6063 aluminum sheet plate

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Silicon and magnesium serve as alloying ingredients in 6063 aluminum sheet. In general, 6063 aluminum sheet has strong mechanical qualities and is suitable for welding and heat treatment. Aluminum alloy has significantly greater comprehensive performance criteria than the industry norm.

In addition to having superior extrudability, corrosion resistance, and surface treatment performance, 6063 alloy has a lesser strength than 6061 aluminum. 6063 is a low alloy with good plasticity that is part of the Al-Mg-Si family. It serves a variety of useful purposes.

6063 aluminum sheet plate chemical composition

Chemical Composition WT(%) Silicon	Iron	Copper	Magnesium	Manganese	Chromium	Zinc	Titanium	Others	Aluminum
0.2~0.6	0.35	0.1	0.45~0.9	0.1	0.1	0.1	0.15	0.15	Balance

The density of 6063 aluminum alloy is 2.69g/cm3.

The role of elements in 6063 aluminum sheet

1. The function of the element magnesium (Mg): There is still more time to develop free silicon (Si), but if silicon (Si) is present, insufficient magnesium (Mg) results in excess time Mg 2. In Si metal, Mg and Si first generate AlFeSi, AlFe (Mn) Si, and the remainder generate Mg 2Si. Al 3. Mg: Si=(2×24.3)/28.1=1.73 is the weight ratio of magnesium to silicon in Mg 2Si; the atomic weights of silicon and magnesium are 28.1 and 24.3, respectively. In AlFe (Mn)Si, the weight ratio of (Fe Mn) to Si is (Fe Mn): Si=55.8 55/28.1=3.94 ≈4, where 55.8 5.Manganese's atomic weight is equal to that of iron. Because total Si-0.25 (Fe Mn) is the quantity of silicon (Si) that actually produces Mg 2Si, the ingredients' iron (Fe) and manganese (Mn) contents should be kept under control.

2. The silicon (Si) effect: producing magnesium 2Si Since silicon is soluble in the matrix and may reach 1.65% solubility in aluminum at 550°C, excess silicon may have a strengthening effect. Fine-particle precipitation at room temperature has a strengthening effect, but it will decrease extrusion performance. Excess silicon (Si) is usually kept to a maximum of 0.2%; if there is not enough silicon (Si), excess magnesium (Mg) will produce Mg 2Al 3, which will lower processing performance.

3. Copper (Cu) function: a lot of copper will create the CuAl 2 phase; it frequently turns into Al-Cu-Mg-Si alloy (hard aluminum); very little copper is dissolved in the matrix, and the precipitate during aging is modest, preventing negative consequences caused by waiting before aging.

4. The role of chromium (Cr) is to refine the grain and enhance tensile strength and forming.

5. Iron (Fe) function: no more than 0.15%, since this will cause the surface to oxidize and turn gray.

Melting and casting process of 6063 aluminum sheet

1. Ingredients: How much magnesium is predicted to be required for extra Si based on the specified Mg2Si? The quantity of iron (Fe) that is added is determined by the amount of silicon (Si) and magnesium (Mg) in the scrap, which is used to regulate iron (Fe). Aluminum ingots are then tested in front of the furnace.

2. Melting: stop magnesium (Mg) from burning on the floating surface and absorbing hydrogen, and stop silicon (Si) from sinking to the bottom and slagging.

3. Refining: To avoid secondary pollution from impure nitrogen (including O2, H 2O), pure

N2, and refined cryolite Al 2O3 (to dissolve and remove it as scum), release chlorine, and react with hydrogen to generate HCL.

4. Casting: the on-site operators determine the ideal circumstances and make the necessary adjustments in the form of files for temperature, speed, water pressure, and water temperature.
5. Around 735°C is used for the slag removal process, which facilitates the separation of slag and liquid.
6. The main refining process adds a solid refining agent, and the secondary refining process uses the gas refining technique. Refining typically uses the secondary refining method.
7. In general, it must be cast within 30 minutes to 1 hour after the furnace being shut off; if not, it must be refined once more.
8. In order to refine the grains throughout the casting process, Ai-Ti-B must be added continually.

The furnace temperature is typically set at 1050°C during smelting, and the metal temperature is regulated to not exceed 770°C. These are some important parameters in the melting and casting process.

Above is an introduction to the 6063 aluminum sheet melting and casting process. The material is immediately cast into a product after being melted at a high temperature. After being dissolved in an electric arc furnace, it is often poured into a casting that can withstand high temperatures and cooled to crystallize, anneal, or cut into products.

In order to guarantee high production efficiency, satisfy crystal analysis standards, and create a network structure, the melting atmosphere, melting temperature, and cooling conditions are primarily controlled during production.

6063 aluminum sheet plate Specificaton

Standards	ASTM B209 / ASME SB209
Temper	O, T3,T4,T5, T6, T651 T6511
Thickness	0.3-600 mm
Width	100-2600 mm
Length	500-10000 mm
Surface	Bright, polished, hair line, brush, sand blast, embossed, etching, etc.
Finish	Mill, Customer specific finish
Aluminum Sheet/ Plate Coating	PVC Coated, Color Coated, Polyester, Fluorocarbon, polyurethane and epoxy coating
Type	Hot-Rolled (HR) / Cold-Rolled (CR) Sheet

Physical Properties of 6063 aluminum

Density	Melting Point	Modulus of Elasticity	Electrical Resistivity	Thermal Conductivity	Thermal Expansion
2.69 g/cm3	600°C	69.5 GPa	0.035×10-6 O.m	200 W/m.K	23.5 x 10-6 /K

