

Aluminum 7075-T6; 7075-T651

Categories: [Metal](#); [Nonferrous Metal](#); [Aluminum Alloy](#); [7000 Series Aluminum Alloy](#)

Material Notes: General 7075 characteristics and uses (from Alcoa): Very high strength material used for highly stressed structural parts. The T7351 temper offers improved stress-corrosion cracking resistance.

Applications: Aircraft fittings, gears and shafts, fuse parts, meter shafts and gears, missile parts, regulating valve parts, worm gears, keys, aircraft, aerospace and defense applications; bike frames, all terrain vehicle (ATV) sprockets.

Data points with the AA note have been provided by the Aluminum Association, Inc. and are NOT FOR DESIGN.

Composition Notes:



A Zr + Ti limit of 0.25 percent maximum may be used with this alloy designation for extruded and forged products only, but only when the supplier and the purchaser have mutually agreed.




Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium 7075-T6; Aluminium 7075-T651, UNS A97075; ISO AlZn5.5MgCu; Aluminium 7075-T6; Aluminium 7075-T651; AA7075-T6; Al7075-T6

Vendors: [Click here to view all available suppliers for this material.](#)

Please [click here](#) if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	2.81 g/cc	0.102 lb/in ³	AA; Typical
Mechanical Properties	Metric	English	Comments
Hardness, Brinell	150	150	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	191	191	Converted from Brinell Hardness Value
Hardness, Rockwell A	53.5	53.5	Converted from Brinell Hardness Value
Hardness, Rockwell B	87	87	Converted from Brinell Hardness Value
Hardness, Vickers	175	175	Converted from Brinell Hardness Value
Tensile Strength, Ultimate	572 MPa	83000 psi	AA; Typical
	41.0 MPa @Temperature 371 °C	5950 psi @Temperature 700 °F	
	55.0 MPa @Temperature 316 °C	7980 psi @Temperature 601 °F	
	76.0 MPa @Temperature 260 °C	11000 psi @Temperature 500 °F	
	110 MPa @Temperature 204 °C	16000 psi @Temperature 399 °F	
	214 MPa @Temperature 149 °C	31000 psi @Temperature 300 °F	
	483 MPa @Temperature 100 °C	70100 psi @Temperature 212 °F	
	572 MPa @Temperature 24.0 °C	83000 psi @Temperature 75.2 °F	
	593 MPa @Temperature -28.0 °C	86000 psi @Temperature -18.4 °F	
	621 MPa @Temperature -80.0 °C	90100 psi @Temperature -112 °F	
	703 MPa @Temperature -196 °C	102000 psi @Temperature -321 °F	
	>= 462 MPa @Thickness 88.93 - 102 mm	>= 67000 psi @Thickness 3.501 - 4.00 in	Plate; T62, T651
	>= 490 MPa @Thickness 76.23 - 88.9 mm	>= 71100 psi @Thickness 3.001 - 3.50 in	Plate; T62, T651
	>= 496 MPa @Thickness 63.53 - 76.2 mm	>= 71900 psi @Thickness 2.501 - 3.00 in	Plate; T62, T651
	>= 510 MPa @Thickness 0.203 - 0.279 mm	>= 74000 psi @Thickness 0.00800 - 0.0110 in	Sheet
	>= 524 MPa @Thickness 0.305 - 0.991 mm	>= 76000 psi @Thickness 0.0120 - 0.0390 in	Sheet
	>= 524 MPa @Thickness 50.83 - 63.5 mm	>= 76000 psi @Thickness 2.001 - 2.50 in	Plate; T62, T651
	>= 531 MPa @Thickness 25.43 - 50.8 mm	>= 77000 psi @Thickness 1.001 - 2.00 in	Plate; T62, T651
	>= 538 MPa @Thickness 1.02 - 3.17 mm	>= 78000 psi @Thickness 0.0400 - 0.125 in	Sheet
	>= 538 MPa @Thickness 3.20 - 6.32 mm	>= 78000 psi @Thickness 0.126 - 0.249 in	Sheet
	>= 538 MPa @Thickness 6.35 - 12.7 mm	>= 78000 psi @Thickness 0.250 - 0.499 in	Plate; T62, T651
	>= 538 MPa	>= 78000 psi	Plate; T62, T651

