

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: ≤ 0.18%, Si: ≤ 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: ≤ 0.16%, Si: ≤ 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: ≤ 0.20%, Si: ≤ 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.