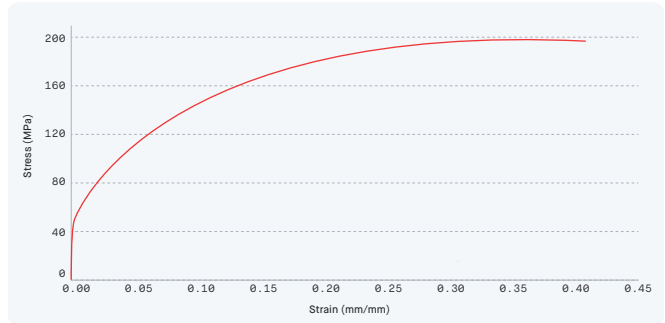


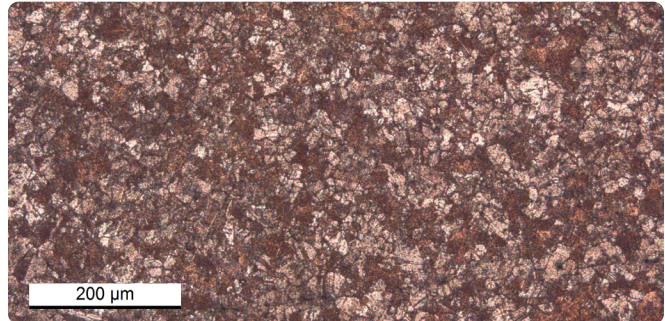
[Material Data Sheet]

Copper



COMPOSITION %

Cu	99.9
O	0.01
Other	Balance



PERFORMANCE

	Standard	Studio System™ As-Sintered	MIM - MPIF 35 typ ¹ As-Sintered
Electrical conductivity	ASTM E1004	85.2 %IACS	n/a
Coefficient of thermal expansion (CTE)	ASTM E228 20 - 38 °C	17.01 *10 ⁻⁶ /°C	15.7 *10 ⁻⁶ /°C
	ASTM E228 20 - 66 °C	17.15 *10 ⁻⁶ /°C	16 *10 ⁻⁶ /°C
	ASTM E228 20 - 93 °C	17.22 *10 ⁻⁶ /°C	16.4 *10 ⁻⁶ /°C
	ASTM E228 20 - 121 °C	17.33 *10 ⁻⁶ /°C	16.7 *10 ⁻⁶ /°C
	ASTM E228 20 - 149 °C	17.43 *10 ⁻⁶ /°C	16.9 *10 ⁻⁶ /°C

MECHANICAL PROPERTIES

	Standard	Studio System™ As-Sintered	MIM - MPIF 35 typ ¹ As-Sintered
Ultimate tensile strength (MPa)	ASTM E8M	195	207
Yield strength (MPa)	ASTM E8M	45	69
Elongation (%)	ASTM E8M	37	30
Density (g/cc)	ASTM B311	8.75	8.5 (min)

1. Per MPIF Standard 35, Materials Standards for Metal Injection Molded Parts (MPIF 35-MIM, 2018). End-use material performance is impacted (+/-) by certain factors including but not limited to part geometry and design, application and evaluation conditions, etc.

End-use material performance is impacted (+/-) by certain factors including but not limited to part geometry and design, application and evaluation conditions, etc. Tensile properties, density, and electrical conductivity data reported are mean values minus 1 sigma.