

LM20

Aluminium Casting Alloy (AL – Si12Cu)
Colour Code – Yellow/Green

Chemical composition

Copper	0.4 Max
Magnesium	0.20 Max
Silicon	10.0 – 13.0
Iron	1.0 Max
Manganese	0.5 Max
Nickel	0.1 Max
Zinc	0.2 Max
Lead	0.1 Max
Tin	0.1 Max
Titanium	0.2 Max
Aluminium	Remainder

Mechanical Properties

	<u>Chill Cast</u>	<u>Die Cast</u>
0.2 % Proof Stress (N/mm ²)*	70 – 80	120
Tensile Stress (N/mm ²)*	190 – 230	280
Elongation (%)*	5	1 – 3
Impact Resistance. Izod (Nm)	9.0	4.0
Brinell Hardness Number	55 – 65	65 – 75
Endurance Limit (5 x 10 ⁷ cycles +/- N/mm ²)	80 – 100	80 – 100
Modulus of Elasticity (x10 ³ N/mm ²)	71	71

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

Strength at Elevated Temperatures

Tensile strength and hardness decrease fairly regularly with increasing temperature and become relatively poor at temperatures of the order of 200°C, with a corresponding increase in elongation.

Physical Properties

Coefficient of thermal Expansion (per degree Centigrade at 20 – 30°C.)	0.0000020
Thermal Conductivity (Cal / cm ² / cm / °C / sec at 20°C)	0.37
Electrical Conductivity (% Copper Standard at 20°C)	37
Specific Gravity	2.68
Freezing Range (°C) approx.	565 – 575

Values are approximate and will vary with condition.

Machinability

Castings made in LM20 are rather difficult to machine. This is due to their tendency to drag and rapid tool wear caused by the high silicon content. The higher copper content does reduce the problem of drag compared to LM6.

Carbide-tipped tools with large rake angles and relatively low cutting speeds give comparatively good results. A cutting lubricant and coolant should be employed.

Corrosion Resistance

LM20 exhibits high resistance to corrosion under both ordinary atmospheric and marine conditions. For the severest conditions this property can be further enhanced by anodic treatment. LM20 is only marginally worse than LM6 with respect to corrosion resistance.

Anodising

LM20 can be anodised by any of the common processes. The resulting protective film ranges in colour from grey to dark brown. The surfaces of diecastings are generally not suitable for decorative anodising.

Casting Characteristics

FLUIDITY – Can be cast into thinner and more intricate sections than many other types of casting alloys.

PRESSURE TIGHTNESS – Especially suitable for leak-tight castings.

HOT-TEARING – Castings tend to exhibit complete freedom from hot-tearing.

TYPICAL POURING TEMPERATURE – Pouring temperatures for diecastings 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 little above the freezing range or the bottom of the melt may become enriched in such elements as iron and manganese.

PATTERNMAKERS' SHRINKAGE – 1.3% or 1/75.

Heat Treatment

Castings in LM20 tend not to be heat treated.

Applications and General Notes

Suitable for marine 'on deck' castings, water-cooled manifolds and jackets, motor-car and road transport fittings; thin sections and intricate castings such as motor housings, meter cases and switch-boxes; for very large castings, e.g. cast doors and panels where ease of casting is essential; for chemical and dye industry castings, e.g. pump parts; for paint industry and food and domestic castings. In general use, where marine atmospheres or service conditions make corrosion resistance a matter of major importance. LM20 is generally only preferred to LM2 or LM24 when the castings are used in aggressive media, requiring the higher resistance LM20 offers. Where the very highest resistance is required, then LM6 may be found superior to LM20.

LM20 has slightly better castability than LM6.

