



*This steel can is coated with tin for corrosion protection*

Tin is one of the few metals that has been used and traded by humans for more than 5000 years. As tin is easy to melt, our ancestors were able to alloy tin with copper to make bronze. Tin was therefore an important metal in our history and development, taking us from the Stone Age to the Bronze Age. Bronze could be sharpened and used in tools and weapons, and people started to go in search of tin, venturing into other lands to trade goods.

You might have heard of tin soldiers and tin whistles, but today the biggest use of tin is to make cans for packaging food, which keep important things in your kitchen cupboard, such as Baked Beans for you or Pal for your dog, fresh for long periods of time.

## **PROPERTIES**

- Tin is a white metal at room temperature.
- Tin is soft.
- Tin is highly corrosion-resistant and fatigue-resistant.
- Tin is non-toxic.
- Tin is highly malleable (able to be shaped).
- Tin alloys easily with other metals.
- Tin has a low melting point (232°C).
- Tin is easy to recycle.
- The word tin is Anglo-Saxon in origin, but the symbol for tin, Sn, comes from the Roman word Stannum.

## USES

USE	DESCRIPTION
Tinplate	About 50% of tin is used as tinplate for canned foods and drinks, where steel cans are coated with tin to make them rust-resistant, more attractive, and more easily shaped and soldered. (Steel alone would rust, and tin alone would be too soft and too expensive).
Solder	About 30% of tin is used as a tin-lead solder in electronic parts, plumbing, machinery, and cars.
Bronze	An alloy of copper and tin - used for statues, bearings in car engines and heavy machinery, and musical instruments such as bells, cymbals and gongs.
Pottery and glass making	Tin oxide is used as a white glaze on pottery (including tiles) or glassware, and can be coloured with other metal oxides. Plate glass is made by floating molten glass on a bath of molten tin while it solidifies, giving the glass a very flat and polished surface.
Other	In biocides (such as wood preservatives and disinfectants), making dyes, plating baths, making perfumes and soaps, making plastics, strengthening glass bottles, in toothpaste, in veterinary medicines, church organ pipes (lead-tin alloy), cast iron, fire retardants, pewter (mostly tin, with antimony, copper and lead, and used for beer tankards, candlesticks, salt and pepper shakers etc), dental fillings and tinsel (60-40 tin-lead alloy).

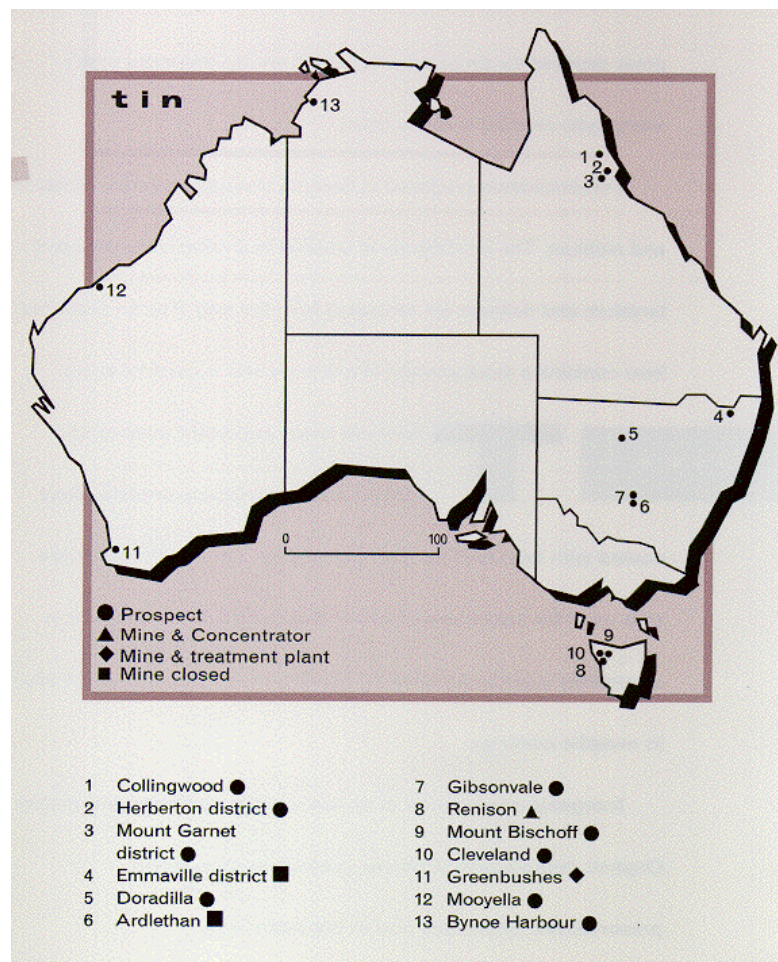


*Bronze statue of Colonel Light, the Founder of Adelaide*

## SOURCE

Australia does not produce large quantities of tin by world standards, but we do mine deposits of tin ore in Tasmania and, to a lesser extent, Western Australia (in Greenbushes). Tin ore was first discovered in Australia in the 1880s, and in fact the Renison Bell mine in Tasmania (named after George Renison Bell, the prospector and explorer who first staked a claim in the area) is one of the largest underground tin mines in the world.

Tin ore is mined either underground or by bucket-line dredging, depending on the location of the ore. The tin ore is separated from waste rock by gravity methods such as shaking tables and spirals, as it is relatively heavy. To obtain pure tin, the ore is then heated with carbon in a smelting process, then further refined by heating.



*Location of major Tin Mines in Australia*

## **AMAZING FACTS**

- About 300 BC, the Chinese developed a crossbow made from bronze, enabling them to defeat the Mongolians who were using ordinary long bows with less range and penetrating power. The Chinese were thus able to open up trade routes with Western Asia and Europe, ending 3000 years of Chinese isolation.
- In the first century AD, the Romans used tin to make bronze items, and lead-tin solder. They also used tin to make pewter items (like cups, plates and ornaments) made from 70% tin and 30% lead, which was dangerous given that lead is poisonous!
- In 618 AD, tin was exchanged by Britain for corn from Alexandria, to help relieve a famine.
- In the phrase 'Tinker, tailor, soldier, sailor.....' the word tinker probably comes from the tin pots and pans that tinkers (often gypsies) mended in Old England.
- During the 18<sup>th</sup> century, pewter figurines were very popular to own, such as 'tin soldiers'.
- In the late 18<sup>th</sup> century in China, tin was first beaten into thin sheets and used to line tea chests.
- In 1795, Napoleon Bonaparte offered a prize for anyone who could find a way of keeping food fresh for longer (for his soldiers). So a Frenchman called Nicholas Appert discovered that food boiled in glass bottles, then immediately sealed, would keep for several months. Then in 1810 an Englishman, Peter Durand, patented the first tinfoil food container. In 1825, a ship carrying tinned foods (pea soup and beef) to the Arctic sank, yet nearly 100 years later some of the containers were recovered and the contents were still fresh enough to eat!
- Church bells are made of bronze, with a high tin content, giving them a wonderful resonating sound. Famous bells include those in Westminster Abbey, the 'Oranges and Lemons' bells of St Clements, and the largest bell in the world in Moscow which weighs about 130 tonnes (Big Ben only weighs about 15 tonnes).

## **FOR FURTHER INFORMATION**

- Fact Sheet: Tin, Minerals Council of Australia and Australian Geological Survey Organization, 1999
- Tin and Tantalum, Minerals of Western Australia Series #7, The Chamber of Minerals and Energy of WA Inc.