

Aluminium Alloy 2011

Aluminium alloy 2011 is a high mechanical strength alloy that machines exceptionally well. Often called a Free Machining Alloy or 'FMA' it is well suited to use in automatic lathes.

Machining at high speeds produces fine chips that are easily removed. The excellent machining characteristics allow the production of complex and detailed parts. In some circumstances 2011 can replace free machining brass without the need for alterations to tooling.

It has poor corrosion resistance, which means parts made from 2011 tend to be anodised to provide additional surface protection.

When higher levels of corrosion resistance are required, 6262 T9 may be a suitable replacement.

Applications

2011 is typically used in applications that require parts manufactured by repetition machining.

These applications may include:

- ◆ Appliance parts & trim
- ◆ Automotive trim
- ◆ Fasteners and fittings
- ◆ Ordnance

Chemical Composition

Element	% Present
Si	0.4%
Fe	0.7%
Cu	5.0-6.0%
Pb	0.2-0.6%
Bi	0.2-0.6%
Zn	0.3%
Other	0.15%
Al	Balance

Alloy Designations

Aluminium alloy 2011 also corresponds to the following standard designations and specifications:

AlCu6BiPb	FC1
A92011	CB60
3.1655	AlCuBiPb

Mechanical Properties

Temper	T3	T6
Proof Stress 0.2% (MPa)	290	300
Tensile Strength (MPa)	365	395
Shear Strength (MPa)	220	235
Elongation A5 (%)	15	12
Hardness Vickers (HV)	100	115

Physical Properties

Property	Value
Density	2.82 g/cm ³
Melting Point	535°C
Modulus of Elasticity	71 GPa
Electrical Resistivity	0.045x10 ⁻⁶ Ω.m
Thermal Conductivity	138 W/m.K
Thermal Expansion	23x10 ⁻⁶ /K

Fabrication

Process	Rating
Workability - Cold	Fair
Machinability	Excellent
Weldability - Gas	Poor
Weldability - Arc	Poor
Weldability - Resistance	Poor
Brazability	Poor
Solderability	Fair



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Welding

Alloy 2011 has extremely poor weldability and thus welding is not recommended. However, as it is used for machined parts there is rarely a need to weld this alloy.

Temper

The most common tempers for 2011 aluminium are:

- ◆ T3 – Solution heat treated, cold worked and naturally aged
- ◆ T6 – Solution heat treated and artificially aged

Supplied Forms

2011 aluminium is typically supplied as either round or hexagonal bar.

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