

Aluminum recycling

Aluminum recycling is the process by which scrap aluminum can be reused in products after its initial production. The process involves simply re-melting the metal, which is far less expensive and energy intensive than creating new aluminum through the electrolysis of aluminum oxide (Al_2O_3), which must first be mined from bauxite ore and then refined using the Bayer process. Recycling scrap aluminum requires only 5% of the energy used to make new aluminum. For this reason, approximately 31% of all aluminum produced in the United States comes from recycled scrap. Used beverage containers are the largest component of processed aluminum scrap, with most UBC scrap manufactured back into aluminum cans.



Process for recycling beverage cans

Aluminum recycling

In recent time, there has been a massive improvement in recycling aluminum cans. In 2003, Americans recycled 62.6 billion aluminum cans. Those cans, placed end-to-end, could make 171 circles around the earth. Every minute, an average of 105,800 aluminum cans are recycled. That is how important can recycling has become. But what is involved here? Here is it...

Collection:

Local councils provide special can recycling containers (bins) that are clearly marked. This helps people to know what to place in them. Cans include soda, fruit and vegetable cans. Trucks come for these at pick up spots to the recycling centers. Cans may also be metallic or steel, but people do not know the difference.

Preparation:

At the collection center, a huge magnet is rolled over them as they move on the conveyor belt to pull out all the metal and steel cans. Only the aluminum cans are washed,

crushed, condensed in to 30-pounds briquettes for other companies for further processing. The rest is also sorted and sent to their appropriate recycling centers.

Melting:

The crushed cans are loaded into a burning furnace, where all printing and designs on the cans are removed, melted and blended with new (virgin) aluminum. The molten (liquid) aluminum is poured into molds and made into bars called *ingots*.

Sheets:

The ingots are then fed into powerful rollers, which flatten them into thin sheets of aluminum of about 25.4 in thickness. These thin sheets are rolled into coils and sold or sent to can-making factories. They use the aluminum coils to prepare cans and containers for other food and drink manufacturers. It is estimated that cans collected at collection points take up to 60 days to be appear in the shops again as new cans containing your favorite soda, juice or food.

Here's how the process works:

1.) Aluminum cans arrive at the recycling plant in large blocks, or bales

These bales are loaded onto a conveyor, which takes them to the shredder.



2.) The shredder chops the cans into small pieces

This is so that it is easier to remove all the inks and coatings used to decorate and protect the can.

It also makes the metal melt faster in the furnace

3.) The shredded cans are passed under a very powerful magnet

This removes any traces of steel. Drink cans are made of steel too, and can be recycled – but not in this factory!

Because the steel cans are magnetic they can be separated from the aluminum using this powerful magnet.

4.) The aluminum shreds move along the conveyor into the decoater

Here the decoration is removed from the shredded cans. The decoater blows hot air through the shreds and the inks and coatings vaporize.

The decoating process also warms the shreds up, so that they melt faster when they reach the furnace.

The hot gases are removed and cleaned.



5.) The decoated shreds are fed into the furnace

The furnace is heated to 7000C – this is a low melting point for a metal.

At this stage of the process other chemicals are added to make the aluminum the correct composition.

Any impurities rise to the surface of the molten aluminum, forming a layer of ‘dross’. Dross is removed using a special ‘scraping’ tool and this is also taken for recycling.



6.) The molten aluminum is transferred to another furnace

This ‘holding furnace’ is where the metal waits to be cast into ingots. The holding furnace tilts very gradually to pour the hot, molten aluminum.

The metal flows into molds, which are suspended over a pit about 10m deep. As it enters the mold it is cooled by a curtain of water which surrounds the mold.

As the aluminum cools it hardens and becomes heavier. This makes the base of the mould lower into the pit so that more aluminum flows into the mold.

Gradually an ingot is formed.



7.) The finished ingots are lifted from the casting pit by an overhead crane

It takes about three hours to cast the ingots. The factory makes three ingots at a time.

Each is 9 meters long and weighs 27 ton – and contains 1.5 million recycled aluminum drink cans.

The ingots are loaded onto a truck and dispatched to the rolling mill

At the rolling mill the ingots are rolled into a very, very thin sheet which is used by the can making company to make new drink cans for us to buy in supermarkets, cafes and vending machines.

And the whole process starts all over again!



Facts about the recycling plant

It is open 24 hours a day, 50 weeks of the year. It recycles around 18 million aluminum cans every day. It produces 15 27-ton ingots every day. There are about 80 people working in the plant.

Facts about aluminum can recycling

It saves 95% of the energy compared to making aluminum from its raw materials (known as primary production).

It saves 95% of the greenhouse gas emissions compared to the primary, or smelting, process.

It saves raw materials. It reduces the space needed for landfill – where waste is buried in holes in the ground.