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6063 - T6 Extrusions

Aluminium Alloy 6063

Aluminium alloy 6063 is a medium strength alloy commonly referred to as an architectural alloy. It is normally used in intricate extrusions.

It has a good surface finish, high corrosion resistance, is readily suited to welding and can be easily anodised. Most commonly available as T6 temper, in the T4 condition it has good formability.

Applications

6063 is typically used in:

- Architectural applications
- Extrusions
- Window frames
- Doors
- Shop fittings
- Irrigation tubing

In balustrading the rails and posts are normally in the T6 temper and formed elbows and bends are T4. T4 temper 6063 aluminium is also finding applications in hydroformed tube for chassis.

Aluminium Alloy 6063A

Aluminium alloy 6063A is a variation of 6063 with greater strength but retains the same good surface finish qualities and affinity for anodising.

Applications

6063A is used in the same applications as 6063. It is also used in:

Road transport
Rail transport
Extreme sports equipment

Chemical Composition
Spec: BS EN 573-3: 2009
Alloy 6063

Chemical Element	% Present
Manganese (Mn)	0.0 - 0.10
Iron (Fe)	0.0 - 0.35
Magnesium (Mg)	0.45 - 0.90
Silicon (Si)	0.20 - 0.60
Zinc (Zn)	0.0 - 0.10
Titanium (Ti)	0.0 - 0.10
Chromium (Cr)	0.0 - 0.10
Copper (Cu)	0.0 - 0.10
Other (Each)	0.0 - 0.05
Others (Total)	0.0 - 0.15
Aluminium (Al)	Balance

Properties

Physical Property	Value
Density	2.70 g/cm³
Melting Point	655 °C
Thermal Expansion	23.5 x10^-6 /K
Modulus of Elasticity	69.5 GPa
Thermal Conductivity	201 W/m.K
Electrical Resistivity	0.033 x10^-6 Ω .m
Electrical Resistivity	52 % IACS

Spec: To BS EN 755-2: 2008
Rod & Bar - Up To 150mm Dia. & A/F

Mechanical Property	Value
Proof Stress	170 Min MPa
Tensile Strength	215 Min MPa
Hardness Brinell	75 HB
Elongation A	10 Min %
Elongation A50 mm	8 Min %

Spec: To BS EN 755-2: 2008
Rod & Bar - 150mm to 200mm Dia. & A/F

Mechanical Property	Value
Proof Stress	160 Min MPa
Tensile Strength	195 Min MPa
Hardness Brinell	75 HB
Elongation A	10 Min %

Spec: BS EN 755-2
Tube - Up To 25mm Wall Thickness

Mechanical Property	Value
Proof Stress	170 Min MPa
Tensile Strength	215 Min MPa
Elongation A50 mm	8 Min %
Hardness Brinell	75 HB
Elongation A	10 Min %

Spec: BS EN 755-2:2008
Profiles - Up to 10mm Wall Thickness

Mechanical Property	Value
Proof Stress	170 Min MPa
Tensile Strength	215 Min MPa
Elongation A50 mm	6 Min %
Hardness Brinell	75 HB
Elongation A	8 Min %

Spec: BS EN 755-2:2008
Profiles - 10mm to 25mm Wall Thickness

Mechanical Property	Value
Proof Stress	160 Min MPa
Tensile Strength	195 Min MPa
Elongation A50 mm	6 Min %
Hardness Brinell	75 HB
Elongation A	8 Min %

Alloy Designations
Aluminium alloy 6063/6063A corresponds to the following standard designations and specifications ***but may not be a direct equivalent***:
AA6063
Al Mg0.7Si
GS10
AlMgSi0.5
A-GS
3.32206
ASTM B210
ASTM B221
ASTM B241 (Pipe- Seamless)
ASTM B345 (Pipe- Seamless)
ASTM B361
ASTM B429
ASTM B483
ASTM B491
MIL G-18014
MIL G-18015
MIL P-25995
MIL W-85
QQ A-200/9
SAE J454
UNS A96063
HE19

Temper Types
The most common tempers for 6063 aluminium are:

- O - Soft
- T6 - Solution heat treated and artificially aged

Weldability
Alloy 6063 is suitable for all conventional welding methods. Welding wire generally should be alloy 5183 or alloy 4043. When maximum electrical conductivity is required use alloy 4043.
For strength and conductivity use alloy 5346 and increase the size of the weld to compensate for the lower conductivity.

Weldability – Gas: Good
Weldability – Arc: Very Good
Weldability – Resistance: Good
Brazability: Very Good
Solderability: Good

Fabrication
Workability - Cold: Average (Acceptable)
Machinability: Good