

Material Information



Aluminum 6061

Introduction

Aluminum 6061, also known as AA 6061 or UNS A96061, is a heat-treatable aluminum alloy containing magnesium and silicon as its principal alloying elements. It is known for its good combination of strength, corrosion resistance, machinability, weldability, and moderate formability. Aluminum 6061 is widely used for sheet metal fabrication when higher strength and structural performance are required compared with commercially pure aluminum and lower-strength alloys.

Advantages

Good strength, corrosion resistance, machinability, and weldability make Aluminum 6061 suitable for a wide range of fabricated sheet metal components. Its relatively high strength-to-weight ratio helps reduce part weight while maintaining structural performance. It can also be welded, cut, and formed using conventional fabrication processes, although the selected temper should be considered when bending or forming the material.

Disadvantages

Aluminum 6061 generally has lower formability than Aluminum 5052, particularly in harder tempers such as T6. Bending and forming may therefore require larger bend radii and appropriate tooling to reduce the risk of cracking. Welding can also reduce the strength of heat-treated 6061 in and around the heat-affected zone, so the material temper and required mechanical performance should be considered for welded parts.

Tolerance

We offer tolerances as tight as $\pm 0.005"$. Tighter tolerances are available upon manual review.

Recommendation

The combination of good strength, corrosion resistance, lightweight construction, machinability, and weldability makes Aluminum 6061 suitable for sheet metal fabricated parts used in transportation, aerospace, industrial equipment, structural assemblies, and general engineering applications. It is particularly appropriate for components that require higher strength and

rigidity while still benefiting from the low density and corrosion resistance of aluminum.

Material Specifications (For reference only.)	
Tensile strength	276MPa
Shear modulus	97GPa
Elongation at Break	17%
Hardness	95 HB
Density	2.7 g/cm ³

Attention

Aluminum 6061 is a heat-treatable alloy, and its mechanical properties vary with temper. Harder tempers such as 6061-T6 provide higher strength but are less suitable for tight-radius bending, while softer tempers can provide better formability. During fabrication, bend radius, material orientation, and temper should be considered to reduce the risk of cracking and excessive springback. For welded components, the reduction in strength near the weld area should also be taken into account.

Applications

3DSPRO finds people using Aluminum 6061 to make functional parts and prototypes in the following industries and applications.

Transportation and automotive:

Brackets, structural panels, chassis components, mounts, protective covers, and other lightweight parts requiring good strength and corrosion resistance.

Aerospace and aviation:

Structural brackets, panels, housings, supports, and other fabricated components where a combination of lightweight construction and mechanical strength is required.

Industrial equipment:

Machine guards, equipment panels, enclosures, frames, brackets, and other fabricated parts requiring good strength, corrosion resistance, and weldability.

General engineering and structural applications:

Cabinets, covers, mounting plates, support components, frames, and other sheet metal fabricated parts that require a balance of strength, weight, and corrosion resistance.