

LM24  
ALUMINIUM CASTING ALLOY  
(Al—Si8CuFe)  
Colour Code—RED/BLUE

This alloy conforms with British Standard 1490 LM24.

**Chemical composition**

	%
Copper	3.0-4.0
Magnesium	0.30 max
Silicon	7.5-9.5
Iron	1.3 max
Manganese	0.5 max
Nickel	0.5 max
Zinc	3.0 max
Lead	0.3 max
Tin	0.2 max
Titanium	0.2 max
Aluminium	Remainder

**Mechanical Properties**

	Chill Cast	Die Cast
0.2% Proof Stress (N/mm <sup>2</sup> )*	100-120	150
Tensile Stress (N/mm <sup>2</sup> )*	180-220	320
Elongation (%)*	1.5-4	1-3
Impact Resistance. Charpy (Nm) ^	-	3.4
Brinell Hardness Number	85	85
Modules of Elasticity (x 10 <sup>3</sup> N/mm <sup>2</sup> )	71	71

\*The values shown are typical for chill cast bars produced to the requirements of B.S.1490 or die cast 6 mm diameter test bars; minimum specification requirements are in heavy type.

^Untouched test bar.

**Strength at Elevated Temperatures**

Room temperature tensile strength is largely maintained up to temperatures of the order of 150°C, and approximately halved at 250°C.

It should be noted, however, that other factors may restrict the use of die castings at elevated temperatures.

**Physical Properties**

Coefficient of Thermal Expansion (per °C at 20-100°C)	0.000021
Thermal Conductivity (cal/cm <sup>2</sup> /cm/°C/s at 25°C) ^	0.23
Electrical Conductivity (% copper standard at 20°C) ^	24
Specific Gravity	2.79
Freezing Range (°C) approx.	580-520

^Applies to die castings; values are approximate and will vary with condition.

### **Machinability**

Machining practice is similar to that for other aluminium casting alloys containing silicon. Whilst there is not the tendency to drag associated with high silicon alloys such as LM6, tool wear is more rapid than in the case of alloys containing relatively small amounts of silicon. The use of carbide-tipped tools is recommended but a good finish can be obtained with high speed steels. Lower alloy steel tools may be used provided they are frequently reground to maintain a sharp cutting edge. A cutting lubricant and coolant should be employed.

### **Corrosion Resistance**

Resistance to attack under normal atmospheric conditions is similar to that alloy LM4-fairly good. In marine atmospheres, or under other severe conditions, castings in this alloy should be protected by painting.

### **Anodising**

Anodising treatment by either the chromic or sulphuric acid process produces an anodic film of grey colour. The surfaces of die castings, however, are not generally suitable for decorative anodising.

### **Casting Characteristics**

**FLUIDITY**—Although slightly less fluid than LM6 and LM2, the alloy is used successfully for castings of thin section.

**PRESSURE TIGHTNESS**—Suitable for leak-tight castings.

**HOT-TEARING**—Most castings may be produced in this alloy with complete absence of hot-tears.

**TYPICAL POURING TEMPERATURE**—Pouring temperatures for die castings depend very largely on the particular casting and the machine, and vary too widely for a typical temperature to provide useful guidance. The melt should not, however, be allowed to stand at temperatures only a little above the freezing range or the bottom of the melt may become enriched in such elements as iron and manganese.

### **Heat-Treatment**

Castings in this alloy are not heat-treated.

### **Application and General Notes**

LM24 is essentially a die casting alloy. It has excellent casting characteristics and is generally a little simpler to die cast than the higher silicon-containing alloys. Die castings in LM24 are suitable for most engineering applications and have an advantage over an alloy such as LM6 when maximum mechanical properties are required. In practice LM6 is preferred to LM24 only for die castings in which a high resistance to corrosion is the primary requirement. An alloy of composition similar to LM24 is by far the most widely used die casting alloy in the United States and a similar alloy has been adopted by the European Die Casting Committee.

For the vast majority of die castings the alloys LM2 and LM24 are equally suitable.