

This alloy conforms to British Standard 1490:1988 LM31. Castings are standardized in the as cast (M) condition and in the precipitation treated (TE) condition.

CHEMICAL COMPOSITION

	%
Copper	0.1 max.
Magnesium	0.5-0.75
Silicon	0.25 max.
Iron	0.5 max.
Manganese	0.1 max.
Nickel	0.1 max.
Zinc	4.8-5.7
Lead	0.05 max.
Tin	0.05 max.
Titanium	0.25 max.
Chromium	0.4-0.6
Aluminium	Remainder
Others: each	0.05 max.
Others: total	0.15 max.

If Titanium alone is used for grain refining, the amount present shall be not less than 0.05%.

MECHANICAL PROPERTIES

Castings in the as cast (M) condition must be naturally aged for three weeks before determining the mechanical properties.

	LM31-M
	Sand Cast
0.2%. Proof Stress(N/mm ₂)	170
Tensile Stress (N/mm ₂)	215
Elongation (%)	4
Impact Resistance Charpy (Nm)	2.7-4.0
Brinell Hardness	70
Endurance Limit (5x10 ⁸ cycles; N/mm ₂)	62
Modulus of Elasticity (x10 ³ N/mm ₂)	71
Shear Strength (N/mm ₂)	180
	LM31-TE
	Sand Cast
0.2% Proof Stress (N/mm ₂)	-
Tensile Stress (N/mm ₂)	215
Elongation (%)	4
Impact Resistance Charpy (Nm)	-
Brinell Hardness	-
Endurance Limit (5x10 ⁸ cycles;N/mm ₂)	60 - 90
Modulus of Elasticity (x10 ³ N/mm ₂)	-
Shear Strength (N/mm ₂)	-

The values shown are typical ranges for sand cast test bars produced to the requirement of BS 1490. Those in heavier type are minimum specification values.



LM31 ALUMINIUM CASTING ALLOY (A1-Zn5Mg0.7Cr0.5Ti)

STRENGTH AT ELEVATED TEMPERATURES

In comparison with the other Aluminium casting alloys, the strength of LM31 at elevated temperatures is good.

PHYSICAL PROPERTIES

Coefficient of Thermal Expansion (per°C at 20-100°C)	0.000025
Thermal Conductivity (cal/cm_/cm/°C at 25°C)	0.35
Electrical Conductivity (% copper standard at 20°C)	35
Density (g/cm_)	2.81
Freezing Range (°C) approx	615-570

MACHINABILITY

LM31 has good machinability characteristics.

CORROSION RESISTANCE

This alloy has very good corrosion resistance.

ANODIZING

This alloy is suitable for clear or colour (decorative) anodizing.

CASTING CHARACTERISTICS

FLUIDITY – Fair.

PRESSURE TIGHTNESS – Fair.

HOT-TEARING – Fair

TYPICAL POURING TEMPERATURE – 620-650° C

The practical pouring temperature will depend on the configuration of the mould.

LM31 is generally sand cast but can be gravity or high pressure die cast.

PATTERNMAKERS'SHRINKAGE – 1.3% or 1/75

HEAT TREATMENT

Good strength and toughness can be produced by natural ageing or by artificial ageing after casting. Castings in the M condition (as cast) must be naturally aged for three weeks before testing to determine mechanical properties, or before use.

LM31-TE (artificially aged) – heat for 8 hours at 160°C.

Using this alloy avoids the risks of distortion and cracking on quenching after solution heat treatment.

APPLICATIONS

LM31 has very good shock resistance and is suitable for shock resisting components. It is used for general engineering castings, particularly large sand castings.