	~ 550 MPa @Thickness 12.7 - 25.4 mm	~ 70000 psi @Thickness 0.500 - 1.00 in	Plate, T62, T651
Tensile Strength, Yield	503 MPa	73000 psi	AA; Typical
	>= 372 MPa @Thickness 88.93 - 102 mm	>= 54000 psi @Thickness 3.501 - 4.00 in	Plate; T62, T651
	>= 400 MPa @Thickness 76.23 - 88.9 mm	>= 58000 psi @Thickness 3.001 - 3.50 in	Plate; T62, T651
	>= 421 MPa @Thickness 63.53 - 76.2 mm	>= 61100 psi @Thickness 2.501 - 3.00 in	Plate; T62, T651
	>= 434 MPa @Thickness 0.203 - 0.279 mm	>= 62900 psi @Thickness 0.00800 - 0.0110 in	Sheet
	>= 441 MPa @Thickness 50.83 - 63.5 mm	>= 64000 psi @Thickness 2.001 - 2.50 in	Plate; T62, T651
	>= 462 MPa @Thickness 0.305 - 0.991 mm	>= 67000 psi @Thickness 0.0120 - 0.0390 in	Sheet
	>= 462 MPa @Thickness 6.35 - 12.7 mm	>= 67000 psi @Thickness 0.250 - 0.499 in	Plate; T62, T651
	>= 462 MPa @Thickness 25.43 - 50.8 mm	>= 67000 psi @Thickness 1.001 - 2.00 in	Plate; T62, T651
	>= 469 MPa @Thickness 1.02 - 3.17 mm	>= 68000 psi @Thickness 0.0400 - 0.125 in	Sheet
	>= 469 MPa @Thickness 12.7 - 25.4 mm	>= 68000 psi @Thickness 0.500 - 1.00 in	Plate; T62, T651
	>= 476 MPa @Thickness 3.20 - 6.32 mm	>= 69000 psi @Thickness 0.126 - 0.249 in	Sheet
	32.0 MPa @Strain 0.200 %, Temperature 271 °C	4640 psi @Strain 0.200 %, Temperature 520 °F	
	45.0 MPa @Strain 0.200 %, Temperature 316 °C	6530 psi @Strain 0.200 %, Temperature 601 °F	
	62.0 MPa @Strain 0.200 %, Temperature 260 °C	8990 psi @Strain 0.200 %, Temperature 500 °F	
	87.0 MPa @Strain 0.200 %, Temperature 204 °C	12600 psi @Strain 0.200 %, Temperature 399 °F	
	186 MPa @Strain 0.200 %, Temperature 149 °C	27000 psi @Strain 0.200 %, Temperature 300 °F	
	448 MPa @Strain 0.200 %, Temperature 100 °C	65000 psi @Strain 0.200 %, Temperature 212 °F	
	503 MPa @Strain 0.200 %, Temperature 24.0 °C	73000 psi @Strain 0.200 %, Temperature 75.2 °F	
	517 MPa @Strain 0.200 %, Temperature -28.0 °C	75000 psi @Strain 0.200 %, Temperature -18.4 °F	
	545 MPa @Strain 0.200 %, Temperature -80.0 °C	79000 psi @Strain 0.200 %, Temperature -112 °F	
	634 MPa @Strain 0.200 %, Temperature -196 °C	92000 psi @Strain 0.200 %, Temperature -321 °F	
Elongation at Break 	9.0 % @Temperature -196 °C	9.0 % @Temperature -321 °F	
	11 % @Temperature -80.0 °C	11 % @Temperature -112 °F	
	11 % @Temperature -28.0 °C	11 % @Temperature -18.4 °F	
	11 % @Temperature 24.0 °C	11 % @Temperature 75.2 °F	
	14 % @Temperature 100 °C	14 % @Temperature 212 °F	
	30 % @Temperature 149 °C	30 % @Temperature 300 °F	
	55 % @Temperature 204 °C	55 % @Temperature 399 °F	
	65 % @Temperature 260 °C	65 % @Temperature 500 °F	
	70 % @Temperature 316 °C	70 % @Temperature 601 °F	
	70 % @Temperature 374 °C	70 % @Temperature 700 °F	