Summary of mechanical properties for 6063 aluminum alloy

Mechanical Properties	Metric	English
Ultimate Tensile Strength	241 MPa	35000 psi

Tensile Yield Strength	214 MPa	31000 psi
Shear Strength	152 MPa	22000 psi
Modulus of Elasticity	68.9 GPa	10000 ksi
Shear Modulus	25.8 GPa	3740 ksi

Advantages of 6063 aluminum alloy

1. It has a high impact hardness and may be reinforced by heat treatment.
2. The surface is extremely smooth after processing, making it simple to color and anodize.
3. Aluminum sheet 6063 exhibits outstanding welding capabilities, strong resistance to corrosion, and little propensity for stress corrosion cracking. The Al-Mg-Si alloy is one of the heat-treatable aluminum alloys that does not develop stress corrosion cracks.
4. A clean and cozy environment is ensured by strong corrosion resistance, the absence of dangerous microorganisms, and a strong odor from mold and moisture.
5. High hardness, which prolongs the product's service life by preventing cracking and deformation.

6063 aluminum alloy usages

1. Strips are widely employed in a variety of sectors, including electronics, aviation, aerospace, construction, decorating, and weaponry.
2. Spacecraft wall panels, rocket forging rings, aircraft skins, fuselage frames, girders, rotors, propellers, fuel tanks, wall panels, and landing gear pillars are all made of aluminum.
3. Automobile body structural components, subway vehicles, railroad passenger cars, high-speed passenger cars, doors and windows, shelves, car engine components, air conditioners, radiators, body panels, wheels, and ship components are all made of aluminum.
4. Packaging materials made of aluminum Thin plates and foils are the primary metal packaging materials used to produce cans, lids, bottles, barrels, and packaging foils for all-aluminum pop cans. extensively utilized in the packaging of industrial goods, food, drinks, cosmetics, and medications.
5. PS plates are mostly made of aluminum printing materials. PS plates made of aluminum are a novel material for the printing industry that are utilized in automated plate production and printing.
6. Materials made of aluminum for architectural ornamentation Aluminum alloys provide outstanding process and welding performance, adequate strength, and strong resistance to corrosion.
7. Various busbars, wiring, conductors, electrical components, refrigerators, air conditioners, cables, and other areas are the primary uses for aluminum materials in electronic household appliances. Details: In addition to being widely employed in automated mechanical components, precision machining, mold production, electronics and precision instruments, SMT, PC board solder carriers, and other sectors, round and square rods have applications in the domains of communication, electrical fixtures, and aerospace.

What does 6063-t6 aluminum alloy mean?

The 6063-t6 aluminum alloy indicates that the retreat process is in the T6 state and the brand is 6063 alloy. The hardness of 6063-t6 is 73HB, and the yield strength value of T6 state treatment is typically 210MPa.

1. The brand is 6063 aluminum sheet, and the number 6063 in 6063-t6 indicates that it is a member of the 6000 series alloy. The 6063 aluminum sheet, which is an aluminum-magnesium-silicon alloy, has a minor amount of copper and iron to increase its strength in addition to the necessary amounts of manganese and chromium.
2. One example of a high-hardness alloy is 6063 aluminum alloy, which is also the main factor for its frequent use in the production of abrasive tools, precision machining, and other mechanical components.

3. The term "T6" in 6063-T6 aluminum alloy refers to the more widely used annealing procedure of aluminum sheet.
4. After heat treatment, the 6063-T6 aluminum alloy can successfully increase the variety of 6063 aluminum sheet and enhance its usage, benefits, and properties.

6063 aluminum alloy hardness

The high-hardness aluminum plate alloy series is exemplified by 6063, which has a hardness of up to 95HB. The advantages of 6063 aluminum alloy are its high strength and resistance to deformation.
The 6063-T1 aluminum alloy plate has a hardness of 42HB and a yield strength of 95Mpa.
The 6063-T5 aluminum alloy plate has a hardness of 60HB and a yield strength of 175 MPa.
The 6063-T6 aluminum alloy plate has a hardness of 73HB and a yield strength of 210 MPa.
The 6063-T832 aluminum alloy plate has a hardness of 95HB and a yield strength of 240MPa.

Notes for reference: 10 watts of hardness is equivalent to 120 MPa, and 13 watts is equivalent to 270 MPa. You can compare the reference data and extrapolate based on the manufacturing condition you wish to know.

6063 aluminum sheet vs 6061 aluminum sheet

Aluminum 6061 alloys are twice as strong as 6063 aluminum sheet. Usually made with extremely smooth surfaces that are suitable for anodizing, it is frequently used to create aluminum furniture, window and door frames, automotive parts, architectural fabrication, electronic components, and other long-lasting consumer goods.

ALLOY	6061 VS 6063
Chemical Composition	In terms of Mg and SI, 6061 is 30-50% more than 6063. The most direct effect is that 6061 has a greater strengthening effect than 6063.
Mechanical Properties	The strengthening effect of 6061 heat treatment is greater. In contrast, the higher the tensile strength, the greater the deformation resistance, so the plasticity of the 6061 alloy is lower than 6063.
Plasticity	6061-T6 is used in occasions that require certain strength and hardness. 6063 is a representative alloy for extrusion with good extrudability.
Other Aspects	Surface treatment: Both 6061 and 6063 anodizing properties are very good. 6063 aluminum is better. Machinability: Both are good. 6061 is better. Corrosion resistance: Both are good. 6063 is slightly better. Weldability: 6063 is slightly better. Price: 6063 aluminum sheet price is a little higher than 6061.
Conclusion	Simply speaking, 6061’s advantage is strength, while 6063 wins in extrudability.