

3104 Aluminum Foil

Introduction of 3104 aluminum foil

3104 aluminum foil is a specialist alloy in the aluminum sector, known for its exceptional strength, formability, and corrosion resistance.

This article investigates the chemical composition, mechanical qualities, benefits, uses, and comparisons to comparable alloys.

Its chemical composition and mechanical qualities make it ideal for the automotive, aerospace, packaging, and construction industries.

While it has characteristics with other aluminum alloys, its unique features provide advantages in applications that demand a combination of strength, formability, and corrosion resistance.

As industries look for lightweight, robust, and ecologically friendly materials, 3104 aluminum foil's position is projected to grow, increasing its importance in modern manufacturing and design.

Chemical Composition of 3104 aluminum foil

The chemical composition of 3104 aluminum foil is crucial for its performance:

Element	Percentage (%)
Aluminum (Al)	Balance
Manganese (Mn)	0.8-1.4
Magnesium (Mg)	0.8-1.3
Copper (Cu)	≤ 0.25
Silicon (Si)	≤ 0.6
Iron (Fe)	≤ 0.8
Zinc (Zn)	≤ 0.25
Titanium (Ti)	≤ 0.10
Other Elements	≤ 0.15 each, ≤ 0.5 total

The combination of manganese and magnesium improves the alloy's strength and formability, while copper and other metals help it resist corrosion.

Mechanical Properties

3104 aluminum foil exhibits the following mechanical properties:

Tensile Strength: 270-310 MPa

Yield Strength: ≥ 160 MPa

Elongation: ≥ 10%

Hardness (Brinell): 70-85 HB

These properties make 3104 aluminum foil suitable for applications requiring high strength and good formability.

Advantages of 3104 Aluminum Foil

High Strength: Because of the manganese and magnesium content, 3104 alloy is substantially stronger than pure aluminum.

Excellent Formability: It may be sculpted without cracking or fracturing, making it perfect for intricate designs.

Corrosion Resistance: The alloying elements offer excellent resistance to air corrosion and seawater.

Weldability: TIG, MIG, and resistance welding are all viable options.

Lightweight: Like all aluminum alloys, it has a high strength-to-weight ratio.

Aluminum is highly recyclable, which reduces its environmental impact.

Comparison with Similar Alloys

Here is a comparison of 3104 aluminum foil with other commonly used aluminum alloys:

Alloy	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Corrosion Resistance	Applications
3104	270-310	≥ 160	≥ 10	Good	Automotive, packaging, construction
3003	140-180	≥ 110	≥ 18	Very Good	General-purpose, roofing, food containers
3105	185-215	≥ 145	≥ 10	Good	Building materials, food packaging
5052	228-269	≥ 193	≥ 12	Excellent	Marine, aerospace, transportation
8011	125-165	≥ 110	≥ 2	Good	Food packaging, industrial applications

3104 vs. 3003: 3104 has stronger strength but lower elongation than 3003, making it more suited for structural applications where strength is important.

3104 vs. 3105: Both have equal formability and strength, but 3104 contains more magnesium, which increases strength.

3104 vs. 5052: 5052 has better corrosion resistance since it contains more magnesium, while 3104 is stronger.

3104 vs. 8011: While 8011 is often used for food packaging due to its outstanding workability, 3104 provides more strength for more demanding applications.