

Alloys 3 (C17510) and 10 (C17500) Tube

Alloy 3 and Alloy 10 tube from Materion Performance Alloys provide high electrical and thermal conductivity coupled with moderate strength. Typical applications include heat exchanger tubing and resistance welding components.

CHEMICAL COMPOSITION (weight percent)

Alloy	Nickel	Cobalt	Beryllium	Copper
3 (C17510)	1.4 – 2.2	-	0.2 – 0.6	Balance
10 (C17500)	-	2.4 – 2.7	0.4 – 0.7	Balance

PHYSICAL PROPERTIES*

Alloy	Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)
3	20,000 ksi 138 GPa	1900°F 1040°C	45-60% IACS 2.9-3.8 μΩ-cm	0.319 lb/in ³ 8.83 g/cm ³	9.8x10 ⁻⁶ in/in °F 17.6x10 ⁻⁶ m/m °C	140 BTU/ft hr °F 240 W/m °C
10	20,000 ksi 138 GPa	1850°F 1010°C	45-60% IACS 2.9-3.8 μΩ-cm	0.319 lb/in ³ 8.83 g/cm ³	9.8x10 ⁻⁶ in/in °F 17.6x10 ⁻⁶ m/m °C	115 BTU/ft hr °F 200 W/m °C

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

**Density in the un-heat treated condition is 0.316 lbs/in³ (8.75 g/cm³) for both alloys

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	10-30	70-210	35-55	240-380	20-35
H (TD04)		0.375 - 3.75	9.5 - 76	50-75	340-520	65-80	450-550	10-15
AT (TF00)	After 3 hours	0.75 - 16	19.1 - 406	80-100	550-690	100-130	690-900	10-25
HT (TH04)	After 2 hours	0.375 - 3.75	9.5 - 76	95-125	660-860	110-140	760-970	5-25

*Properties may vary by tube wall thickness.

FORMS AVAILABLE

Alloys 3 and 10 tube are 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. Alloys 3 and 10 are also available in rod, bar, wire, plate and parts finished by drawing, extrusion, and machining. Alloy 3 is also available in strip.

SPECIFICATIONS AND STANDARDS

C17500, C17510, ASTM B937, EN 12163, EN 12165, EN 12167, SAE J 461, SAE J 463

TOLERANCES

	Outside Diameter (in)		Standard Diameter Tolerance (in)	Outside Diameter (mm)		Standard Diameter Tolerance (mm)
	Over	Including		Over	Including	
Cold Worked	0.375	0.625	±0.003	9.5	15.9	±0.08
	0.625	0.75	±0.006	15.9	19.1	±0.15
	0.75	1.00	±0.006	19.1	25.4	±0.15
	1.00	2.00	±0.008	25.4	50.8	±0.20
	2.00	3.00	±0.010	50.8	76.2	±0.25
	3.00	3.75	±0.012	76.2	95.3	±0.30
Extruded	0.75	1.25	±0.020	19.1	31.8	±0.51
	1.25	2.00	±0.030	31.8	50.8	±0.76
	2.00	3.00	±0.040	50.8	76.2	±1.02
	3.00	4.00	±0.050	76.2	102	±1.27
	4.00	6.00	±0.060	102	152	±1.52
	6.00	8.00	±0.100	152	203	±2.54
	8.00	16.0	±0.125	203	406	±3.18

Additional tolerances are per ASTM B 937. 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:

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 TOLL FREE: 800-521-8800
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