MATERION

Data Sheet

Alloys 25 (C17200) and 165 (C17000) Forgings and Extrusions

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. Alloy 165 provides strength close to that of Alloy 25, with slightly lower beryllium content. These alloys feature high fatigue strength and resistance to wear, corrosion, galling and stress relaxation. Typical applications for parts finished by forging or extrusion of these alloys include undersea instrument and repeater housings, generator rings and resistance welding components.

Chemical Composition (Weight Percent)

Alloy	Beryllium	Nickel + Cobalt	Nickel + Cobalt + Iron	Copper
25 (C17200)	1.80 - 2.00	0.20 min.	0.6 max.	Balance
165 (C17000)	1.60 - 1.85	0.20 min.	0.6 max.	Balance

Physical Properties*

Alloy	Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)
25	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 °C
165	19,000 ksi 131 GPa	1600°F 870°C	25 - 30% IACS 6.2 - 7.8 µΩ-cm	0.304 lb/in^3 8.41 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/in^3 (8.30 g/cm^3) for Alloy 25 and 0.302 lb/in^3 (8.36 g/cm^3) for Alloy 165.

Mechanical Properties*

Alloy	Temper*	Heat Treatment Required	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation	Hardness
		625°F 330°C	ksi	MPa	ksi	MPa	Percent	HRB or HRC
25	A (TB00)	Before Heat Treatment	20 - 40	130 - 280	60 - 85	410 - 590	20 - 75	B45 - B85
25	AT (TF00)	After 3 hours	130 - 175	890 - 1210	165 - 200	1140 - 1380	3 - 10	C36 - C42
165	A (TB00)	Before Heat Treatment	25 - 35	130 - 250	60 - 85	410 - 590	20 - 60	B45 - B85
165	AT (TF00)	After 3 hours	120 - 155	830 - 1070	150 - 190	1030 - 1310	3 - 10	C32 – C29

*Properties may vary by size.

Industry Standards and Specifications

Alloy 25: C17200, ASTM B570, AMS 4650, SAE J461, SAE J463, EN12153, EN 12420

Alloy 165: C17000, ASTM B570, SAE J461, SAE J463

Related Information

Additional technical or safe handling information on parts made by forging or extrusion from Alloy 25 or Alloy 165 may be obtained by phoning +1.800.375.4205. For pricing and availability, phone +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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