

## Alloy 165 (C17000) Mill Hardened Strip

Materion's Alloy 165 strip provides strength and conductivity close to Alloy 190 strip, with slightly less beryllium. This alloy features excellent stress relaxation resistance and high fatigue strength. Typical applications include high reliability spring contacts for switches and relays, battery contacts and automotive terminals.

### Chemical Composition (Weight Percent)

Alloy	Beryllium	Nickel + Cobalt	Nickel + Cobalt + Iron	Copper
C17000	1.60 - 1.85	0.2 min.	0.6 max.	Balance

### Typical 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	18 - 33% IACS 5.2 - 9.6 μΩ-cm	0.304 lb/in <sup>3</sup> 8.41 g/cm <sup>3</sup>	9.7 x 10 <sup>-6</sup> in/in °F 17.0 x 10 <sup>-6</sup> m/m °C	60 BTU/ft hr °F 105 W/ m K

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

### Typical Mechanical Properties\*

Temper	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation**	Hardness	Formability (Minimum Bend Radius to Thickness Ratio for a 90° Bend)***	
	ksi	MPa	ksi	MPa			Longitudinal	Transverse
AM (TM00)	70 - 95	485 - 655	100 - 110	690 - 760	18 - 30	225 - 251	1.0	1.0
¼ HM (TM01)	80 - 110	550 - 760	110 - 120	760 - 825	15 - 25	230 - 271	1.5	1.7
½ HM (TM02)	95 - 125	655 - 860	120 - 135	825 - 930	12 - 22	257 - 301	1.9	2.2
HM (TM04)	110 - 135	760 - 930	135 - 150	930 - 1035	9 - 20	285 - 343	3.8	5.1
SHM (TM05)	125 - 140	860 - 965	150 - 160	1035 - 1110	9 - 18	309 - 363	5.0	7.7
XHM (TM06)	135 - 170	930 - 1140	155 - 175	1070 - 1205	3 - 15	317 - 378	6.1	10.4

\*Properties may vary by thickness.

\*\*Percent elongation valid only for strip 0.004" (0.10 mm) and thicker.

\*\*\*Formability numbers valid for strip 0.010" (0.25 mm) and thinner.

### Forms Available

Alloy 165 strip is available in widths ranging from 0.050" to 16" (1.27 to 452.7 mm) and in thicknesses ranging from 0.002" to 0.040" (0.05 to 1.0 mm). Thicker gauges may be produced at substantially reduced formability. Alloy 165 is also available in rod, bar, plate, tube and parts finished by forging or extrusion.

## Industry Standards and Specifications

C17000, ASTM B194, NACE MRO175/ISO 15156

## Related Information

Additional technical information on Alloy 165 strip may be obtained by calling +1.800.375.4205. For pricing and availability, call +1.800.521.8800.

## Tolerances

Strip Thickness (inches)		Standard Thickness Tolerance (inches)	Strip Thickness (mm)		Standard Thickness Tolerance (mm)
Over	Including	Plus or Minus	Over	Including	Plus or Minus
	0.0020	0.00010		0.05	0.003
0.0020	0.0040	0.00015	0.05	0.10	0.004
0.0040	0.0060	0.00020	0.10	0.20	0.006
0.0060	0.0090	0.00025	0.20	0.30	0.008
0.0090	0.0130	0.00030	0.30	0.70	0.010
0.0130	0.0260	0.00040	0.70	1.00	0.016
0.0260	0.0370	0.00060	1.00	1.30	0.020
0.0370	0.0500	0.00080	1.30	2.00	0.025
0.0500	0.0750	0.00100			

Additional tolerances are per ASTM B194. 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.

## 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](http://berylliumsafety.com), [berylliumsafety.eu](http://berylliumsafety.eu) and [Materion.com](http://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](mailto: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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