

Corrosion Resistance Alloy 5083 has excellent resistance to general corrosion, and is used in marine applications. Resistance is excellent in aqueous solutions in the pH range 4 – 9.

The corrosion resistance of aluminium alloys relies on a protective surface oxide film, which when damaged is readily repaired by the rapid reaction between aluminium and oxygen. However, the high reactivity of the base metal can give rapid corrosion if the film cannot be repaired, so aluminium alloys are not suitable for use with reducing media. Alloy 5083 can be anodised to improve the corrosion resistance by thickening the protective surface film.

Alloy 5083 can be susceptible to exfoliation corrosion in severe applications. Material in the H116 temper is least susceptible, and passes the ASTM G66 Exfoliation Susceptibility Test (ASSET Test). AS 1734 suggests alloy 5083 should not be used above 65°C.

Since aluminium is a reactive metal, it may corrode more quickly when in electrical contact with most other metals. The prediction of galvanic corrosion is complex; please consult **Austral Wright Metals** for specific advice.

Physical Properties

Property	at	value	unit	Property	At	value	unit	
Density	20°C	2,660	kg/m ³	Melting Range		574 – 638	°C	
Weight	20°C	2.66 x thickness in mm		Mean Coefficient of Expansion	20°C	24.2	x 10 ⁻⁶ /°C	
Modulus of Elasticity				Thermal Conductivity	25°C	120	W / m . °C	
	Tension	20°C	70.3	GPa	Electrical Resistivity	20°C	59.5	Nano-ohm . m
	Torsion		26.4		Electrical conductivity			
Compression	20°C	71.7	GPa	(all tempers)	20°C	29	% IACS	

Fabrication Aluminium 5083 is readily cold formable, as it is ductile. Forming loads and tool & press wear are generally less than with carbon steel. For piercing and blanking the punch to die clearance should be about 7% of the thickness per side for temper O, 7.5% for other tempers.

Recommended minimum bend radii for 180° and 90° cold bends at 90° to the rolling direction.

Temper	180° bend		90° bend		t = material thickness
	Up to 1.5 mm	Over 1.5 mm	Up to 1.5 mm	Over 1.5 mm	
O	1.0t	-	1.0t	1.5t	
H116	3.0t	3.0t	2.0t	2.0t	
H321	2.0t	3.0t	1.5t	2.0t	

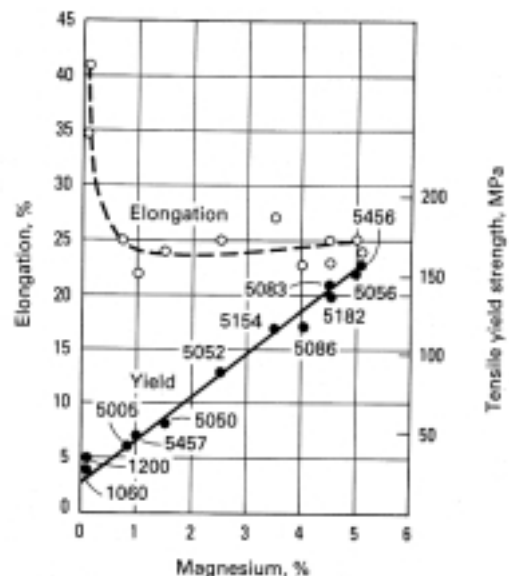
Welding Alloy 5083 is readily welded by the TIG and MIG processes using 5183, 5356 or 5556 filler alloys. Welding the H116 temper will reduce the tensile and yield strengths in the heat affected zone to those of the annealed condition. Aluminium must be very dry & clean to avoid contamination & porosity of the weld. It is essential that all traces of flux used in welding or brazing are removed by scrubbing with hot water.

Heat Treatment Alloy 5083 is annealed at 350°C, time at temperature and cooling rate are unimportant. Stress relief is rarely required, but can be carried out at about 220°C. If loss of strength is of concern, stress relief tests should be conducted.

Summary of Characteristics

Corrosion resistance	Very good
Formability	Good (H116)
Weldability	Very good
Anodising [†]	Fair
Machinability	Fair
Brazeability	Poor

[†] 5083 is anodised for corrosion protection only



Comparison of yield strength & elongation with magnesium content for commercial alloys – annealed temper.