



Most drink cans are made of aluminium

You probably best know aluminium as the can holding your soft drink, or the foil covering food in your fridge. In fact, aluminium is the second-most used metal (after iron) as it can be alloyed with almost any other metal to create materials with a whole range of useful properties, all very strong yet also very lightweight and resistant to corrosion. Some of these alloys have special names - for example, you might have heard of Zinalume or Duralumin. Aluminium is also present in many precious and beautiful gemstones such as turquoise, rubies, sapphires, emeralds, topaz, jade and aquamarines.

Aluminium is by far the most plentiful metal in Earth's crust, However, whereas copper, gold, lead and zinc were used by humans thousands of years ago, aluminium has only been used for a little over 100 years because humans did not know until then how to purify it!

PROPERTIES

- Aluminium is never found on its own in nature.
- Aluminium is a silvery-coloured metal.
- Aluminium is very light (about 1/3rd the weight of copper) yet strong - some alloys are even stronger than steel.
- Aluminium is highly rust-resistant.
- Aluminium is non-toxic and non-inflammatory.
- Aluminium is malleable and ductile (can be beaten and drawn into a wire).
- Aluminium has the symbol Al (from the Roman word Alumen - their word for the aluminium-potassium compound alum).
- Aluminium is a very good heat and electrical conductor.
- Aluminium can be alloyed (mixed) with almost any other metal.

USES

USE	DESCRIPTION
Building and construction	As aluminium is strong, light, easily shaped and resistant to corrosion, it is used in cladding, doors, window frames, awnings and bridge rails.
Transport	For the above reasons, aluminium parts are found in cars, trucks, buses, aircraft, ships, rail and trams.
Appliances	Also for the above reasons: fridges, washing machines, lawn mowers etc.
Heating and ventilation	As aluminium is a good conductor of heat, it is used in heating and cooling systems.
Packaging	As aluminium can be rolled into very thin sheets and is non-toxic, it is used for kitchen foil, packaging foil, cans and containers.
Electrical and communications	Aluminium's ability to conduct electricity means it is used for power transmission including towers, electrical conduit, machinery and equipment, telephone cables and capacitors.
Other	Utensils (cutlery, pans), industrial machinery, chemical industry, production of steel, anti-perspirants, furniture, reflectors in telescopes, making high octane petrol, road signs, antacids, and jewellery.

SOURCE

Never found in its pure form, aluminium is locked together with other elements. For example, the ore from which we most commonly obtain aluminium is called bauxite (a mixture of aluminium, oxygen and hydrogen).



Bauxite is the main ore mineral of aluminium

Australia is the world's largest producer and exporter of aluminium, mining 40% of the world's bauxite. Our major mining areas are Weipa in North Queensland (Matthew Flinders first noticed the 'reddish cliffs' there in 1802), Gove in the Northern Territory and the Darling Range in Western Australia.



Location of Major Aluminium Mines in Australia

Aluminium-bearing rock is blasted in open-pit mines, scooped up by front-end loaders and crushed. The aluminium oxide (called alumina) is separated from the waste rock by dissolving in caustic soda. The aluminium is then separated from the oxygen using a process called 'electrolysis', which uses large amounts of electricity. An electric current is passed through a solution containing the alumina. The oxygen combines with the carbon anode and forms carbon dioxide gas. The aluminium settles at the bottom of the pot and is siphoned off. Impurities are removed, alloying elements can be added, and the molten aluminium is cast into various shapes and sizes, depending on the end use required.

AMAZING FACTS

- Around 5300 BC, pottery makers in the Middle East used clays containing aluminium, although they did not realise there was a metal in these clays giving the products extra strength.
- Around 2000 BC, the ancient Egyptians and Babylonians used the aluminium-potassium compound called 'alum' for medicinal purposes (to reduce bleeding).
- Bauxite is named after the French district of Les Baux, where it was first discovered in 1821.
- In 1886, two scientists (an American Charles Hall and a Frenchman Paul Heroult), continents apart, both found a method of producing aluminium by electrolysis. In addition, both were born in 1864 and both died in 1914!
- Two years later, in 1888, a method for extracting alumina from bauxite was developed by Karl Bayer.
- Between 1852 and 1895, as the technology for producing pure aluminium was developed, this metal became more readily available. As a result, the price per pound weight of aluminium dropped from US \$545 to just 50 cents!
- There was great demand for aluminium during the two World Wars and the Korean War, for use in trucks and aircraft (planes had previously been made of wood and fabric).
- As aluminium is such a reactive metal, you'd think it would corrode badly and therefore be useless! However, because pure aluminium reacts very quickly with air or water it gets a thin, almost invisible layer of aluminium oxide on its surface, which then acts as a protective coating from any further corrosion.
- Worldwide, four out of every five drink cans are made of aluminium. Many of these are recycled, which is a great thing for the environment as it reduces waste, and the recycling process uses a lot less electricity than smelting aluminium from its ore.

FOR FURTHER INFORMATION

- Fact Sheet: Aluminium, Minerals Council of Australia and Australian Geological Survey Organization, 1999
- Aluminium, Minerals of Western Australia Series #3, Chamber of Minerals and Energy of WA Inc.