

## Profile Parameters

### 1. The basic properties of aluminum

Silvery white can form an oxide film to prevent metal corrosion in humid air, the relative density of 2.7g/cm<sup>3</sup>, a melting point of 660°C, a boiling point of 2327°C, high specific strength, good electrical and thermal conductivity, high reflection and oxidation resistance.

### 2. Types

Profile type: aluminum profile, aluminum pipe, aluminum bar, etc.

Plate type: aluminum plate, aluminum foil, aluminum strip (coil)

Casting: aluminum castings, aluminum pellets

### 3. Commonly used grades

The first digit of the grade indicates the aluminum alloy series, the second digit indicates the modification of the original aluminum alloy, and the last two digits indicate the purity of the aluminum alloy in the same group.

**100:** Good formability and high corrosion resistance are required for processing, but high-strength parts are not required. Such as storage containers, thin plate processing parts, deep-drawn concave vessels, heat exchangers, printing plates, nameplates, reflective appliances, etc.

**2011:** Free-cutting alloy with good machinability and high strength, but poor corrosion resistance. It is suitable for volume shafts, optical components, screw heads, screws and mechanically processed products that require good cutting performance.

**3003:** It has the properties of 1xxx series alloys and has higher strength than 1xxx series alloys, such as kitchen utensils, food and chemical product processing and storage devices, tanks and tanks for transporting liquid products, and various pressure vessels and pipes for thin plate processing.

**4A01:** High silicon content, heat-resistant, wear-resistant, belonging to construction materials, mechanical parts, forging materials, and welding materials.

**5052:** The most representative alloy with medium strength (5083 is the highest), with good corrosion resistance, weldability and formability, especially high fatigue strength and good seawater resistance. It is used in the manufacture of aircraft fuel tanks, oil pipes, and transportation vehicles, Sheet metal parts of ships, instruments, street lamp brackets and rivets, hardware products, etc.

**6061:** heat-treated corrosion-resistant alloy. Treatment with T6 can have a very high endurance value, but the strength of the welded interface is low, so it is suitable for screws, ships, vehicles, and land structures.

**6N01:** Medium-strength alloy for extrusion, can be used as large-scale thin-skinned profiles with complex shapes, and has good corrosion resistance and weldability. Applicable to vehicles, land structures and ships.

**6063:** A representative alloy for extrusion, its strength is lower than 6061, and its extrudability is good. It can be used as a profile with complex cross-sectional shapes. It has good corrosion resistance and surface treatment. It is suitable for construction road guardrails, vehicles, furniture, and home appliances. products, decorations.

**7072:** Low electrode potential, mainly used for anti-corrosion coating materials, also suitable for heat exchanger fins, air conditioner aluminum foil and ultra-thin strips.

**7075:** One of the alloys with the highest strength among aluminum alloys, but its corrosion resistance is not good. The covering skin with 7072 can improve its corrosion resistance, but the cost will increase. Applicable to aircraft, ski poles, thick plates, and forgings.

#### **Material selection example:**

The product requirements are relatively hard, and the surface treatment is coarse wire drawing or coarse sand surface. Choose 5000 series aluminum alloy, commonly used: 5052

For products with high requirements for surface treatment, without sand holes and traces of profiles, choose 6000 series aluminum alloy, commonly used: 6063/6061

The product is required to be cheap and needs to be re-examined for stretching and shape. 2000 series pure aluminum is selected, commonly used: 2011

The product has high strength and high hardness and needs to be used for load-bearing structures. Choose 7000 series aluminum alloy, commonly used: 7075

## **4. Surface treatment of aluminum**

- (1) Anodizing after sandblasting or wire drawing
- (2) Electrophoretic painting
- (3) Powder electrostatic spraying and fluorocarbon spraying after polishing
- (4) Electroplating after polishing the mirror surface



- (5) Wood grain thermal transfer printing
- (6) Polymer PVC coating

## 5. Aluminum profiles

Aluminum profiles are aluminum tube materials with different cross-sectional shapes obtained by hot-melting and extruding aluminum rods. The molding process mainly includes five processes: casting, extrusion, cutting, CNC washing and cutting, surface pretreatment, and coloring.

Titanium plating and electrophoresis are the most expensive, followed by wood grain thermal transfer, anodizing, and finally spraying. The specific price is subject to the manufacturer's quotation.

### **The main applications of aluminum profiles are as follows:**

1. Architectural aluminum profiles (doors, windows, curtain walls)
2. Aluminum profile of radiator
3. General industrial aluminum profiles: mainly used in industrial production and manufacturing, such as automated machinery and equipment, skeletons, etc., which can be molded and customized.
4. Aluminum alloy profiles for rail vehicle structures: mainly used in the manufacture of rail vehicle bodies.
5. Decorate aluminum profiles, make them into aluminum alloy surface frames, and mount various decorative paintings.
6. Appearance aluminum profiles are mainly used in home appliances or communication industries, such as mobile hard disks, mobile power supplies, televisions, monitors, etc. for internal structure and appearance decoration.

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