

Alloy 165 (C17000) Tube

Alloy 165 Tube from Materion Brush Performance Alloys provides strength close to that of Alloy 25, with slightly lower beryllium content. Alloy 165 features high fatigue strength and magnetic permeability approaching unity. Typical applications include undersea instrument housings and repeater housings.



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)	Relative Magnetic Permeability
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	9.7x10 ⁻⁶ in/in °F 17.5x10 ⁻⁶ m/m °C	60 BTU/ft hr °F 105 W/m K	<1.0006

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

**Value listed is the density after heat treatment. The density before heat treatment is 0.302 lbs/in³ (8.36 g/cm³)

MECHANICAL PROPERTIES*

Temper	Heat Treatment Required	Outside Diameter		0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
		in	mm	ksi	MPa	ksi	MPa	Percent
A (TB00)	Before Heat Treatment	0.75 - 16	19.1 - 406	20-35	130-250	60-85	410-590	20-60
H (TD04) H (TD04) H (TD04)	Before Heat Treatment	≤ 0.375 >0.375 - 1 >1 - 3	≤ 9.5 >9.5 - 25.4 > 25.4 - 76	75-105 75-105 75-105	520-720 520-720 520-720	90-130 90-125 85-120	620-900 620-860 590-830	8-30 8-30 8-20
AT (TF00) AT (TF00)	After 3 - 4 hours	0.75 - 3 > 3 - 16	19.1 - 76 > 76 - 406	125-155 125-155	860-1070 860-1070	150-190 150-190	1030-1310 1030-1310	4-10 3-10
HT (TH04) HT (TH04) HT (TH04)	After 2 - 3 hours	≤ 0.375 >0.375 - 1 >1 - 3	≤ 9.5 >9.5 - 25.4 > 25.4 - 76	145-185 145-185 135-175	1000-1280 1000-1280 930-1210	170-210 170-210 165-200	1170-1450 1170-1450 1140-1380	2-5 2-5 4-9

*Properties may vary by tube wall thickness.

FORMS AVAILABLE

Alloy 165 tube is available with outside diameters ranging from 0.75" to 16" (19.1 mm to 406 mm) for Annealed (A) temper. Hard (H) temper is available in 0.375" to 3" (9.5 mm to 76 mm) outside diameters. Wall thickness is typically 10 to 20% of the outside diameter, subject to certain maximum and minimum constraints. Smaller diameter tube may be produced by tube redrawers. Alloy 165 is also available in strip, rod, bar, plate and parts finished by drawing, extrusion, and machining.

SPECIFICATIONS AND STANDARDS

C17000, ASTM B-251, SAE J 461, SAE J 463

RELATED INFORMATION

Additional technical information on Alloy 165 tube may be obtained by phoning 800-375-4205. For pricing and availability, phone 800-521-8800 or the local sales number listed on the bottom of this page.

TOLERANCES

Outside Diameter (inches)		Standard Diameter Tolerance (inches)		Outside Diameter (mm)		Standard Diameter Tolerance (mm)	
Over	Including	Cold Drawn Tube	Extruded Tube	Over	Including	Cold Drawn Tube	Extruded Tube
0.375	0.500	±0.002		9.5	12	±0.05	
0.500	1.00	±0.003		12	25	±0.08	
1.00	2.00	±0.004		25	50	±0.10	
2.00	3.00	±0.02% of OD		50	75	±0.02% of OD	
0.75	1.25		±0.020	20	30		±0.50
1.25	2.50		±0.030	30	65		±0.75
2.50	6.00		±0.060	65	150		±1.50

Additional tolerances are per ASTM B 251. 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.

SAFE HANDLING OF COPPER BERYLLIUM

Handling copper beryllium in solid form poses no special health risk. Like many industrial materials, beryllium-containing materials may pose a health risk if recommended safe handling practices are not followed. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. For additional information on safe handling practices or technical data on copper beryllium, contact Materion Performance Alloys, Technical Service Department at 1-800-375-4205.

North American Service Centers – Sales Inquiries

For bar, tube, plate/sheet >0.060" (1.5 mm) thick and rod >0.5" (12.7 mm) diameter:

Warren, MI

TOLL FREE: 800-521-8800
PHONE: +(1) 586-772-2700
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International Sales Offices

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