MATERION

Data Sheet

# Alloy 25 (C17200) Plate

Alloy 25 from Materion provides 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 wear plates and other galling resistant components.

## 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 °C to 200 °C) | Thermal Conductivity (25 °C) |
|---|---|---|---|---|---|
| 19,000 ksi<br>131 GPa | 1600 °F<br>870 °C | 25 - 30% IACS<br>5.8 - 6.9 µΩ- cm | 0.302 lb/in$^3$<br>8.36 g/cm$^3$ | 9.7 x 10$^{-6}$ in/in °F<br>17.5 x 10$^{-6}$ m/m °C | 60 BTU/ft hr °F<br>105 W/m K |

*Properties listed 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/in$^3$ (8.30 g/cm$^3$).

## Typical Mechanical Properties*

| Temper* | Plate Thickness | | Heat Treatment Required at | 0.2% Offset Yield Strength | | Ultimate Tensile Strength | | Elongation |
|---|---|---|---|---|---|---|---|---|
| | in | mm | 600 – 675 °F<br>315 – 357 °C | ksi | MPa | ksi | MPa | Percent |
| A (TB00) | 0.5 - 8 | 12.7 - 203.2 | Before Heat Treatment | 20 - 35 | 130 - 250 | 60 - 85 | 410 - 590 | 20 - 75 |
| H (TD04) | 0.188 - 0.375 | 4.8 - 9.5 | | 75 - 105 | 520 - 720 | 90 - 130 | 620 - 900 | 8 - 20 |
| H (TD04) | > 0.375 - 1 | > 9.5 - 25.4 | | 75 - 105 | 520 - 720 | 90 - 125 | 620 - 860 | 8 - 20 |
| H (TD04) | > 1 - 2 | > 25.4 - 51 | | 75 - 105 | 520 - 720 | 85 - 120 | 590 - 830 | 8 - 20 |
| H (TD04) | > 2 - 3 | > 51 - 76 | | 75 - 105 | 520 - 720 | 85 - 120` | 590 - 830 | 8 - 20 |
| AT (TF00) | 0.5 - 8 | 12.7 - 203.2 | After 3 Hours | 140 - 175 | 970 - 1200 | 165 - 200 | 1140 - 1380 | 3 - 10 |
| HT (TH04) | 0.188 - 0.375 | 4.8 - 9.5 | After 2 Hours | 160 - 200 | 1100 - 1380 | 180 - 215 | 1240 - 1490 | 1 - 5 |
| HT (TH04) | > 0.375 - 1 | > 9.5 - 25.4 | | 155 - 200 | 1060 - 1380 | 180 - 220 | 1240 - 1520 | 1 - 5 |
| HT (TH04) | > 1 - 2 | > 25.4 - 51 | | 150 - 200 | 1030 - 1380 | 175 - 215 | 1200 - 1490 | 2 - 5 |
| HT (TH04) | > 2 - 3 | > 51 - 76 | | 130 - 180 | 890 - 1250 | 165 - 200 | 1140 - 1380 | 2 - 5 |

*Properties may vary by thickness.

## Forms Available

Alloy 25 plate is supplied in lengths from 24” to 126” (610 to 3200 mm), and in widths from 12 to 22 inches (305 to 559 mm). Solution annealed tempers are available in thicknesses ranging from 0.5" to 8" (12.7 to 203.2 mm) and cold rolled tempers are available from 0.188" to 1.25" (4.8 mm to 32 mm). Alloy 25 is also available in strip, wire, rod, bar, tube, and parts finished by drawing, extrusion, and machining.

## Industry Standards and Specifications

UNS# C17200, ASTM B-194, AMS 4530, AMS 4533, AMS 4534, AMS 4650, AMS 4651, SAE J 461, SAE J 463, JIS H3130

## Tolerances

| Plate Thickness (inches) | | Standard Thickness Tolerance (inches) | | Plate Thickness (mm) | | Standard Thickness Tolerance (mm) | |
|---|---|---|---|---|---|---|---|
| Over | Including | Plus | Minus | Over | Including | Plus | Minus |
| 0.188 | 0.205 | 0.020 | 0 | 4.8 | 5.2 | 0.5 | 0 |
| 0.205 | 0.300 | 0.024 | 0 | 5.2 | 7.6 | 0.6 | 0 |
| 0.300 | 0.500 | 0.030 | 0 | 7.6 | 13 | 0.8 | 0 |
| 0.500 | 0.750 | 0.038 | 0 | 13 | 20 | 1.0 | 0 |
| 0.750 | 1.00 | 0.046 | 0 | 20 | 25 | 1.2 | 0 |
| 1.00 | 1.50 | 0.056 | 0 | 25 | 40 | 1.4 | 0 |
| 1.50 | 3.00 | 0.066 | 0 | 40 | 76 | 1.7 | 0 |
| 3.00 | 8.00 | 0.125 | 0 | 76 | 203 | 3.2 | 0 |

Additional tolerances are per ASTM B 248. 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 plate may be obtained by phoning +1.800.375.4205.

## 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.



**MATERION Alloys and Composites**
6070 Parkland Boulevard
Mayfield Heights, OH 44124 USA

**Contact Us:**
materion.com/ContactPAC
1.800.375.4205

**MATERION Global Headquarters**
6070 Parkland Boulevard
Mayfield Heights, OH 44124 USA

 