

Alloy M25 (C17300) Rod

Alloy M25 from Materion is a free machining, high performance copper alloy. M25's properties minimize signal distortion in coaxial RF connectors and reduce power loss in circular connectors and contact probes. M25 is available in straight rod or coiled wire product forms and in different tempers to accommodate diverse design requirements. After machining and forming operations, M25 parts can be easily heat treated and plated to obtain maximum mechanical and electrical performance. Applications requiring stability to 175 °C or reliable contact force in miniaturized designs specify Alloy M25. In demanding electronic applications, M25 provides performance and reliability superior to any free machining copper alloy.

Chemical Composition (Weight Percent)

Alloy	Beryllium	Nickel + Cobalt	Nickel + Cobalt + Iron	Lead	Copper
C17300	1.80 - 2.0	0.20 min.	0.6 max.	0.20 - 0.60	Balance

Physical Properties*

Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)	Machinability Index
19,000 ksi 131 GPa	1600 °F 870 °C	22 - 28% IACS 5.9 - 6.9 μΩ-cm	0.302 lb/in ³ 8.36 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	60% (vs. free-cutting brass)

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

**Value listed is the density after heat treatment. The density before heat treatment is 0.30 lb/in³ (8.30 g/cm³).

Mechanical Properties*

Temper**	Diameter		Heat Treatment Required	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
	inch	mm		ksi	MPa	ksi	MPa	
A (TB00)	0.030 - 2.5	0.76 - 63.5	Before Heat Treatment	20 - 35	130 - 250	60 - 85	410 - 590	20 - 75
H (TD04)	0.030 - 0.375	0.76 - 9.5	Before Heat Treatment	75 - 105	520 - 720	90 - 130	620 - 900	8 - 30
H (TD04)	>0.375 - 1	>9.5 - 25.4		75 - 105	520 - 720	90 - 125	620 - 860	8 - 30
H (TD04)	>1 - 2.5	>25.4 - 63.5		75 - 105	520 - 720	85 - 120	590 - 830	8 - 20
AT (TF00)	0.030 - 2.5	0.76 - 63.5	After 3 hours	145 - 175	1000 - 1210	165 - 200	1140 - 1380	4 - 10
HT (TH04)	0.030 - 0.375	0.76 - 9.5	After 2 - 3 hours	160 - 200	1100 - 1380	185 - 225	1280 - 1550	2 - 9
HT (TH04)	>0.375 - 1	>9.5 - 25.4		155 - 195	1070 - 1340	180 - 220	1240 - 1520	2 - 9
HT (TH04)	>1 - 2.5	>25.4 - 63.5		145 - 190	1000 - 1310	175 - 215	1210 - 1480	4 - 9

*Properties may vary by diameter.

**Rod is typically provided in an annealed or cold drawn temper and heat treated after machining. Only rod greater than 0.4375" (11.0 mm) diameter or thickness may also be purchased in the pretempered (heat treated) condition.

Forms Available

Alloy M25 rod is supplied in straight lengths up to 12 ft (3.7 m) and in diameters ranging from 0.03" to 2.5" (0.76 to 63.5 mm). Rod may be purchased with pointed and/or chamfered ends. Alloy M25 is also available in wire form.

Industry Standards and Specifications

C17300, ASTM B196, EN 12164, MIL-C-21657

Tolerances

	Rod Diameter (inches)		Standard Diameter Tolerance (in)		Rod Diameter (mm)		Standard Diameter Tolerance (mm)	
	Over	Including	Diameter or Thickness	Out of Round	Over	Including	Diameter or Thickness	Out of Round
Cold Drawn	0.030	0.080	± 0.0003	0.0003	0.76	2.0	± 0.008	0.008
	0.080	0.1250	± 0.0004	0.0004	2.0	3.2	± 0.010	0.010
	0.1250	0.250	± 0.0006	0.0004	3.2	6.4	± 0.015	0.010
	0.250	0.3125	± 0.0007	0.0007	6.4	7.9	± 0.018	0.018
	0.3125	0.3750	± 0.001	0.001	7.9	9.5	± 0.025	0.025
	0.3750	0.500	± 0.002	0.002	9.5	12.0	± 0.05	0.05
	0.50	1.0	± 0.003	0.003	12.0	25.0	± 0.08	0.08
	1.0	2.0	± 0.004	0.004	25.0	50.0	± 0.10	0.10
	2.0	2.50	± 0.2% of Size	0.2% of Size	50.0	63.5	± 0.2% of Size	0.2% of Size

Additional tolerances are per ASTM B196. 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 technical or safe handling information on Alloy M25 may be obtained by phoning +1.800.375.4205. For pricing and availability, please contact +1.800.521.8800.

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 berylliumsafety.com, berylliumsafety.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 email 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.

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