



MATERIALS FACTSHEET

Ferrous Metals

- **Mainly composed of ferrite or iron.**
- **Small amounts of other elements added in such as carbon, nickel, tungsten and chromium.**
- **Almost all ferrous metals are magnetic**
- **Example are mild steel, stainless steel and carbon steel.**
- **Generally a dull grey colour**
- **Develops a surface oxide over time which is a reddish brown colour.**

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Mild steel

Properties

- Tough
- Malleable
- Magnetic

Uses

- Structural steel girders
- Car body panels

Advantages

- Easily worked and joined, even in a school workshop
- Relatively cheap
- Widely available in numerous forms and sections
- Can be recycled

Disadvantages

- Will oxidise (rust) if left unprotected
- Can only be case hardened

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Stainless steel

Properties

- Hard
- Tough
- Excellent corrosion resistance

Uses

- Cutlery
- Kitchen sinks
- Pots and pans
- Surgical instruments

Advantages

- Easily cleaned
- Does not need any surface finishing
- Can be recycled
- High lustre finish

Disadvantages

- Difficult to use and join in a school workshop
- Specialist welding equipment required for joining

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Carbon steel

Properties

- Ductile

Uses

- Nails
- Screws
- Nuts and general ironmongery

Advantages

- Can be recycled

Disadvantages

- Will oxidise (rust) if left unprotected
- Can be easily heat treated

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Non-ferrous metals

- Contain no iron
- Consist almost entirely of pure metals
- Not magnetic
- Examples are Aluminium, copper, zinc, and brass
- Good conductors of heat and electricity

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Aluminium

Properties

- Lightweight
- Soft
- Ductile
- Malleable
- Good conductor of heat and electricity
- Good corrosion resistance

Uses

- Window frames
- Soft drink cans
- Kitchen foil
- Used in alloys

Advantages

- Easily drawn into thin wires and sheets
- Can be recycled
- Easily cast

Disadvantages

- Expensive
- Difficult to weld as specialist equipment is required

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Copper

Properties

- Malleable
- Ductile
- Good conductor of heat and electricity
- Corrosion resistant

Uses

- Electric cables
- Plumbing fittings and pipes
- Hot water cylinders

Advantages

- Easily drawn into thin wires
- Can be recycled
- Easily soldered

Disadvantages

- Expensive
- Will tarnish (change colour) over time.

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Brass (alloy)

Properties

- Good resistance to corrosion
- Good fluidity, casts well
- Good conductor of heat and electricity

Uses

- Plumbing fittings
- Marine fittings

Advantages

- Can be polished to achieve a high-lustre finish
- Tougher than copper
- Can be recycled
- Easily cast and turned

Disadvantages

- Relatively expensive

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zinc

Properties

- Excellent resistance to corrosion

Uses

- Protective coverings for railings and dustbins
- Negative battery terminals

Advantages

- Can be recycled

Disadvantages

- Brittle

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Alloys

- A metal that is formed by mixing two or more metals.
- An endless list is possible, each with their own properties such as increased hardness.
- Alloys are normally grouped as ferrous or non ferrous
- Both Mild steel and brass are alloys;
- Mild steel is 99.8% iron, 0.2% carbon
- Brass is 65% copper, 35% zinc