

Aluminum Introduction

Aluminum is an incredibly versatile material, making it highly suitable for CNC machining. It possesses a wide range of properties that make it desirable in various industries. Notably, aluminum exhibits excellent machinability, allowing it to be easily worked with CNC equipment. It also possesses desirable characteristics for welding and electroplating and demonstrates good resistance to corrosion. Furthermore, aluminum boasts a high strength-to-weight ratio, making it both strong and lightweight. It also maintains its integrity and shape well, even when subjected to high temperatures. Additionally, aluminum can be polished and colored with ease after machining, offering further customization options.

Due to its remarkable properties, aluminum finds extensive application across numerous industries. It is widely used in automotive, defense, aerospace, transportation, construction, packaging, electronics, and consumer goods sectors, among others.

Information of Aluminum

Features	Information
Subtypes	6061-T6, 7075-T6, 7050, 2024, 5052, 6063, etc
Process	CNC machining (Milling, Turning), Injection molding
Applications	Fast tooling/Fixture/Jig, From Rapid prototypes to Production
Finishing Options	Electrophoretic coating, Blackening treatment, Anodizing, Hard Anodizing, Shot Blasting, Plating, Powder Coating, Painting, Tumble Polishing

Available Aluminum Sub-types

Sub-types	Yield Strength	Elongation at Break	Hardness	Density	Maximum Temp
Aluminum 6061-T6	35,000 psi	12.50%	Brinell 95	2.768 g/cm ³ 0.1 lbs / cu. in.	1080° F
Aluminum 7075-T6	68,000 psi	11%	Rockwell B86	2.768 g/cm ³ 0.1 lbs / cu. in	380° F
Aluminum 5052	23,000 psi	8%	Brinell 60	2.768 g/cm ³ 0.1 lbs / cu. in.	300° F
Aluminum 6063	16,900 psi	11%	Brinell 55	2.768 g/cm ³ 0.1 lbs / cu. in.	212° F

Die Casting Aluminum Alloys Types

Aluminum alloys are commonly used in die casting due to their excellent cast-ability, lightweight nature, and good mechanical properties. Some commonly used die casting aluminum alloy materials include:

ADC12 (A383):

This is one of the most widely used aluminum alloys for die casting. It offers good strength, excellent castability, and reasonable corrosion resistance. ADC12 has high fluidity, which makes it suitable for intricate and thin-walled parts.

The composition standards of ADC12 aluminum alloy are:

ADC12 contains Aluminum (Al) residue, Copper (Cu)1.5-3.5; Silicon (Si)9.6-12.0; Magnesium (Mg) \leq 0.3; Zinc (Zn) \leq 1.0; Iron (Fe) \leq 0.9; Manganese (Mn) \leq 0.5; Nickel (Ni) \leq 0.5; Tin (Sn) \leq 0.3

A380:

A380 offers better corrosion resistance compared to ADC12 and has good mechanical properties. It exhibits excellent dimensional stability and thermal conductivity, making it suitable for a range of applications.

The composition standards of A380 aluminum alloy are:

A380 contains Aluminum (Al) residue, Copper (Cu)3.0-4.0; Silicon (Si)7.5-9.5; Magnesium (Mg)0.1Max; Iron (Fe)2.0Max; Zinc (Zn)3.0Max; Manganese (Mn)0.5Max; Nickel (Ni)0.5Max; Tin (Sn)0.35Max

A380 is close to the Japanese standard ADC10 and is an Al Si Cu alloy with high silicon content.

A360:

A360 alloy provides good corrosion resistance, high-pressure tightness, and excellent cast-ability. It can be easily machined and has moderate strength, making it ideal for automotive and electrical components.

KYLT

- die casting, injection molding, rapid prototyping & CNC machining, die casting machines

The composition standards of A360 aluminum alloy are:

A360 is an American die cast aluminum alloy grade with the following chemical composition: Aluminum (Al) residue; Silicon (Si)9.0-10.0; Iron (Fe)1.3; Copper (Cu)0.6; Manganese (Mn)0.35; Magnesium (Mg)0.40-0.60; Nickel (Ni)0.50; Zinc (Zn) 0.50; Tin (Sn)0.15

A413:

A413 is known for its exceptional pressure tightness and resistance to hot cracking. It has good fluidity and can fill complex molds reliably. A413 is commonly used for components that require air-tightness, such as automotive engine brackets and housings.

The composition standards of A413 aluminum alloy are:

Aluminum (Al) Margin; Silicon (Si) 6.8-8.2; Copper (Cu) $Cu+Zn \leq 0.15$; Magnesium (Mg) ≤ 0.05 ; Manganese (Mn) ≤ 0.50 ; Titanium (Ti) ≤ 0.15 ; Calcium (Ca) ≤ 0.10 ; Iron (Fe)0.000-0.500

AlSi10Mg:

This alloy contains silicon and magnesium, offering high strength, good corrosion resistance, and excellent thermal properties. AlSi10Mg is commonly used in industries such as aerospace, automotive, and consumer goods.

The composition standards of A413 aluminum alloy are:

Aluminum (Al) Margin; Silicon (Si)9.2; Magnesium (Mg)0.48; Manganese (Mn)0.21; Copper (Cu)0.26; Iron (Fe)0.84; Nickel (Ni)0.17; Zinc (Zn)0.25; Tin (Sn)0.11