

Aerospace Grade Aluminum

Aerospace grade aluminum is a kind of ultra-high strength deformed aluminum alloy, which is widely used in aviation industry. It has good mechanical and processing properties, good plasticity after solution treatment and good heat treatment strengthening effect. Generally, aerospace aluminum has high strength and toughness below 150 °C (or even higher), so it is an ideal structural material. In addition, aerospace aluminium is light in weight and has a significant effect of lightweight, which has replaced steel and occupied the leading position of aviation materials. Aviation equipment has a high demand for aluminum, which is an important high-end application market of aluminum.

We offer innovative, high performance products that bring cost benefits to aerospace companies of all kinds-whether they build commercial aircraft, military aircraft or work on space programs. Our aerospace aluminium products are available in four main forms:

Plates, which can be machined to make particular shapes, such as bulkheads

Sheets used for fuselage and wing skins

Extrusions for structural components such as stringers

Precision castings, which provide a large variety of customized components such as door frames or engine gearboxes

Component	Material	Alloy Elements	Properties
Front legs of seat	Al 2017, Al 2024	Copper, Magnesium	Good machining, high strength, high fatigue strength, corrosion resistance
Wing leading edge	Al 2024		
Seat ejectors	Al 2024		
Backrests and armrests	Al 6xxx	Magnesium, Silicon	High strength, good formability weldability, corrosion resistance
Fuselage skins, stringers and bulkheads	Al 6013, Al 6050, Al 7050, Al 7079		
Wing skins, panels and covers	Al 7075	Zinc, Magnesium, Copper	Highest strength, high toughness, good formability
Rear legs of seat and seat spreaders	Al 7075		
Wing spars, ribs	7055-T77		
Wheels and loading gear links	7055-T77		
Horizontal and vertical stabilisers	Al 7xxx		
Upper and lower wing skins	8090-T86, 2055-T8, 2199-T8E80	Lithium, Copper, Magnesium	Low density, excellent fatigue and toughness, crack growth resistance
Floor sections of the aircraft	2090-T83, 2090-T62		
Sear structure	2090-T83		
Supporting members of fuselage structure	8090-T651, 2090-T651		

Mechanical properties of aerospace aluminum:



The mechanical properties of an alloy are an important factor in the decision where to use it during construction. In the list below we give some typical properties:

2024-T3

This is the most common of the the high-strength aluminum alloys. It is high grade aircraft quality. 2024-T3 aluminum sheet is thought of as the aircraft alloy because of its strength and it also has excellent fatigue resistance. Corrosion resistance is less than 6061, hence the alclad versions. Welding is generally not recommended. Typical uses for 2024-T3 Alclad aluminum sheet are fuselage and wing skins, cowls, aircraft structures and also for repair and restoration because of its really shiny finish (2024-T3 Alclad). Its ultimate strength is 62000 PSI with a shearing strength of 40000 PSI.

6061-T6

This alloy has a very good corrosion resistance and finishing ability, welding goes without any problems too. The strength level of 6061-T6 aluminum sheet is about that of mild steel. 6061-T6 aluminum sheet can be fabricated by most of the commonly used techniques. Typical uses are aircraft landing mats, truck bodies and frames, structural components and more. Ultimate strength is 45000 PSI with a shearing strength of 30000 PSI.

5052-H32

This one has the highest strength in the NON-heatable alloy series. It is not structural. 5052 aluminum sheet has higher fatigue strength than most alloys. 5052 aluminum sheet has excellent corrosion resistance, particularly in marine applications and has excellent workability. This aluminum sheet is commonly used to construct fuel tanks.

3003-H14

Most widely used of aluminum alloys, pure aluminum with manganese added for strength, approx 20% stronger than the 100 series. 3003-H14 aluminum sheet has great workability and may be deep drawn, spun, welded or brazed. 3003 aluminum sheet is NON-heat treatable. This aluminum sheet is widely used for cowls and baffle plating. Ultimate strength is 21000 PSI with a shearing strength of 14000 PSI.

7075

Aircraft manufacturers use high-strength alloys (principally alloy 7075) to strengthen aluminum aircraft structures. Aluminum alloy 7075 has Copper (1.6 %), Magnesium (2.5 %) and Zinc (5.6 %) added for ultimate strength, but the copper content makes it very difficult to weld. On the other hand it anodizes really beautifully. 7075 has the best machinability and it will result in a very nice finish. Ultimate strength is 33000 PSI (-O) and 82000 PSI (-T6) with a shearing strength of 22000 PSI (-O) and 49000 PSI (-T6).

