



# Hall & Botterill

## CAST ALUMINIUM PRODUCTS

### LM27

#### Aluminium Casting Alloy

Al-Si7Cu2Mn0.5)

This alloy conforms to BS1490: 1988 LM27

#### Chemical Composition %

Copper	1.5-2.5
Magnesium	0.35 max
Silicon	6.0-8.0
Iron	0.8 max
Manganese	0.2-0.6
Nickel	0.3 max
Zinc	1.0 max
Lead	0.2 max
Tin	0.1 max
Titanium	0.2 max
Aluminium	Remainder
Others: each	0.05 max
Others: total	0.15 max

#### Mechanical Properties

	SAND CAST	CHILL CAST
.2% Proof Stress (N/mm <sup>2</sup> )	80-90	90-110
Tensile Stress(N/mm <sup>2</sup> )	<b>140</b>	<b>160</b>
Elongation(%)	<b>1</b>	<b>2</b>
Brinell Hardness	70-85	75-90
Endurance Limit(5x10 <sup>7</sup> cycles;N/mm <sup>2</sup> )	50-70	60-90
Modulus of elasticityX10 <sup>3</sup> N/mm <sup>2</sup> 0	71	71

Shear Strength(N/mm<sup>2</sup>) - -

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

### **Strength at Elevated Temperatures**

LM27 alloy retains a high proportion of its original room temperature strength at moderately elevated temperatures. For short period exposure, the tensile strength of chill castings is reduced by only 20% at 200<sup>o</sup> C and by 40% at 250<sup>o</sup>C. The reduction in proof stress is considerably less.

### **Physical Properties**

Coefficient of Thermal Expansion(per<sup>o</sup>Cat20-100<sup>o</sup>c) 0.0000215

Thermal Conductivity (cal/cm<sup>2</sup>cm/<sup>o</sup>Cat25<sup>o</sup>C) 0.37

### **Machinability**

LM27 has fairly good machining characteristics and is similar in this respect to LM4-M. For the best results, tungsten carbide tools are recommended. Liberal use of cutting lubricant and coolant is advised.

### **Corrosion Resistance**

Resistance to attack under normal atmospheric conditions is fairly good.

### **Casting Characteristics**

FLUIDITY –Good, suitable for thin castings

PRESSURE TIGHTNESS –Excellent, particularly suitable for castings required to be leak tight

HOT-TEARING –Excellent, hot tearing problems are seldom encountered with this alloy.

TYPICAL POURING TEMPERATURE -710<sup>o</sup>C

Practical temperatures will vary above or below this value dependent on the mould configuration.

PATTERNMAKERS'SHRINKAGE -1.3% or 1/75

### **Heat Treatment**

This alloy is standardised In the as cast condition, but it has been shown that the tensile properties may be substantially increased by an appropriate heat treatment. The response to heat treatments is dependent on the presence of Magnesium so it is important that castings for heat treatment should have a Magnesium content at the top of the range. (0.35% max)

LM27-TB7(Solution heat treated and stabilised) heat for 6-16 hours at 505-525°C then quench in hot water, and heat for 6-16 hours at 160-170°CThe mechanical properties obtained from this treatment depend on the Magnesium content, and are of the following order:-

	<b>SAND CAST</b>	<b>CHILL CAST</b>
0.2%Proof Stress(N/mm <sup>2</sup> )	250-280	250-290
Tensile Stress (N/mm <sup>2</sup> )	290-310	280-340
Elongation(%)	0.5-2	1-3
Brinell Hardness	110-130	110-130

### **Applications**

LM27 is a very versatile alloy and, with its excellent castability, it is suitable for most general purpose castings where moderate mechanical properties are desirable, such as general engineering components, domestic and office equipment, household fittings, electrical tools and switch gear, automatic engine and transmission components.

It is equally suitable for sand and permanent mould castings of thick or thin sections, and for castings required to be pressure tight. In short, it can be used with the advantage of slightly superior castability for all the kinds of applications for which LM4 is used and may be expected, in time, to supersede the older alloy.