Structural Beams (6061-T6)

QQ-A-200/8, ASTM B308

The following specifications cover Aluminum 6061

Physical and Mechanical Properties
Ultimate Tensile Strength, psi: 45,000
Yield Strength, psi: 40,000
Brinell Hardness: 95
Rockwell Hardness: B60

Chemistry Data:
Aluminum: Balance
Chromium: 0.04 - 0.35
Copper: 0.15 - 0.4
Iron: 0 - 0.7
Magnesium: 0.8 - 1.2
Manganese: 0.15 max
Other: 0.15 max
Remainder Each: 0.05 max
Silicon: 0.4 - 0.8
Titanium: 0.15 max
Zinc: 0.25 max

Physical Data
Density (lb / cu. in.): 0.098
Specific Gravity: 2.7
Melting Point (Deg F): 1090
Modulus of Elasticity Tension: 10
Modulus of Elasticity Torsion: 3.8

6061 Aluminum is, by most any measure, the most commonly used aluminum alloy. It is specified in most any application due to its strength, heat treatability, comparatively easy machining, and weldability. If that were not enough, it is also capable of being anodized, adding a layer of protection for finished parts. The main alloy ingredients of 6061 aluminum are magnesium and silicon.

Principal Design Features
Probably the most commonly available, heat treatable aluminum alloy.

Applications
Commonly used in the manufacture of heavy-duty structures requiring good corrosion resistance, truck and marine components, railroad cars, furniture, tank fittings, general structural and high pressure applications, wire products, and in pipelines.

Machinability
Machinability in the harder T 4 and T6 tempers is good. It is notably less easy to machine in the annealed temper.

Forming
Easily cold worked and formed in the annealed condition. Stamping, bending, spinning, deep drawing are all readily accomplished using standard methods.

Welding
The alloy has very good welding characteristics and may be welded by all of the common welding techniques. Gas tungsten arc welding is generally used for thin sections (less than 0.032") and gas metal arc welding is used for heavier sections. Use alloy 4043 filler wire for best results, although a decrease in T6 properties will result.

Heat Treatment
Solution heat treat at 990 F for adequate time to allow for thorough heating and then water quench. Precipitation hardening is done at 320 F for 18 hours and air cool, followed by 350 F for 8 hours and air cooling.

Forging
The alloy is capable of being hot forged at temperatures in the range of 900 F to 750 F.

Hot Working
Hot working may be done in the temperature range of 700 F to 500 F.

Cold Working
Cold working in the O temper condition is readily performed. The alloy is notably less easy to cold form in the T4 and T6 tempers.

Annealing
Annealing should be done at 775 F for 2 to 3 hours followed by controlled cooling at 50 f per hour down to 500 F, then air cool.

Aging
The aging precipitation heat treatment is done at 350 F for 8 hours followed by air cooling. This produces the T6 temper.

Tempering
Not applicable.

Hardening
See "Aging".

Other Physical Props
Electrical conductivity 40% of copper.