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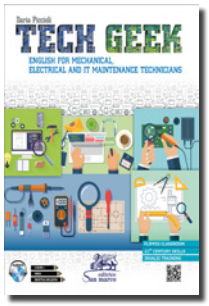
TECH GEEK
English for mechanical, electrical and IT maintenance technicians



Types of metals

The word 'metal' refers to a class of substances including such elements as gold, silver, copper, iron, lead and tin. They are characteristically lustrous, ductile, and fusible. They are also good conductors of heat and electricity. Metals can be divided into two broad categories: ferrous and non-ferrous metals.

Ferrous metals are iron-based materials that have been the foundations for industrial growth and economic development all over the world.

- **Iron** is the most widely used of all metals, nearly always as an alloy.[1] It is used to make steel and a variety of steel alloys. It is heavy, malleable, ductile and magnetic. It is used in transport, construction, machinery, and much more.
- **Steels** are a large family of metals. All of them are artificially produced alloys of iron containing up to 3% of other elements (including carbon). Steel is described as mild, medium or high-carbon steel according to the percentage of carbon it contains. Changing the carbon content changes the properties of the steel and the way that it is used. The more carbon steel contains the harder it is. The heat treatment given to a steel can affect its properties too. Cooling a red-hot tool steel rapidly in cold water makes it harder and more brittle. If you cool the same piece of metal more slowly, it gets softer. The main properties of mild steel are toughness and high tensile strength. Metals such as nickel, chromium, and tungsten may be added to produce a wide range of alloy steels, including stainless steel and high speed steels.
- **Cast iron** contains iron (94-98%) and carbon (2-6%). It is a strong material but rather brittle. Compressive strength is particularly high. It is used mainly for castings and engines.

Among the most widely used **non-ferrous metals** which do not contain iron are aluminium, copper, brass, lead, silver, and zinc.

GLOSSARY

1 a substance consisting of two or more components, which are usually metallic elements.

ACTIVITIES

1 *Match the following characteristics of metals with their definitions.*

1 Malleability	A Ability to move heat or electricity from one place to another
2 Ductility	B Capacity to withstand loads tending to reduce size
3 Compressive strength	C Ability to be worked and shaped without breaking
4 Brittleness	D Resistance of a material to a force tending to tear it apart
5 Tensile strength	E Capability to be drawn out into wire or thread
6 Conductivity	F Tendency to break without being distorted

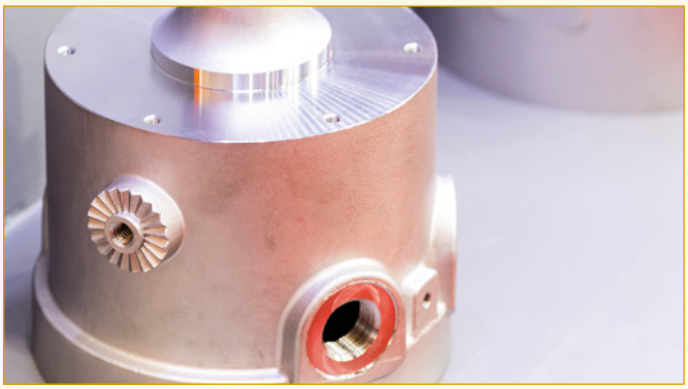
2 *Read the following short descriptions of some of the most common non-ferrous metals and their applications. Then match each description with the corresponding object in the pictures below.*

1 Cans, boats, ladders, tubing, aircraft parts and kitchenware are usually made of aluminium. This metal is the third most common element in the Earth's crust. It is light, strong and resistant to corrosion. It is a very good conductor of electricity and heat and it machines well. It can be extruded, that is forced through a pattern to shape it. Moreover, it can be easily recycled helping to preserve the environment.

2 Lead is a bluish grey metal mainly used in soldering, piping, and batteries. It is soft, heavy, ductile, and it loses its shape under pressure, but resists corrosion.

3 Copper is mostly used as a base for alloys and as an electrical conductor. It is a malleable and ductile reddish brown metal which has a good workability and resistance against corrosion. Copper does not require any maintenance, which makes it very economical.

4 Zinc is the third most common non-ferrous metal in the Earth's crust (after aluminium and copper). It reacts with iron and it resists corrosion. It also has a low melting point. It is used in precision die-casting, as a protective coating in nuts and bolts, and in copper-based alloys.



A .....

B .....

C .....

D .....

3 *Gather information about two other non-ferrous metals: brass and silver. Write some notes to describe their features and applications.*