

## **Aluminium 5083**

Aluminium 5083 is known for exceptional performance in extreme environments. 5083 is highly resistant to attack by both seawater and industrial chemical environments.

Alloy 5083 also retains exceptional strength after welding. It has the highest strength of the non-heat treatable alloys but is not recommended for use in temperatures in excess of 65°C.

### Applications

Alloy 5083 is typically used in:

- ~ Shipbuilding
- ~ Rail cars
- ~ Vehicle bodies
- ~ Tip truck bodies
- ~ Mine skips and cages
- ~ Pressure vessels

Mechanical Properties shown are for H32 temper

### CHEMICAL COMPOSITION

Manganese (Mn) 0.40 - 1.00  
Iron (Fe) 0.40 Typical  
Copper (Cu) 0.10 Typical  
Magnesium (Mg) 4.00 - 4.90  
Silicon (Si) 0.40 Typical  
Zinc (Zn) 0.25 Typical  
Chromium (Cr) 0.05 - 0.25  
Titanium (Ti) 0.15 Typical  
Aluminium (Al) Balance

### ALLOY DESIGNATIONS

Alloy 5083 also confirms to:

GM41  
A95083  
AIMG4.5Mn  
Al Mg4.5 Mn0.7

### TEMPER TYPES

The most common tempers for 5083 aluminium are:

- O - Soft
- H111 - Some work hardening imparted by shaping processes but less than required for H11 temper
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- H32 - Work hardened by rolling then stabilised by low-temperature heat treatment to quarter hard
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### SUPPLIED FORMS

- Plate
- Sheet

### PHYSICAL PROPERTIES

Density 2.65 Kg/m<sup>3</sup>  
Melting Point 570 °C  
Thermal Expansion 25 x10<sup>-6</sup> /K

Modulus of Elasticity 72 GPa  
Thermal Conductivity 121 W/m.K  
Electrical Resistivity 0.058 x10<sup>-6</sup> Ω .m

### MECHANICAL PROPERTIES

Proof Stress 240 MPa  
Tensile Strength 330 MPa  
Elongation 17 %  
Shear Strength 185 MPa  
Hardness Vickers 95 HV  
*Properties above are for material in the H32 condition*

### WELDABILITY

When welding 5083 to itself or another alloy from the same sub-group, the recommended filler metal is 5183. Other suitable fillers are 5356 and 5556.  
Weldability – Gas: Average  
Weldability – Arc: Excellent  
Weldability – Resistance: Excellent  
Brazability: Poor  
Solderability: Poor

### FABRICATION

Workability – Cold: Average  
Machinability: Poor

### DISCLAIMER

This Data is indicative only and must not be seen as a substitute for the full specification from which it is drawn. In particular, the mechanical property requirements vary widely with temper, product and product dimensions. The information is based on our present knowledge and is given in good faith. However, no liability will be accepted by the Company in respect of any action taken by any third party in reliance thereon. As the products detailed may be used for a wide variety of purposes and as the Company has no control over their use; the Company specifically excludes all conditions or warranties expressed or implied by statute or otherwise as to dimensions, properties and/or fitness for any particular purpose. Any advice given by the Company to any third party is given for that party's assistance only and without liability on the part of the Company. Any contract between the Company and a customer will be subject to the company's Conditions of Sale. The extent of the Company's liabilities to any customer is clearly set out in those Conditions; a copy of which is available on request.