	Temperature 31 °C	Temperature 700 °F	
	>= 3.0 % @Thickness 88.93 - 102 mm	>= 3.0 % @Thickness 3.501 - 4.00 in	Plate; T62, T651
	>= 5.0 % @Thickness 0.203 - 0.279 mm	>= 5.0 % @Thickness 0.00800 - 0.0110 in	Sheet
	>= 5.0 % @Thickness 50.83 - 63.5 mm	>= 5.0 % @Thickness 2.001 - 2.50 in	Plate; T62, T651
	>= 5.0 % @Thickness 63.53 - 76.2 mm	>= 5.0 % @Thickness 2.501 - 3.00 in	Plate; T62, T651
	>= 5.0 % @Thickness 76.23 - 88.9 mm	>= 5.0 % @Thickness 3.001 - 3.50 in	Plate; T62, T651
	>= 6.0 % @Thickness 25.43 - 50.8 mm	>= 6.0 % @Thickness 1.001 - 2.00 in	Plate; T62, T651
	>= 7.0 % @Thickness 0.305 - 0.991 mm	>= 7.0 % @Thickness 0.0120 - 0.0390 in	Sheet
	>= 7.0 % @Thickness 12.7 - 25.4 mm	>= 7.0 % @Thickness 0.500 - 1.00 in	Plate; T62, T651
	>= 8.0 % @Thickness 1.02 - 3.17 mm	>= 8.0 % @Thickness 0.0400 - 0.125 in	Sheet
	>= 8.0 % @Thickness 3.20 - 6.32 mm	>= 8.0 % @Thickness 0.126 - 0.249 in	Sheet
	>= 9.0 % @Thickness 6.35 - 12.7 mm	>= 9.0 % @Thickness 0.250 - 0.499 in	Plate; T62, T651
	11 % @Thickness 1.59 mm	11 % @Thickness 0.0625 in	AA; Typical
	11 % @Diameter 12.7 mm	11 % @Diameter 0.500 in	AA; Typical
Modulus of Elasticity	71.7 GPa	10400 ksi	AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus.
Poissons Ratio	0.33	0.33	
Fatigue Strength	159 MPa @# of Cycles 5.00e+8	23000 psi @# of Cycles 5.00e+8	completely reversed stress; RR Moore machine/specimen
Fracture Toughness	17.6 MPa-m ^{1/2}	16.0 ksi-in ^{1/2}	T651; Plate; S-L; average
	16.5 - 19.8 MPa-m ^{1/2}	15.0 - 18.0 ksi-in ^{1/2}	T651; Plate; S-L
	18.7 MPa-m ^{1/2}	17.0 ksi-in ^{1/2}	T651; Forgings; S-L
	20.0 MPa-m ^{1/2}	18.2 ksi-in ^{1/2}	K(IC) in S-L Direction
	22.0 - 25.3 MPa-m ^{1/2}	20.0 - 23.0 ksi-in ^{1/2}	T651; Plate; T-L
	24.2 MPa-m ^{1/2}	22.0 ksi-in ^{1/2}	T651; Plate; T-L; average
	25.0 MPa-m ^{1/2}	22.8 ksi-in ^{1/2}	K(IC) in T-L Direction
	28.6 MPa-m ^{1/2}	26.0 ksi-in ^{1/2}	T651; Plate; L-T; average
	27.5 - 29.7 MPa-m ^{1/2}	25.0 - 27.0 ksi-in ^{1/2}	T651; Plate; L-T
	29.0 MPa-m ^{1/2}	26.4 ksi-in ^{1/2}	K(IC) in L-T Direction
Machinability	70 %	70 %	0-100 Scale of Aluminum Alloys
Shear Modulus	26.9 GPa	3900 ksi	
Shear Strength	331 MPa	48000 psi	AA; Typical
Electrical Properties			
	Metric	English	Comments
Electrical Resistivity	0.00000515 ohm-cm @Temperature 20.0 °C	0.00000515 ohm-cm @Temperature 68.0 °F	AA; Typical
Thermal Properties			
	Metric	English	Comments
CTE, linear	21.6 µm/m-°C @Temperature -50.0 - 20.0 °C	12.0 µin/in-°F @Temperature -58.0 - 68.0 °F	
	23.4 µm/m-°C @Temperature 20.0 - 100 °C	13.0 µin/in-°F @Temperature 68.0 - 212 °F	
	23.6 µm/m-°C @Temperature 20.0 - 100 °C	13.1 µin/in-°F @Temperature 68.0 - 212 °F	AA; Typical; average over range
	24.3 µm/m-°C @Temperature 20.0 - 200 °C	13.5 µin/in-°F @Temperature 68.0 - 392 °F	
	25.2 µm/m-°C @Temperature 20.0 - 300 °C	14.0 µin/in-°F @Temperature 68.0 - 572 °F	
Specific Heat Capacity	0.960 J/g-°C	0.229 BTU/lb-°F	
Thermal Conductivity	130 W/m-K	900 BTU-in/hr-ft²-°F	AA; Typical at 77°F
Melting Point	477 - 635.0 °C	890 - 1175 °F	AA; Typical range based on typical composition for wrought products 1/4 inch thickness or greater. Homogenization may raise eutectic melting temperature 20-40°F but usually does not eliminate eutectic melting.
Solidus	477 °C	890 °F	AA; Typical
Liquidus	635.0 °C	1175 °F	AA; Typical
Processing Properties			
	Metric	English	Comments
Annealing Temperature	413 °C	775 °F	

Solution Temperature	466 - 482 °C	870 - 900 °F
Aging Temperature	121 °C	250 °F

Component Elements Properties	Metric	English	Comments
Aluminum, Al	87.1 - 91.4 %	87.1 - 91.4 %	As remainder
Chromium, Cr	0.18 - 0.28 %	0.18 - 0.28 %	
Copper, Cu	1.2 - 2.0 %	1.2 - 2.0 %	
Iron, Fe	<= 0.50 %	<= 0.50 %	
Magnesium, Mg	2.1 - 2.9 %	2.1 - 2.9 %	
Manganese, Mn	<= 0.30 %	<= 0.30 %	
Other, each	<= 0.05 %	<= 0.05 %	
Other, total	<= 0.15 %	<= 0.15 %	
Silicon, Si	<= 0.40 %	<= 0.40 %	
Titanium, Ti	<= 0.20 %	<= 0.20 %	
Zinc, Zn	5.1 - 6.1 %	5.1 - 6.1 %	

[References](#) for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error. We also ask that you refer to MatWeb's [terms of use](#) regarding this information. [Click here](#) to view all the property values for this datasheet as they were originally entered into MatWeb.