

Aluminium Alloy 6063 & 6063A

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

Alloy Designations

Aluminium alloy 6063/6063A also corresponds to the following standard designations and specifications:

| | |
|---------------------------|---------------------------|
| 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 |

Chemical Composition

| Element | 6063 % Present | 6063A % Present |
|---------|-------------------|--------------------|
| Si | 0.2 to 0.6 | 0.3 to 0.6 |
| Fe | 0.35 max | 0.15 to 0.35 |
| Cu | 0.1 max | 0.1 |
| Mn | 0.1 max | 0.15 |
| Mg | 0.45 to 0.9 | 0.6 to 0.9 |
| Zn | 0.1 max | 0.15 |
| Ti | 0.1 max | 0.1 |
| Cr | 0.1 max | 0.05 |
| Al | Balance | Balance |



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All Data is indicative only and must not be seen as a substitute for the full specification from which it is drawn. In particular, the mechanical property requirements vary widely with temper, product form and product dimensions. For more complete details please refer to the relevant specification – The BS EN Specifications for aluminium are listed on a separate Datasheet.

Temper

The most common tempers for 6063 aluminium are:

- ◆ Annealed wrought alloy
- ◆ T4 – Solution heat treated and naturally aged
- ◆ T6 – Solution heat treated and artificially aged

6063 Mechanical Properties

| Temper | O | T4 | T6 |
|---------------------------------|-----|-----|-----|
| Minimum Proof Stress 0.2% (MPa) | 50 | 65 | 160 |
| Minimum Tensile Strength (MPa) | 100 | 130 | 195 |
| Shear Strength (MPa) | 70 | 110 | 150 |
| Elongation A5 (%) | 27 | 21 | 14 |
| Hardness Vickers (HV) | 25 | 50 | 80 |

6063A Mechanical Properties

| Temper | T4 | T6 |
|---------------------------------|-----|-----|
| Minimum Proof Stress 0.2% (MPa) | 90 | 190 |
| Minimum Tensile Strength (MPa) | 150 | 220 |
| Elongation A5 (%) | 10 | 5 |

Physical Properties

| Property | Value |
|------------------------|----------------------------|
| Density | 2.70 g/cm ³ |
| Melting Point | 600°C |
| Modulus of Elasticity | 69.5 GPa |
| Electrical Resistivity | 0.035x10 ⁻⁶ Ω.m |
| Thermal Conductivity | 200 W/m.K |
| Thermal Expansion | 23.5 x 10 ⁻⁶ /K |

Fabrication

| Process | Rating |
|--------------------------|-----------|
| Workability - Cold | Average |
| Machinability | Average |
| Weldability – Gas | Excellent |
| Weldability – Arc | Excellent |
| Weldability – Resistance | Excellent |
| Brazability | Excellent |
| Solderability | Good |

Welding

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.

Supplied Forms

6063 aluminium extrusions are available from Aalco in the following forms with a T6 temper:

- ◆ Square Box Section
- ◆ Rectangular Box Section
- ◆ Channel
- ◆ Equal Angle
- ◆ Unequal Angle
- ◆ Flat Bar
- ◆ Tube

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