

ALUMINUM COMMON GRADE 6005 WITH T5 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ³
Mechanical Properties	Metric	English
Hardness, Brinell	95	95
Hardness, Knoop	120	120
Hardness, Vickers	107	107
Ultimate Tensile Strength	260	37700
Tensile Yield Strength	240	34800
Elongation at Break	8.00%	8.00%
Modulus of Elasticity	69.0 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength	100 MPa	14500 psi
Machinability		
Shear Modulus	26.0 GPa	3770 ksi
Shear Strength	205 MPa	29700 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000349 ohm-cm	0.00000349 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68 ^o F	23.4 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	13.0 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
CTE, linear 250 ^o C	25.0 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	13.9 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
Specific Heat Capacity	0.890 J/g $\cdot\text{A}^{\circ}\text{C}$	0.213 BTU/lb $\cdot\text{A}^{\circ}\text{F}$
Thermal Conductivity	189 W/m-K	1310 BTU-in/hr-ft ² $\cdot\text{A}^{\circ}\text{F}$
Melting Point	607.2 - 654 A°C	1125 - 1210 A°F
Solidus	607.2 A°C	1125 A°F
Liquidus	654 A°C	1210 A°F
Processing Properties	Metric	English
Solution Temperature	546.1 A°C	1015 A°F
Aging Temperature	174 A°C	346 A°F
Material Components	Metric	English
Aluminum, Al	97.5 - 99.0 %	97.5 - 99.0 %
Chromium, Cr	≤ 0.100 %	≤ 0.100 %
Copper, Cu	≤ 0.100 %	≤ 0.100 %
Iron, Fe	≤ 0.350 %	≤ 0.350 %
Magnesium, Mg	0.400 - 0.600 %	0.400 - 0.600 %
Manganese, Mn	≤ 0.100 %	≤ 0.100 %
Other, each	≤ 0.0500 %	≤ 0.0500 %
Other, total	≤ 0.150 %	≤ 0.150 %
Silicon, Si	0.600 - 0.900 %	0.600 - 0.900 %
Titanium, Ti	≤ 0.100 %	≤ 0.100 %
Zinc, Zn	≤ 0.100 %	≤ 0.100 %

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Alliance LLC 6005-T5

ALUMINUM COMMON GRADE 6061 WITH T4

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ³
Mechanical Properties	Metric	English
Hardness, Brinell	65	65
Hardness, Knoop	88	88
Hardness, Vickers	75	75
Ultimate Tensile Strength	241	35
Tensile Yield Strength	145	21
Elongation at Break	22.00%	22.00%
Modulus of Elasticity	68.9 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength	96.5 MPa	14000 psi
Machinability	50.00%	50.00%
Shear Modulus	26.0 GPa	3770 ksi
Shear Strength	165 MPa	24000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000432 ohm-cm	0.00000432 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68 ^o F	23.6 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	13.1 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
CTE, linear 250 ^o C	25.2 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	14.0 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
Specific Heat Capacity	0.896 J/g $\cdot\text{A}^{\circ}\text{C}$	0.214 BTU/lb $\cdot\text{A}^{\circ}\text{F}$
Thermal Conductivity	154 W/m-K	1070 BTU-in/hr-ft ² $\cdot\text{A}^{\circ}\text{F}$
Melting Point	582 - 651.7 A°C	1080 - 1205 A°F
Solidus	582 A°C	1080 A°F
Liquidus	651.7 A°C	1205 A°F
Processing Properties	Metric	English
Solution Temperature	529 A°C	985 A°F
Aging Temperature	160 A°C	320 A°F
Material Components	Metric	English
Aluminum, Al	95.8 - 98.6 %	95.8 - 98.6 %
Chromium, Cr	0.0400 - 0.350 %	0.0400 - 0.350 %
Copper, Cu	0.150 - 0.400 %	0.150 - 0.400 %
Iron, Fe	\leq 0.700 %	\leq 0.700 %
Magnesium, Mg	0.800 - 1.20 %	0.800 - 1.20 %
Manganese, Mn	\leq 0.150 %	\leq 0.150 %
Other, each	\leq 0.0500 %	\leq 0.0500 %
Other, total	\leq 0.150 %	\leq 0.150 %
Silicon, Si	0.400 - 0.800 %	0.400 - 0.800 %
Titanium, Ti	\leq 0.150 %	\leq 0.150 %
Zinc, Zn	\leq 0.250 %	\leq 0.250 %

