistance
Squeezy bottles, toys, wrapping films, cheap kitchenware, carrier bags, high frequency insulation
Powders, granules, sheet, film

High density polythene (HDPE)

Wide range of colours, stiff, hard, tough, easy to process, cheap, excellent chemical resistance
Buckets, bowls, milk crates, chemical drums, quality kitchen ware, cable insulation
Powders, granules, sheet, film

Polyvinyl chloride (PVC)

Wide range of colours, rigid or flexible, durable, weatherproof, strong, electrical insulator
Electrical insulation, plumbing fittings, pipes and gutters, roof materials
Powder, granules, extrusion, sheet

Poly-propylene (PP)

Very tough and resistant to fatigue
Chairs, sterilisable hospital equipment, suitcases, car accelerator pedals, hinges, food packaging
Powder, granules, sheet

Expanded polystyrene (foamed) PS (expanded)

White, light, good insulator, absorbs shocks but crumbles easily, gives off poisonous gas when burned
Heat and sound insulation, packaging, buoyancy in canoes and small boats
Sheets and beads

Acrylic/perspex (PMMA)

Hard, stiff, very durable, polishes well, many colours available or clear, very tough
Signs for shops, aircraft canopies, double glazing, baths, displays (instead of glass)
Sheet, rod and tubes

Polyamide/nylon (PA)

Hard, tough, wear resistant, self-lubricating, fatigue and creep resistant
Bearings, gear wheels, clothing packaging
Powder, chips, rod, tube, sheet

PET (*PET)*

Light, sparkling 'crystal clear' appearance, very tough
Packaging (drinks bottles), in clothing, duvet and anorak fillings
Powder, pellets, fibre

Thermosetting plastics

Common name (**Abbreviation)**
Properties
Uses
Availability

Polyester resin *(PR)*

Stiff, hard, brittle; much stronger when laminated with glass or carbon fibres
Boats, canoes, chairs, encapsulating electronics
Powder, chips, rod, tubes, sheet

Epoxy resin *(ER)*

Good insulator and adhesive
Two part glues for metals and woods
Powder, pastes

Melamine formalde-hyde *(MF)*

Strong, hard, heat resistant
Kitchen work surfaces, good quality plastic cups and plates
Sheet, powder, granules

Melamine formalde-hyde *(MF)*

Strong, hard, heat resistant
Kitchen work surfaces, good quality plastic cups and plates
Sheet, powder, granules

Urea formalde-hyde *(UF)*

White, strong, tough, attractive to look at
Good quality electrical fittings
Powder, granules

Wood properties table

Category	Types/examples	Description/properties	Uses
Natural	**Softwoods** *Pine* *Cedar* *Yew*	Light – mid brown. Coniferous trees. Fast growing. Open grain. Cost – moderate.	Indoors and outdoors. Fences. Moderate costing. Furniture.
	Hardwoods *Oak* *Teak* *Mahogany*	Mostly dark coloured. Deciduous trees. Slow growing close grain. Cost – expensive.	Indoors and outdoors. High quality furniture. Window frames.
Manufactured boards	Laminated chipboard Wood chippings glued together with a plastic finish.	A range of colours. No grain. Cost – cheap.	Used indoors. Cheap furniture. Work surfaces.
	Medium density fibreboard (MDF) Wood fibres glued and compressed together.	Light brown colour. No grain. Cost – cheap.	Used indoors Moderate costing. Furniture. Children's toys.