



## Alloy 6042

Alloy 6042 is a new aluminum alloy offering improved machinability and reduced lead levels to comply with RoHS and ELV recycling requirements†. As an improved machining alternative to alloy 6061, alloy 6042 also becomes a RoHS and ELV-compliant alternative to 6262 alloy, which exceeds the .4% maximum lead level. The end-user will still need to review all pertinent directives to assure compliance of all components in the equipment assembly. Alloys 6042-T5 and 6042-T5511 are listed in ASTM B 221 and ASTM B 241 specifications.

While providing RoHS and ELV compliance, alloy 6042 offers good machinability characteristics similar to 6262 alloy. In the heat-treated -T5, -T5511 temper condition, 6042 typically produces curled and broken chips and a smooth machined surface. In certain applications, the use of chip breakers or special machining techniques (i.e. peck drilling) can further improve chip formation.

Alloy 6042 has excellent corrosion resistance at atmospheric conditions and good corrosion resistance to seawater, with corrosion resistance superior to 2011 alloy and comparable to 6262 alloy. (Caution: direct contact by dissimilar metals can cause galvanic corrosion.) Good finishing characteristics can be obtained for 6042 with mechanical finishing, chemical conversion and anodizing. Anodizing methods can include clear, clear and color dye, and hardcoat to improve aesthetic appearance and enhance corrosion and wear resistance. For machining applications, alloy 6042 is available in many rod, bar and hex sizes. Refer to Hydro ACC-U-LINE™ machine grade product brochures for more details.

Joining characteristics for welding and brazing 6042 are significantly improved over alloy 2011, although not as good as 6061. Since 6042 is a heat treatable alloy, strength in the -T5 condition can be reduced by heat from welding or brazing. Selection of appropriate filler alloys depends on the desired weld characteristics. Consult the Safety Data Sheet (SDS) for proper safety and handling precautions when using alloy 6042.

† RoHS (Restriction of Hazardous Substances) Directive 2002/95/EC 1/27/2003 for electrical and electronic equipment and ELV Directive 2005/673/EC for End-of-Life Vehicles Requirements restrict the amount of lead to .4% maximum.

### Typical applications for 6042 alloy:

- Electrical connectors and screws
- Air conditioning components
- Brake components
- Hydraulic manifolds and valve blocks
- Pneumatic manifolds and valve blocks
- Hardware and fasteners

## 6042 Temper Designations and Definitions

Standard Tempers	Standard Temper Definitions*
T5, T5511	Cooled from an elevated temperature shaping process and artificially aged. (See Notes A & B.)

Special Tempers	Special Temper Definitions**
T5H, T5511H	Hydro's "H" temper is offered for special applications requiring improved machinability and higher minimum mechanical properties than standard -T5 or -T5511. Minimum properties of 42 ksi tensile, 38 ksi yield and 10% elongation are guaranteed. "H" temper is available for rod, bar and certain profiles with a principle thickness of .500" or greater. (See Notes A & B.)

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

\*\* Alloy Products. Hydro Special Temper Designations are unregistered tempers for reference only, not recognized by the Aluminum Association, and are provided for customer use to identify unique processing, material or end use application characteristics.

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 in flattening or straightening may not be recognized in mechanical properties.

Note B: Temper T5511 applies to products that are stress-relieved by stretching.



# Alloy 6042

## Chemical Composition

Melting Temperature Range: 1080-1205 °F

Density: 0.098 lb./in.<sup>3</sup>

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Bi	Others	
											Each	Total
6042	0.50-1.2	0.7	0.20-0.6	0.40	0.7-1.2	0.04-0.35	0.25	0.15	0.15-0.40	0.20-0.8	0.05	0.15

Chemical composition in weight percent maximum unless shown as a range or minimum.  
Average Coefficient of Thermal Expansion (68° to 212°F) = 13.0 x 10<sup>-6</sup> (in./in.°F)

Aluminum = Remainder

## 6042 Extruded Mechanical and Physical Property Limits<sup>1</sup>

Standard Tempers	Wall Thickness <sup>2</sup> (min.)		Tensile Strength ksi (MPa)		Elongation <sup>3</sup> % (min.)	Typical Thermal Conductivity, @77°F, BTU-in./ft. <sup>2</sup> hr.°F (W/m-K@25°C)	Typical Electrical Conductivity, @68°F, % IACS
	inches	mm	Ultimate (min. )	Yield - 0.2% offset (min.)			
T5, T5511 <sup>4</sup>	up thru .499	10.00 - 12.50	38.0 (260)	35.0 (240)	10	1160 (167)	44
	.500 & above	>12.50 & above	42.0 (290)	35.0 (240)	10	1160 (167)	44
<b>Typical Mechanical Properties</b>							
T5, T5511			46.7 (320)	43.1 (300)	14.6	–	–
<b>Hydro Special Tempers*</b>							
T5H, T5511H <sup>4</sup>	.500 & above	>12.50 & above	42.0 (290)	38.0 (260)	10	1160 (167)	44

1. Minimum property levels unless shown as a range or indicated as a maximum (max.)
  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. For stress-relieved tempers, the characteristics and properties other than those specified may differ somewhat from the corresponding characteristics and properties of material in the basic temper.
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## Comparative Characteristics of Related Alloys/Tempers<sup>1</sup>

Alloy	Temper	Formability				Machinability				General Corrosion Resistance				Weldability				Brazeability				Anodizing Response			
		D	C	B	A	D	C	B	A	D	C	B	A	D	C	B	A	D	C	B	A	D	C	B	A
6042	-T5, T5511	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	-T5H, T5511H*	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6262	-T6, -T6511	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6061	-T6, -T6511	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6005	-T5			N/A				N/A				N/A		■	■	■	■	■	■	■	■	■	■	■	■
6063	-T6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2011	-T3 CF <sup>2</sup>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6020	-T8 CF <sup>2</sup>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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

\* Hydro Special Temper Designations are unregistered tempers for reference only, not recognized by the Aluminum Association, and are provided for customer use to identify unique processing, material or end use application characteristics. The specified special temper will not conform to Military, Federal, ASTM, ASME and AMS specifications.

### Extrusion North America

6250 North River Rd, Suite 5000  
Rosemont, IL 60018  
Phone: 877-710-7272  
E-mail: NorthAmerica.Sales@hydro.com  
www.hydroextrusions.com