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ALUMINUM COMMON GRADE 6061 WITH T6 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ³
Mechanical Properties	Metric	English
Hardness, Brinell	95	95
Hardness, Knoop	120	120
Hardness, Vickers	40	40
Ultimate Tensile Strength	60	60
Tensile Yield Strength	107	107
Elongation at Break	12.00%	12.00%
Modulus of Elasticity	68.9 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength	96.5 MPa	14000 psi
Machinability	50.00%	50.00%
Shear Modulus	26.0 GPa	3770 ksi
Shear Strength	207 MPa	30000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000399 ohm-cm	0.00000399 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68 ^o F	23.6 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	13.1 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
CTE, linear 250 ^o C	25.2 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	14.0 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
Specific Heat Capacity	0.896 J/g $\cdot\text{A}^{\circ}\text{C}$	0.214 BTU/lb $\cdot\text{A}^{\circ}\text{F}$
Thermal Conductivity	167 W/m-K	1160 BTU-in/hr-ft ² $\cdot\text{A}^{\circ}\text{F}$
Melting Point	582 - 651.7 A°C	1080 - 1205 A°F
Solidus	582 A°C	1080 A°F
Liquidus	651.7 A°C	1205 A°F
Processing Properties	Metric	English
Solution Temperature	529 A°C	985 A°F
Aging Temperature	160 A°C	320 A°F
Material Components	Metric	English
Aluminum, Al	95.8 - 98.6 %	95.8 - 98.6 %
Chromium, Cr	0.0400 - 0.350 %	0.0400 - 0.350 %
Copper, Cu	0.150 - 0.400 %	0.150 - 0.400 %
Iron, Fe	\leq 0.700 %	\leq 0.700 %
Magnesium, Mg	0.800 - 1.20 %	0.800 - 1.20 %
Manganese, Mn	\leq 0.150 %	\leq 0.150 %
Other, each	\leq 0.0500 %	\leq 0.0500 %
Other, total	\leq 0.150 %	\leq 0.150 %
Silicon, Si	0.400 - 0.800 %	0.400 - 0.800 %
Titanium, Ti	\leq 0.150 %	\leq 0.150 %
Zinc, Zn	\leq 0.250 %	\leq 0.250 %

