
# Alloy 6082

Extrusion North America offers alloy 6082 for structural applications, including rod, bar, tube and profiles. This alloy offers similar but not equivalent physical characteristics compared to 6061 alloy, and slightly higher mechanical properties in the -T6 condition.

Alloy 6082 is very common in Europe and is gaining popularity in the United States for rod and bar machining stock, seamless tubing, structural profiles and custom profiles. This alloy also offers good finishing characteristics and responds well to anodizing. The most common anodizing methods include clear, clear and color dye, and hardcoat.

Alloy 6082 offers good weldability, brazeability, corrosion resistance, formability and machinability. When bending or forming
6082 alloy, it is recommended to use the -0 or -T4 temper. For machining applications, 6082 provides good machinability in the -T5 or -T6 tempers. Machining chips may be difficult to break so it is recommended to use chip breakers or special machining techniques such as peck drilling to improve chip formation. For certain thin wall sections, -T6 temper may not be available due to alloy quenching limitations.

Various commercial joining methods (welding, brazing, etc.) can be easily applied to 6082 alloy. However since 6082 is a heat treatable alloy, strength will be reduced in the weld region.

For machining applications, allloy 6082 is available in many rod, bar and hex sizes. Refer to Hydro ACC-U-LINE™ machine grade product brochures for more details. Tempers -T6 and -T6511 are listed in ASTM B 221 and ASTM B 241 specifications. Consult the Safety Data Sheet (SDS) for proper safety and handling precautions when using 6082 alloy.

**Typical applications for 6082 alloy:**

- Rod and bar, machining stock
- Structural profiles
- Seamless tubing
- Custom profiles

## 6082 Temper Designations and Definitions

| Standard Tempers | Standard Temper Definitions* |
|---|---|
| F | As fabricated. There is no special control over thermal conditions and no mechanical property limits. |
| O | Annealed. Applies to products that are annealed to obtain the lowest strength temper. |
| T4 | Solution heat-treated and naturally aged. (See Note B.) |
| T5, T5511 | Cooled from an elevated temperature shaping process and artificially aged. (See Notes A and C.) |
| T6, T6511 | Solution heat-treated and artificially aged. (See Notes B and C.) |

* For further details of definitions, see Aluminum Association's Aluminum Standards and Data manual and Tempers for Aluminum and Aluminum Alloy Products.

Note A: Applies to products that are not cold worked after cooling from an elevated temperature shaping process, or in which the effect of cold work inflattening or straightening may not be recognized in mechanical properties.

Note B: Applies to products that are not cold worked after solution heat-treatment, or in which the effect of cold work in flattening or straightening may not be recognized in mechanical properties.

Note C: Temper -T5511 and -T6511 applies to products that are stress-relieved by stretching.

## Chemical Composition

**Melting Temperature Range: 1070-1200 ºF** **Density: 0.098 lb./in.$^3$**

| Alloy | Si | Fe | Cu | Mn | Mg | Cr | Zn | Ti | Others | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Each | Total |
| 6082 | 0.7-1.3 | 0.50 | 0.10 | 0.40-1.0 | 0.6-1.2 | 0.25 | 0.20 | 0.10 | 0.05 | 0.15 |

Chemical composition in weight percent maximum unless shown as a range or minimum. Aluminum = Remainder

Average Coefficient of Thermal Expansion (68º to 212ºF) = 12.8 x $10^{-6}$ (in./in.ºF)

# Alloy 6082

## Extruded Mechanical and Physical Property Limits[1]

| Standard Tempers | Wall Thickness[2] (min.) | | Tensile Strength ksi (MPa) | | Elongation[3] % (min.) | Typical Thermal Conductivity, @77°F, BTU-in./ft.²hr.°F (W/m-K@25ºC) | Typical Electrical Conductivity, @68ºF, % IACS |
|---|---|---|---|---|---|---|---|
| | inches | mm | Ultimate (min. ) | Yield - 0.2% offset (min.) | | | |
| **Alloy 6082** | | | | | | | |
| T5, T5511 | 0.080 - 0.500 | 2.00 - 12.50 | 39.0 (270) | 33.0 (230) | 8 | – | – |
| T6, T6511 | 0.200 - 0.750 | 5.00 - 20.00 | 45.0 (310) | 38.0 (260) | 6 | 1190 (172) | 44 |
| | 0.751 - 6.000 | 20.00 - 150.00 | 45.0 (310) | 38.0 (260) | 8 | 1190 (172) | 44 |
| | 6.001 - 8.000 | 150.00 - 200.00 | 41.0 (280) | 35.0 (240) | 6 | 1190 (172) | 44 |
| **Tempers per BS EN 755-2 Specification, 2016 Edition (for Reference Purposes Only)** | | | | | | | |
| O | up thru 7.874 | up thru 200 | 24.0 (160) max | 16.0 (110) max | 14[4] | – | – |
| T4 | up thru 7.874 | up thru 200 | 30.0 (205) max | 16.0 (110) max | 14[4] | – | – |

1. Minimum property levels unless shown as a range or indicated as a maximum (max.) T5, T5511, T6, T6511 property limits per Aluminum Association
2. The thickness of the cross section from which the tension test specimen is taken determines the applicable mechanical properties.
3. For materials of such dimensions that a standard test specimen cannot be taken, or for shapes thinner than .062", the test for elongation is not required. Elongation percent is minimum in 2" or 4 times specimen diameter.
4. Elongation values represent "A" elongation per BS EN 755-2

## Comparative Characteristics of Related Alloys/Tempers[1]

| Alloy | Temper | Formability D C B A | Machinability D C B A | General Corrosion Resistance D C B A | Weldability D C B A | Brazeability D C B A | Anodizing Response D C B A |
|---|---|---|---|---|---|---|---|
| 6082 | -O | | | | | | |
| | -T4 | | | | | | |
| | -T5, -T5511 | | | | | | |
| | -T6, -T6511 | | | | | | |
| 6063 | -T5, -T52 | | | | | | |
| | -T54, -T6 | | | | | | |
| 6061 | -T4 | | | | | | |
| | -T6, -T6511 | | | | | | |
| 6101 | -T6. -T63 | | | | | | |
| | -T61, -T64 | | | | | | |
| 6042 | -T5, -T5511 | | | | | | |
| 6262 | -T6, -T6511 | | | | | | |

1. Rating: A = Excellent B = Good C = Fair D = Poor

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