Alcoa Engineered Products

ALLOY 6082

Understanding Extruded Aluminum Alloys

Alcoa Engineered Products 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. Alloy 6082 is now available in ECON-O-ROD®, ACC-U-ROD®, ECON-O-PLATE®, and ACC-U-PLATE® to satisfy all of your structural and machining stock requirements. Consult the Material Safety Data Sheet (MSDS) for proper safety and handling precautions when using 6082 alloy.

6082 Temper Designations and Definitions (See Note A)

Standard Tempers	Standard Temper Definitions
BS-EN Designations	
O	Annealed applies to products that are annealed to obtain the lowest strength temper.
T4	Solution heat treated and naturally aged. (See Note A.)
T5	Cooled from an elevated temperature shaping process and artificially aged. (See Note B.)
T6	Solution Heat treated and artificially aged. (See Note C.)

Note A: 6082 alloy is recognized by the Aluminum Association, however the tempers have not been registered and cannot be found in the Aluminum Association's Aluminum Standards and Data manual or other standard U.S. Industry specification. BS-EN signifies British standards published by European Committee for Standardization (CEN). **Note B:** 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 C:** 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.

Alloy 6082 Chemical Analysis

Liquidus Temperature: 1220°F **Solidus Temperature:** 1058°F **Density:** 0.097 lb./in.^{3}

Percent Weight	Elements										
	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others Each	Others Total	Aluminum
Minimum	.7	—	—	.4	.6	.04	—	—	—	—	
Maximum	1.3	.50	.10	1.0	1.2	.15	.20	.10	.05	.15	Remainder

Coefficient of Linear Expansion (68° to 212°F) = 12.8 micro inch per inch per °F
Electrical Conductivity for 6082-T6 (at 68°F) = 46.6% IACS

Alloy 6082 Mechanical and Physical Property Limits[1]

	Specified Section or Wall Thickness[2] Inches (mm)		Tensile Strength (ksi)				Elongation	Typical Brinnel Hardness	Typical Ultimate Shearing Strength
			Ultimate		Yield (0.2% Offset)		Percent min. in 2 inch or 4 D[3]	(500 Kg Load/ 10 mm ball)	(ksi)
	Min.	Max.	Min.	Max.	Min.	Max.			
Standard Tempers									
F	All		No Properties Required						
O	—	7.875 in. (200 mm)		24.0 (160 MPA)		16.0 (110 MPA)	14	40-50	NA
T4	—	7.875 in. (200 mm)	30.0 (205 MPA)	—	16.0 (110 MPA)	—	14	60-70	25 (178 MPA)
T5	—	7.875 in. (200 mm)	40.0 (270 MPA)	—	34.0 (230 MPA)	—	8	NA	NA
T6	—	.196 in. (5 mm)	43.0 (295 MPA)	—	37.0 (250 MPA)	—	8	90-100	31 (218 MPA)
	.197 in. (>.5 mm)	.984 in. (25 mm)	45.0 (310 MPA)	—	38.0 (260 MPA)	—	10	90-100	31 (218 MPA)
	.985 in. (>25 mm)	5.705 in. (150 mm)	45.0 (310 MPA)	—	38.0 (260 MPA)	—	8	90-100	31 (218 MPA)
	5.706 in. (>150 mm)	7.875 in. (200 mm)	41.0 (280 MPA)	—	35.0 (240 MPA)	—	6	90-100	31 (218 MPA)
	7.876 in. (>200 mm)	9.843 in. (250 mm)	40.0 (270 MPA)	—	29.0 (270 MPA)	—	6	90-100	31 (218 MPA)

① The mechanical properties for standard tempers are similar to those listed in BS EN 755-2 specification, 1997 edition. Minimum properties may vary slightly depending on specification and product type ie. rod, bar, tube and solid or hollow shape. The above data is provided for reference only. MPA = Mega Pascal. (1 ksi=6.8948 MPA)
② The thickness of the cross section from which the tension test specimen is taken determines the applicable mechanical properties. ③ D-Specimen diameter

Comparative Characteristics of Related Alloys/Tempers[1]

Alloy	Temper	Formability Low–High	Machinability D C B A	General Corrosion Resistance D C B A	Weldability (Arc with Inert Gas) D C B A	Brazeability D C B A	Anodizing Response D C B A
6082	-0						N/A
6082	-T4						
6082	-T5						
6082	-T6						
6061	-0						N/A
6061	-T1, -T4						
6061	-T6, -T6511, -T4511						
6061	-T6H, -T6G, -T6511H, -T6511G						
6061	-T6S2, -T6S10						N/A
6061	-T6S9, -TS10						N/A
6061	-T51						N/A
6063	-T5, -T52						
6063	-T6						
6262	-T6, -T6511						

① Rating: A=Excellent B=Good C=Fair D=Poor For further details of explanation of ratings, see Aluminum Association's Aluminum Standards and Data manual.

Alcoa Distribution and Industrial Products

53 Pottsville Street
Cressona, PA 17929
Phone: 800-233-3165
FAX: 800-252-4646