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ALUMINUM COMMON GRADE 6061 WITH T8 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ³
Mechanical Properties	Metric	English
Hardness, Brinell	120	120
Hardness, Knoop	150	150
Hardness, Vickers	136	136
Ultimate Tensile Strength	>=310 MPa	>=45000 psi
Tensile Yield Strength	>=276 MPa	>=40000 psi
Elongation at Break	8.00%	8.00%
Modulus of Elasticity	69.0 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength		
Machinability	50.00%	50.00%
Shear Modulus	26.0 GPa	3770 ksi
Shear Strength	185 MPa	26800 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000370 ohm-cm	0.00000370 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68 ^o F	23.6 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	13.1 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
CTE, linear 250 ^o C	25.2 $\mu\text{m}/\text{m}\cdot\text{A}^{\circ}\text{C}$	14.0 $\mu\text{in}/\text{in}\cdot\text{A}^{\circ}\text{F}$
Specific Heat Capacity	0.896 J/g $\cdot\text{A}^{\circ}\text{C}$	0.214 BTU/lb $\cdot\text{A}^{\circ}\text{F}$
Thermal Conductivity	170 W/m-K	1180 BTU-in/hr-ft ² $\cdot\text{A}^{\circ}\text{F}$
Melting Point	582 - 651.7 A°C	1080 - 1205 A°F
Solidus	582 A°C	1080 A°F
Liquidus	651.7 A°C	1205 A°F
Processing Properties	Metric	English
Solution Temperature	529 A°C	985 A°F
Aging Temperature	160 A°C	320 A°F
Material Components	Metric	English
Aluminum, Al	95.8 - 98.6 %	95.8 - 98.6 %
Chromium, Cr	0.0400 - 0.350 %	0.0400 - 0.350 %
Copper, Cu	0.150 - 0.400 %	0.150 - 0.400 %
Iron, Fe	<= 0.700 %	<= 0.700 %
Magnesium, Mg	0.800 - 1.20 %	0.800 - 1.20 %
Manganese, Mn	<= 0.150 %	<= 0.150 %
Other, each	<= 0.0500 %	<= 0.0500 %
Other, total	<= 0.150 %	<= 0.150 %
Silicon, Si	0.400 - 0.800 %	0.400 - 0.800 %
Titanium, Ti	<= 0.150 %	<= 0.150 %
Zinc, Zn	<= 0.250 %	<= 0.250 %

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Alliance LLC 6061-T8

ALUMINUM COMMON GRADE 6063 WITH T4 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ^Å 3
Mechanical Properties	Metric	English
Hardness, Brinell	46	46
Hardness, Knoop		
Hardness, Vickers		
Ultimate Tensile Strength	172 MPa	25.0 ksi
Tensile Yield Strength	89.6 MPa	13.0 ksi
Elongation at Break	22.00%	22.00%
Modulus of Elasticity	68.9 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength		
Machinability	50.00%	50.00%
Shear Modulus	25.8 GPa	3740 ksi
Shear Strength	110 MPa	16000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000330 ohm-cm	0.00000330 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68Å°F	23.4 Åµm/m-Å°C	13.0 Åµin/in-Å°F
CTE, linear 250Å°C	25.6 Åµm/m-Å°C	14.2 Åµin/in-Å°F
Specific Heat Capacity	0.900 J/g-Å°C	0.215 BTU/lb-Å°F
Thermal Conductivity	200 W/m-K	1390 BTU-in/hr-ftÅ²-Å°F
Melting Point	616 - 654 Å°C	1140 - 1210 Å°F
Solidus	616 Å°C	1140 Å°F
Liquidus	654 Å°C	1210 Å°F
Processing Properties	Metric	English
Solution Temperature	521 Å°C	970 Å°F
Aging Temperature	177 Å°C	350 Å°F
Material Components	Metric	English
Aluminum, Al	<=97.5%	<=97.5%
Chromium, Cr	<=0.100%	<=0.100%
Copper, Cu	<=0.100%	<=0.100%
Iron, Fe	<=0.350%	<=0.350
Magnesium, Mg	0.450 - 0.900%	0.450 - 0.900%
Manganese, Mn	<=0.100%	<=0.100%
Other, each	<=0.0500%	<= 0.0500 %
Other, total	<= 0.150 %	<= 0.150 %
Silicon, Si	0.200 - 0.600%	0.200 - 0.600%
Titanium, Ti	<=0.100%	<=0.100%
Zinc, Zn	<=0.100%	<=0.100%

