

Alloy 25 (C17200) Wire

Materion Alloy 25 wire provides the highest strength of any copper alloy, with electrical conductivity considerably greater than other high-strength copper alloys. This alloy features excellent stress relaxation resistance and high fatigue strength.

Typical applications include precision coil springs and pins for burn-in and test socket contacts and probe pins, computer processor socket contacts, cold headed fasteners, modular jack contacts, woven mesh electromagnetic shielding gaskets, and resilient eyeglass frames.

Chemical Composition (Weight Percent)

Alloy	Beryllium	Nickel + Cobalt	Nickel + Cobalt + Iron	Copper
C17200	1.80 - 2.00	0.20 min.	0.6 max.	Balance

Typical Physical Properties*

Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient (20 - 200 °C)	Thermal Conductivity (25 °C)
19,000 ksi 131 GPa	1600 °F 870 °C	22-28% IACS 6.2-7.8 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

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

**Value listed is the density after heat treatment. The density before heat treatment is 0.300 lb/in³ (8.30 g/cm³).

Typical Mechanical Properties*

Temper**	Heat Treatment Required	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation***
	600 - 625 °F 315 - 330 °C	ksi	MPa	ksi	MPa	Percent
A (TB00)	Before Heat Treatment	20 - 30	130 - 210	58 - 78	400 - 540	30 - 75
¼ H (TD01)		75 - 105	510 - 730	90 - 115	620 - 800	2 - 25
½ H (TD02)		90 - 125	620 - 870	110 - 135	750 - 940	2 - 15
¾ H (TD03)		115 - 150	790 - 1040	130 - 155	890 - 1070	2 - 8
H (TD04)		130 - 160	890 - 1110	140 - 165	960 - 1140	1 - 8
AT (TF00)	After 3 hours	145 - 180	990 - 1250	160 - 200	1100 - 1380	3 min.
¼ HT (TH01)	After 2 hours	165 - 200	1130 - 1380	175 - 210	1200 - 1450	2 min.
½ HT (TH02)	After 1.5 hours	170 - 210	1170 - 1450	185 - 215	1270 - 1490	2 min.
¾ HT (TH03)	After 1 hour	175 - 220	1200 - 1520	190 - 230	1310 - 1590	2 min.
HT (TH04)	After 1 hour	180 - 220	1240 - 1520	195 - 230	1340 - 1590	1 min.

*Properties may vary by diameter.

**Wire is typically provided in an annealed or cold drawn temper and heat treated after forming. Wire may also be provided pre-tempered (heat treated).

***Elongation numbers valid only for wire greater than 0.004" (0.10 mm) diameter.

Forms Available

Alloy 25 wire is supplied in loose coils or on spools or reels. It is available in diameters ranging from 0.050" to 0.5" (1.27 mm to 12.7 mm) for A, ¼ H, and ½ H tempers. ¾ H and H tempers are available in 0.050" to 0.080" (1.27 mm to 2.0 mm) diameters. Smaller diameter wire may be produced by wire redrawers. Alloy 25 is also available in strip, rod, bar, plate, tube, and parts finished by drawing, extrusion, and machining.

Industry Standards and Specifications

UNS# C17200, ASTM B197, AMS 4725, SAE J461, SAE J463, JIS H3270, EN 1654, EN 12166, GB5233, GB3134

Tolerances

Wire Diameter (Inches)		Standard Diameter Tolerance (inches)		Wire Diameter (mm)		Standard Diameter Tolerance (mm)	
Over	Including	Cold Drawn Tempers	Annealed Temper	Over	Including	Cold Drawn Tempers	Annealed Temper
0.0300	0.0800	± 0.0003	± 0.001	0.8	2.0	± 0.01	± 0.03
0.0800	0.1250	± 0.0004	± 0.002				
0.1250	0.2500	± 0.0006	± 0.002	2.0	3.8	± 0.02	± 0.05
0.2500	0.3125	± 0.0007	± 0.002				
0.3125	0.5000	± 0.0010	± 0.002	3.8	12.0	± 0.03	± 0.05

Additional tolerances are per ASTM B 250. 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 25 wire may be obtained by calling +1.800.375.4205. For pricing and availability, call +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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