

Alloy 25 (C17200) Rod and Bar

Alloy 25 rod and bar from Materion Performance Alloys provide the highest strength of any copper alloy, with electrical and thermal conductivity considerably greater than other high strength copper alloys. This alloy features high fatigue strength and resistance to wear, corrosion, galling, and stress relaxation. Typical applications include downhole drilling flex shafts, bushings and bearings, circular and coaxial connectors, test probes and compression contacts.



CHEMICAL COMPOSITION (weight percent)

| Alloy | Beryllium | Nickel + Cobalt | Nickel + Cobalt + Iron | Copper |
|--------|-------------|-----------------|------------------------|---------|
| C17200 | 1.80 – 2.00 | 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) |
|-----------------------|-------------------------|--------------------------------------|--|---|------------------------------|
| 19,000 ksi 131 GPa | 1600°F 870°C | 25-30% IACS 5.8-6.9 μΩ-cm | 0.302 lb/in ³ 8.36 g/cm ³ | 9.7×10 ⁻⁶ in/in °F 17.5×10 ⁻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 lbs/in³ (8.30 g/cm³)

MECHANICAL PROPERTIES*

| Temper* | Outer Diameter (Rod) or Thickness (Bar) | | Heat Treatment Required | 0.2% Offset Yield Strength | | Ultimate Tensile Strength | | Elongation |
|-----------|---|-----------|-------------------------|----------------------------|-----------|---------------------------|-----------|------------|
| | inch | mm | | ksi | MPa | ksi | MPa | |
| A (TB00) | 0.030-14 | 0.76-356 | Before Heat Treatment | 20-35 | 130-250 | 60-85 | 410-590 | 20-75 |
| H (TD04) | 0.030-0.375 | 0.76-9.5 | | 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) | >1-3 | >25.4-76 | | 75-105 | 520-720 | 85-120 | 590-830 | 8-20 |
| AT (TF00) | 0.030-3 | 0.76-76 | After 3 hours | 145-175 | 1000-1210 | 165-200 | 1140-1380 | 4-10 |
| AT (TF00) | >3-14 | >76-356 | | 130-175 | 900-1210 | 165-200 | 1140-1380 | 3-10 |
| 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) | >1-3 | >25.4-76 | | 145-190 | 1000-1310 | 175-215 | 1210-1480 | 4-9 |

*Properties may vary by diameter (rod) or thickness (bar). **Rod and Bar typically provided in an annealed or cold drawn temper and heat treated after machining. Only rod or bar greater than 0.4375" (12.0) diameter or thickness may also be purchased in the pre-heat treated condition.

FORMS AVAILABLE

Alloy 25 rod and bar are supplied in straight lengths up to 30 ft (9.1m). Solution annealed tempers are available in diameters/ thicknesses ranging from 0.030" to 14" (0.76 mm to 356 mm) and hard drawn tempers are available in 0.030" to 3" (0.76 mm to 76 mm). Alloy 25 is also available in strip, wire, plate, tube and parts finished by drawing, extrusion, and machining.

SPECIFICATIONS AND STANDARDS

C17200, ASTM B-196, AMS 4533, AMS 4534, AMS 4650, AMS 4651, SAE J 461, SAE J 463, JIS H3270, EN 1654, EN 12163, EN 12165, EN 12167, GB5233, GB4431, BMS 7-353 Type 2, MIL-C-21657

TOLERANCES

| | Rod Diameter or Bar Thickness (inches) | | Standard Tolerance (inches) | | Rod Diameter or Bar Thickness (mm) | | Standard Tolerance (mm) | |
|------------|--|-----------|-----------------------------|--------------|------------------------------------|-----------|-------------------------|--------------|
| | Over | Including | Diameter or Thickness | Out of Round | Over | Including | Diameter or Thickness | Out of Round |
| Cold Drawn | 0.0300 | 0.0800 | ±0.0003 | 0.0003 | 0.76 | 2.0 | ±0.008 | 0.008 |
| | 0.0800 | 0.1250 | ±0.0004 | 0.0004 | 2.0 | 3.2 | ±0.010 | 0.010 |
| | 0.1250 | 0.2500 | ±0.0006 | 0.0004 | 3.2 | 6.4 | ±0.015 | 0.010 |
| | 0.2500 | 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 | | 9.5 | 12.0 | ±0.05 | |
| | 0.500 | 1.00 | ±0.003 | | 12.0 | 25.0 | ±0.08 | |
| | 1.00 | 2.00 | ±0.004 | | 25.0 | 50.0 | ±0.10 | |
| | 2.00 | 3.00 | ±0.2% of Size | | 50.0 | 75.0 | ±0.2% of Size | |
| Hot Worked | 0.750 | 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 196. 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 rod or bar may be obtained by phoning 800-375-4205. For pricing and availability, phone 800-521-8800 for rod >0.5" (12.7 mm) diameter, 800-323-2438 for smaller diameter rod, or the local sales number listed on the bottom of this page.

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 strip ≤0.060" (1.5 mm) thick, wire and rod ≤0.5" (12.7 mm) diameter:

Elmhurst, IL

TOLL FREE: 800-323-2438
PHONE: +(1) 630-832-9650
FAX: +(1) 630-832-9657

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
FAX: +(1) 586-772-2472

International Sales Offices

CHINA/HONG KONG

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