

Alloy 165 (C17000) Plate

Alloy 165 plate from Materion provides strength close to that of Alloy 25, with slightly lower beryllium content. This alloy features high fatigue strength and resistance to wear, corrosion, galling, and stress relaxation. Typical applications include wear plates and resistance welding components.

CHEMICAL COMPOSITION (WEIGHT PERCENT)

Alloy	Beryllium	Nickel + Cobalt	Nickel + Cobalt + Iron	Copper
C17000	1.60 - 1.85	0.20 min.	0.6 max.	Balance

PHYSICAL PROPERTIES*

Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)
19,000 ksi 131 GPa	1600°F 870°C	25 - 30% IACS 5.8 - 6.9 μΩ-cm	0.304 lb/in ³ 8.41 g/cm ³	9.7 x 10 ⁻⁶ in/in °F 17.5 x 10 ⁻⁶ m/m °C	60 BTU/ft hr °F 105 W/m K

*Properties specified for the precipitation age hardened (heat treated) condition

** Density in the un-heat treated condition is 0.302 lbs/in³ (8.36 g/cm³)

MECHANICAL PROPERTIES*

Temper**	Plate Thickness		Heat Treatment Required	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
	inch	mm	600 – 675 °F 315 – 357 °C	ksi	MPa	ksi	MPa	Percent
A (TB00)	0.5 - 8	12.7 - 23.2	Before Heat Treatment	20 - 35	130 - 250	60 - 85	410 - 590	20 - 60
H (TD04)	0.188 - 0.375	4.8 - 9.5	Before Heat Treatment	75 - 105	520 - 720	90 - 130	620 - 900	8 - 20
H (TD04)	> 0.375 - 1	> 9.5 - 25.4		75 - 105	520 - 720	90 - 125	620 - 860	8 - 20
H (TD04)	> 1 - 2	> 25.4 - 51		75 - 105	520 - 720	85 - 120	590 - 830	8 - 20
H (TD04)	> 2 - 3	> 51 - 76		75 - 105	520 - 720	85 - 120	590 - 830	8 - 20
AT (TF00)	0.5 - 8	12.7 - 203.2	After 3 hours	130 - 155	890 - 1070	150 - 190	1030 - 1310	3 - 10
HT (TH04)	0.188 - 0.375	4.8 - 9.5	After 2 hours	135 - 165	930 - 1140	170 - 210	1170 - 1450	2 - 5
HT (TH04)	> 0.375 - 1	> 9.5 - 25.4	After 2 hours	135 - 165	930 - 1140	170 - 210	1170 - 1450	2 - 5
HT (TH04)	> 1 - 2	> 25.4 - 51	After 2 hours	135 - 165	930 - 1140	165 - 200	1140 - 1380	2 - 5
HT (TH04)	> 2 - 3	> 51 - 76	After 2 hours	125 - 165	860 - 1140	160 - 190	1100 - 1310	2 - 5

*Properties may vary by thickness

FORMS AVAILABLE

Alloy 165 plate is supplied in lengths from 24 to 126 inches (610 to 3200 mm), and in widths from 12 to 22 inches (305 to 559 mm). Solution annealed tempers are available in thicknesses ranging from 0.5" to 8" (12.7 to 203.2 mm) and hard drawn tempers are available from 0.188" to 3" (4.8 mm to 76 mm). Alloy 165 is also available in strip, rod, bar, tube and parts finished by drawing, extrusion, and machining.

INDUSTRY STANDARDS AND SPECIFICATIONS

C17000, ASTM B-194, SAE J 461, SAE J 463, JIS H3130

TOLERANCES

Plate Thickness (inches)		Standard Thickness Tolerance (inches)		Plate Thickness (mm)		Standard Thickness Tolerance (mm)	
Over	Including	Plus	Minus	Over	Including	Plus	Minus
0.188	0.205	0.020	0	5.0	8.0	0.60	0
0.205	0.300	0.024	0	8.0	13.0	0.80	0
0.300	0.500	0.030	0	13.0	20.0	1.00	0
0.500	0.750	0.038	0	20.0	30.0	1.20	0
0.750	1.00	0.046	0	30.0	40.0	1.40	0
1.00	1.50	0.056	0	40.0	60.0	1.70	0
1.50	3.00	0.066	0	60.0	203.2	3.175	0
3.00	8.00	0.125	0				

Additional tolerances are per ASTM B 194. Please specify the exact tolerances that you require when you place your order. Tighter tolerances may be available at additional cost. Please contact your local sales engineer to confirm the requested capability.

HEALTH AND SAFETY

Processing beryllium-containing alloys poses a health risk if safe practices are not followed. Inhalation of airborne beryllium can cause serious lung diseases in some individuals. Occupational safety and health regulatory agencies worldwide have set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. The SDS and additional important beryllium health and safety information and guidance can be found at berylliumssafety.com, berylliumssafety.eu and Materion.com. For questions on safe practices for beryllium-containing alloys, contact the Materion Product Stewardship Group at +1.800.862.4118 or contact us by e mail at Materion-PS@Materion.com.

Disclaimer:

Only the buyer can determine the appropriateness of any processing practice, end-product or application. Materion does not make any warranty regarding its recommendations, the suitability of Materion's product, or its processing suggestions for buyer's end product, application or equipment.

The properties presented on this data sheet are for reference purposes only, intended only to initiate the material selection process. They do not constitute, nor are they intended to constitute, a material specification. Material will be produced to one of the applicable industry standards, if any, listed in the Industry Standards and Specification section.

Actual properties may vary by thickness and/or part number. Please contact your local sales engineer for detailed properties to be used in simulation.

Any properties marked as preliminary are subject to change at any time as the manufacturing process is further refined.

MATERION PERFORMANCE ALLOYS AND COMPOSITES

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