

Introduction to 5251 Aluminum Alloy:

5251 aluminum alloy is a medium-strength aluminum-magnesium alloy known for its excellent corrosion resistance and formability. It belongs to the 5xxx series of aluminum alloys and is often used in applications that require good weldability and moderate strength. This alloy is commonly used in environments where exposure to marine atmospheres is a concern.

Chemical Composition of 5251 Aluminum Alloy:

- Magnesium (Mg): 1.7 - 2.4%
- Chromium (Cr): 0.15 - 0.35%
- Manganese (Mn): 0.50 - 1.0%
- Iron (Fe): 0.0 - 0.40%
- Silicon (Si): 0.0 - 0.25%
- Copper (Cu): 0.1% max
- Zinc (Zn): 0.1% max
- Titanium (Ti): 0.15% max
- Others: 0.05% each, 0.15% total

Physical Properties of 5251 Aluminum Alloy:

- Density: 2.68 g/cm³ (0.097 lb/in³)
- Melting Point: 650°C (1202°F)
- Thermal Conductivity: 150 W/m·K (1040 BTU-in/hr·ft²·°F)
- Electrical Conductivity: 34 MS/m (211 BTU-in/hr·ft²·°F)

Mechanical Properties of 5251 Aluminum Alloy:

- Tensile Strength: 160 - 200 MPa (23.2 - 29.0 ksi)
- Yield Strength: 100 - 150 MPa (14.5 - 21.8 ksi)
- Elongation: 12 - 18%
- Modulus of Elasticity: 70 GPa (10,100 ksi)
- Hardness (Brinell): 56 HB

Applications of 5251 Aluminum Alloy:

1. Marine Applications: Due to its excellent corrosion resistance, 5251 alloy is suitable for marine components such as boat hulls, decks, and superstructures.
2. Architectural Elements: The alloy's aesthetics, corrosion resistance, and formability make it useful for architectural panels, roofing, and decorative elements.
3. Welded Structures: 5251 alloy's weldability and moderate strength are advantageous for welded structures like pressure vessels, storage tanks, and pipelines.
4. Automotive Industry: The alloy's characteristics make it suitable for automobile panels, components, and body structures.

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5. General Sheet Metal Applications: 5251 alloy is used in various sheet metal applications, including signage, kitchen equipment, and decorative trim.
6. Transportation Industry: The alloy is employed in the manufacturing of transportation-related components such as truck bodies and trailers.
7. Corrosive Environments: 5251 alloy is preferred in environments where exposure to corrosive atmospheres, such as coastal areas, is a concern.

5251 aluminum alloy's balance of corrosion resistance, formability, and moderate strength makes it versatile for various applications across industries.

Please note that the provided information is based on general knowledge, and specific properties or applications may vary based on manufacturing processes and specific alloy variations. Always refer to accurate and updated technical sources for precise information.

