

Scrap aluminium:

A detailed overview

Overview

Aluminium is one of the most recycled and valuable materials in the scrap industry. Scrap aluminium comes in a variety of forms, each with its own characteristics and recycling applications. The most common categories include post-consumer scrap, clean scrap from aluminium extrusion or rolling, scrap profiles of 90/10 and 95/5 aluminium, UBC (used beverage can), and aluminium electrical cable.

Post-consumer scrap is taken from aluminium products discarded by consumers, such as beverage cans, kitchen utensils, and window frames. This form of scrap is essential in recycling processes due to the large amount of aluminium available for reuse.

On the other hand, clean scrap from aluminium extrusion or rolling comes from industrial processes where aluminium has been used in the manufacture of products such as profiles and aluminium sheets.

Other forms of aluminium scrap include scrap profiles of 90/10 and 95/5 aluminium, the numbers referring to the ratio of pure aluminium to other metals. UBCs are an abundant source of recyclable aluminium, and aluminium electrical cable, found in energy and telecommunications installations, also constitutes a valuable source of scrap for recycling. All of these forms of scrap are critical to the production of new aluminium products and to reducing environmental impact by reusing material.



Scrap cleaning process

The process of cleaning scrap aluminium is crucial to ensuring the quality of the recycled material. The first step is to collect the scrap from recycling centres, factories, and other locations. The scrap is then sorted and separated according to the type and purity of the aluminium.

Once sorted, the scrap undergoes a cleaning process that includes the removal of contaminants such as organic residues, plastics, and other metals. This is done using magnetic separation

techniques, chemical baths, and heat treatments. The cleaned scrap is then melted in special furnaces, where any remaining impurities are removed.

Finally, the molten aluminium is poured into moulds to form RSI (Remelt Secondary Ingots), which are used as the raw material for the production of new aluminium products. This process not only conserves natural resources but also reduces greenhouse gas emissions and energy consumption in aluminium production.



Categories

Post-consumer scrap

Definition: Scrap from aluminium products discarded by consumers.

Location: Found in homes, recycling centres, and landfills.

Recycling uses: Used to make new aluminium products such as cans, kitchen utensils, and construction materials.

Recycling process: Collection, separation, cleaning, and smelting to create aluminium ingots.



Clean scrap from aluminium extrusion or rolling

Definition: Waste aluminium from industrial extrusion or rolling processes.

Location: Found in factories that produce aluminium profiles and sheets.

Recycling uses: Recycled to produce new aluminium profiles and sheets.

Recycling process: Collection, cleaning, smelting, and re-extrusion or re-rolling to create new industrial products.



Scrap profiles of 90/10 and 95/5 aluminium

Definition: Aluminium profiles with a ratio of 90% or 95% pure aluminium and 10% or 5% other metals.

Location: Found in building structures, windows, and doors.

Recycling uses: Used to manufacture new profiles and building materials.

Recycling process: Separation, cleaning and smelting of metals and re-extrusion to create new profiles.



Categories

UBC (Used Beverage Can)

Definition: Used beverage cans made of aluminium.

Location: Found in homes, restaurants, recycling centres, and landfills.

Recycling uses: Used to manufacture new beverage cans and other aluminium products.

Recycling process: Collection, cleaning, crushing, smelting, and manufacture of new cans.



Aluminium electrical cable

Definition: Electrical cables made of aluminium.

Location: Found in energy and telecommunications installations.

Recycling uses: Used to manufacture new cables and electrical components.

Recycling process: Collection, stripping of insulation, cleaning, smelting, and extrusion to create new cables.



Other forms of aluminium scrap

Definition: Includes automotive components, kitchen utensils, and aircraft structures.

Location: Found in auto workshops, factories, and airports.

Recycling uses: Used to manufacture new automotive components, utensils, and aircraft parts.

Recycling process: Disassembly, cleaning, smelting, and creation of new products from recycled aluminium.



Primary aluminium: Process and categories

From bauxite to primary aluminium ingots

Primary aluminium is essentially raw aluminium obtained through a complex industrial process that starts with the mining of bauxite and culminates in the production of ingots. The stages of the process are described in detail below, as well as the characteristics and chemical compositions of the most common ingots: A7, A8, and P1020.

The process of primary aluminium production

Bauxite extraction

The process begins with the mining of bauxite, the main source of aluminium. Bauxite is found primarily in tropical and subtropical regions, and is mined in open-pit mining. Once mined, the bauxite is crushed and washed to remove impurities.

Production of alumina

Crushed bauxite is processed using the Bayer process to obtain alumina (aluminium oxide). This process involves dissolving bauxite in a sodium hydroxide solution at high temperature and pressure. The alumina is subsequently precipitated as a pure white powder.

Electrolytic Reduction

Alumina undergoes an electrolytic reduction process in electrolysis cells that contain a bath of molten cryolite. This process, which is known as the Hall-Héroult process, uses electric current to separate the aluminium and the oxygen. The molten aluminium collects at the bottom of the cell.

Ingot Production

Molten aluminium is removed from the electrolytic cells and poured into moulds to form primary aluminium ingots. These ingots can vary in size and purity depending on their end use. The most common ingots include A7, A8, and P1020.

Categories of primary aluminium ingots

Ingot A7

Ingots A7 are known for their high purity. This type of ingot is widely used in industrial applications that require high-quality aluminium.

Category	Chemical Composition	Purity
A7	Al: 99.7%, Fe: $\leq$ 0.18%, Si: $\leq$ 0.10%	99.7%

Ingot A8

The ingot A8 is even purer than the A7 and is used in specialised applications where extremely high purity is required.

Category	Chemical Composition	Purity
A8	Al: 99.8%, Fe: $\leq$ 0.16%, Si: $\leq$ 0.08%	99.8%

Ingot P1020

The ingot P1020 is one of the most common types of primary aluminium and is used in a wide variety of industrial and commercial applications.

Category	Chemical Composition	Purity
P1020	Al: 99.5%, Fe: $\leq$ 0.20%, Si: $\leq$ 0.10%	99.5%



In short, primary aluminium is an essential material in numerous industries and applications due to its lightness, strength, and conductivity. The process to make ingots from bauxite involves several stages that ensure the purity and quality of the final product. Ingots A7, A8, and P1020 represent different purity levels and are used in various applications depending on their specific characteristics.

