

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 17.0x10 ⁻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

**Density in the un-heat treated condition 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 Percent
		in	mm	ksi	MPa	ksi	MPa	
	600 - 675°F 315 - 357°C							
A (TB00)	3 - 4 hours	0.75 - 16	19.1 - 406	20-35	130-250	60-85	410-590	20-60
H (TD04)	2 - 3 hours	≤ 0.375	≤ 9.5	75-105	520-720	90-130	620-900	8-30
H (TD04)	2 - 3 hours	>0.375 - 1	>9.5 - 25.4	75-105	520-720	90-125	620-860	8-30
H (TD04)	2 - 3 hours	>1 - 3	> 25.4 - 76	75-105	520-720	85-120	590-830	8-20
AT (TF00)	-	0.75 - 3	19.1 - 76	125-155	860-1070	150-190	1030-1310	4-10
AT (TF00)	-	> 3 - 16	> 76 - 406	125-155	860-1070	150-190	1030-1310	3-10
HT (TH04)	-	≤ 0.375	≤ 9.5	145-185	1000-1280	170-210	1170-1450	2-5
HT (TH04)	-	>0.375 - 1	>9.5 - 25.4	145-185	1000-1280	170-210	1170-1450	2-5
HT (TH04)	-	>1 - 3	> 25.4 - 76	135-175	930-1210	165-200	1140-1380	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" (3.8 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 rod, bar, plate and parts finished by drawing, extrusion, and machining.

SPECIFICATIONS

C17000, ASTM B-251, SAE J 461, SAE J 463, RWMA Class 4

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		3.8	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	
0.750	1.25		±0.020	20	30		±0.50
1.25	2.50		±0.030	30	38		±0.75
2.50	6.00		±0.060	38	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.

RELATED INFORMATION

Additional information on Alloy 165 may be obtained by phoning 800.375.4205, or one of the numbers below.

North American Service Centers – Sales Inquiries

For strip and small diameter rod and wire:
 Elmhurst, IL
 TOLL FREE: 800-323-2438
 LOCAL: +(1) 630-832-9650
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For Rod, bar, tube and plate:
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