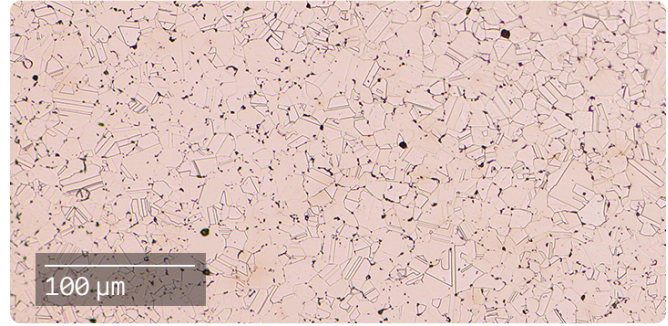


[Material Data Sheet]

Pure Copper

Commercially Pure Copper, 99.95%+


COMPOSITION % (AISI/SAE 4140)

Cu	> 99.95
Fe	0.01
C	0.03
O	< 0.01
Others (total)	< 0.01

OTHER STANDARD DESIGNATIONS

Cu 99.95% O < 300 ppm
C10300

MECHANICAL PROPERTIES

	Standard	Production System™ As-Sintered
Ultimate tensile strength ¹ (MPa)	ASTM E8	174 ± 5
Yield strength ¹ (MPa)	ASTM E8	37 ± 3
Elongation at break (%)	ASTM E8	28 ± 5
Coefficient of thermal expansion (°C ⁻¹)	ASTM E223 20 – 38 °C	17.36
	ASTM E223 20 – 66 °C	17.35
	ASTM E223 20 – 93 °C	17.27
	ASTM E223 20 – 121 °C	17.06
	ASTM E223 20 – 149 °C	17.10
Electrical conductivity ² (%IACS)	ASTM E1004	90 ± 1
Thermal conductivity (W/m-K)	ASTM E1461-13	349 ± 7
Density (g/cc)	ASTM B311	8.65 ± 0.05
Surface Finish ³ (μm Ra)	ISO 4287	3 – 12

ATTRIBUTES & APPLICATIONS

96–97% Theoretical density, 99.95% Copper purity enabling key electrically and thermally conductive applications with Additive design constructed in unibody form coupled with unparalleled flexibility & economics of Single Pass Jetting.

Superior thermal conductivity enabling thermal hardware for both liquid and air cooling systems (cold plates, cold pucks, heat exchangers & sinks, manifolds)

Superior electrical conductivity enabling high frequency transmission of current (coils, bus bar components, powertrain components, induction heating coils)

Components for high power compact electronics across multiple market segments such as mobility, super computing powering cloud and artificial intelligence systems and HVAC across industrial and consumer systems.

- YS & UTS properties noted represent mean values across Xy orientation.
- Cubes with side lengths of 14 mm were used for electrical conductivity measurements.
- Surface roughness measured after sintering; low end is top surface and high end is z direction.