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ALUMINUM COMMON GRADE 6063 WITH T5 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ^Å 3
Mechanical Properties	Metric	English
Hardness, Brinell	60	60
Hardness, Knoop	83	83
Hardness, Vickers	70	70
Ultimate Tensile Strength	186 MPa	27.0 ksi
Tensile Yield Strength	145 MPa	21.0 ksi
Elongation at Break	12.00%	12.00%
Modulus of Elasticity	68.9 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength	68.9 MPa	10000 psi
Machinability		
Shear Modulus	25.8 GPa	3740 ksi
Shear Strength	117 MPa	17000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000316 ohm-cm	0.00000316 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68Å°F	23.4 Åµm/m-Å°C	13.0 Åµin/in-Å°F
CTE, linear 250Å°C	25.6 Åµm/m-Å°C	14.2 Åµin/in-Å°F
Specific Heat Capacity	0.900 J/g-Å°C	0.215 BTU/lb-Å°F
Thermal Conductivity	209 W/m-K	1450 BTU-in/hr-ftÅ²-Å°F
Melting Point	616 - 654 Å°C	1140 - 1210 Å°F
Solidus	616 Å°C	1140 Å°F
Liquidus	654 Å°C	1210 Å°F
Processing Properties	Metric	English
Solution Temperature	521 Å°C	970 Å°F
Aging Temperature	182 Å°C	360 Å°F
Material Components	Metric	English
Aluminum, Al	<=97.5%	<=97.5%
Chromium, Cr	<=0.100%	<=0.100%
Copper, Cu	<=0.100%	<=0.100%
Iron, Fe	<=0.350%	<=0.350
Magnesium, Mg	0.450 - 0.900%	0.450 - 0.900%
Manganese, Mn	<=0.100%	<=0.100%
Other, each	<=0.0500%	<= 0.0500 %
Other, total	<= 0.150 %	<= 0.150 %
Silicon, Si	0.200 - 0.600%	0.200 - 0.600%
Titanium, Ti	<=0.100%	<=0.100%
Zinc, Zn	<=0.100%	<=0.100%

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ALUMINUM COMMON GRADE 6063 WITH T6 TEMPER

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ^Å 3
Mechanical Properties	Metric	English
Hardness, Brinell	73	73
Hardness, Knoop	96	96
Hardness, Vickers	83	83
Ultimate Tensile Strength	241 MPa	35.0 ksi
Tensile Yield Strength	214 MPa	31.0 ksi
Elongation at Break	12.00%	12.00%
Modulus of Elasticity	68.9 GPa	10000 ksi
Poissons Ratio	0.33	0.33
Fatigue Strength	68.9 MPa	10000 psi
Machinability	50.00%	50.00%
Shear Modulus	25.8 GPa	3740 ksi
Shear Strength	152 MPa	22000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000332 ohm-cm	0.00000332 ohm-cm
Thermal Properties	Metric	English
CTE, linear 68Å°F	23.4 Åµm/m-Å°C	13.0 Åµin/in-Å°F
CTE, linear 250Å°C	25.6 Åµm/m-Å°C	14.2 Åµin/in-Å°F
Specific Heat Capacity	0.900 J/g-Å°C	0.215 BTU/lb-Å°F
Thermal Conductivity	200 W/m-K	1390 BTU-in/hr-ftÅ²-Å°F
Melting Point	616 - 654 Å°C	1140 - 1210 Å°F
Solidus	616 Å°C	1140 Å°F
Liquidus	654 Å°C	1210 Å°F
Processing Properties	Metric	English
Solution Temperature	521 Å°C	970 Å°F
Aging Temperature	177 Å°C	350 Å°F
Material Components	Metric	English
Aluminum, Al	<=97.5%	<=97.5%
Chromium, Cr	<=0.100%	<=0.100%
Copper, Cu	<=0.100%	<=0.100%
Iron, Fe	<=0.350%	<=0.350
Magnesium, Mg	0.450 - 0.900%	0.450 - 0.900%
Manganese, Mn	<=0.100%	<=0.100%
Other, each	<=0.0500%	<= 0.0500 %
Other, total	<= 0.150 %	<= 0.150 %
Silicon, Si	0.200 - 0.600%	0.200 - 0.600%
Titanium, Ti	<=0.100%	<=0.100%
Zinc, Zn	<=0.100%	<=0.100%

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