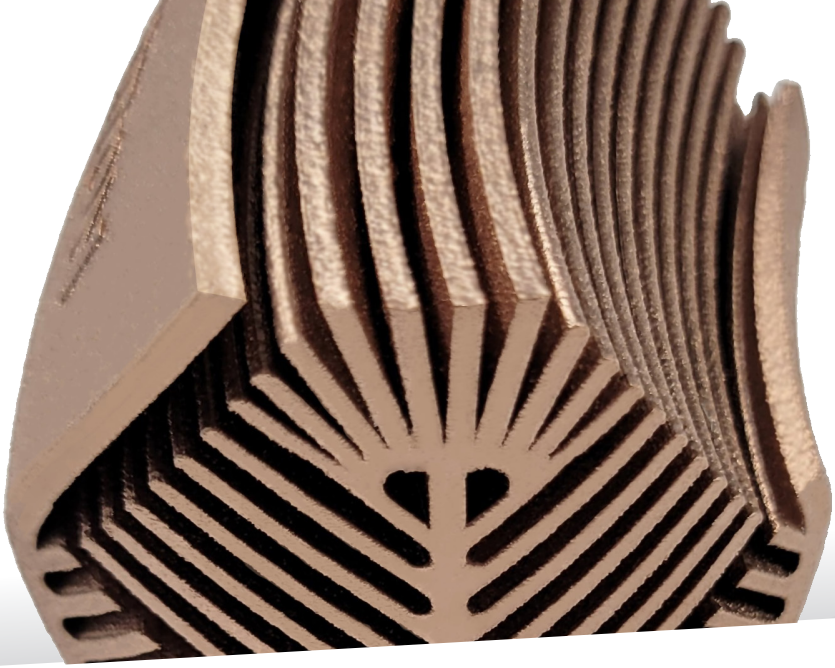


Certified CuCr2.4 (A)

Certified CuCr2.4 (A) is a copper alloy offering improved strength and printability while retaining high thermal and electrical conductivity. 3D Systems offers application development and part production using the integrated additive manufacturing (AM) workflow software, 3DXpert® and the DMP Flex and DMP Factory 350 metal 3D printers. 3D Systems' Certified CuCr2.4 parameters were developed, tested and optimized on real applications in our AS9100/ISO9001 part production facilities, which have the unique distinction of printing more than 1,000,000 challenging metal production parts in various materials, year over year.

For companies looking to develop new applications and processes with Certified CuCr2.4, our Application Innovation Group (AIG) can support and accelerate application development as well as tune the heat treatment to the application needs.

Theoretical Build Rate of 19 cc/hour

Part height	61 mm
Print time	7.8 h (Batch size: 1)
Layer thickness	60 µm
Surface roughness Ra	Steady value of 20 µm for angled surfaces ranging from 0° to 90° [2]

Typical Applications

- Heat management and cooling systems
- Conductive contacts
- Induction coils
- Combustion chambers
- Structural engine parts
- Other high-conductivity applications

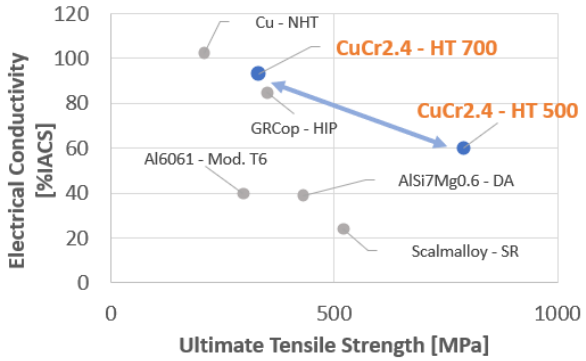
Material Description

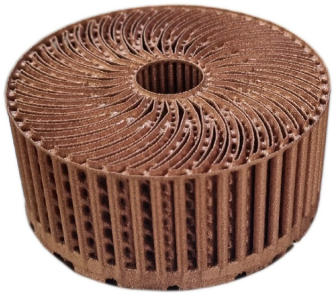
Certified CuCr2.4 is a precipitation hardenable copper alloy. It is stronger than pure copper, also at elevated temperatures, while retaining very high electrical and thermal conductivity.

The addition of chromium to copper increases the laser absorptivity and optimizes thermal conductivity in as printed condition, making the powder easy to process. By annealing the printed parts, the conductivity can be increased to meet the application specific requirements.

Two heat treatments are suggested but these can be tailored further if needed, balancing mechanical properties and conductivity

Electrical Conductivity up to 93% IACS[1]

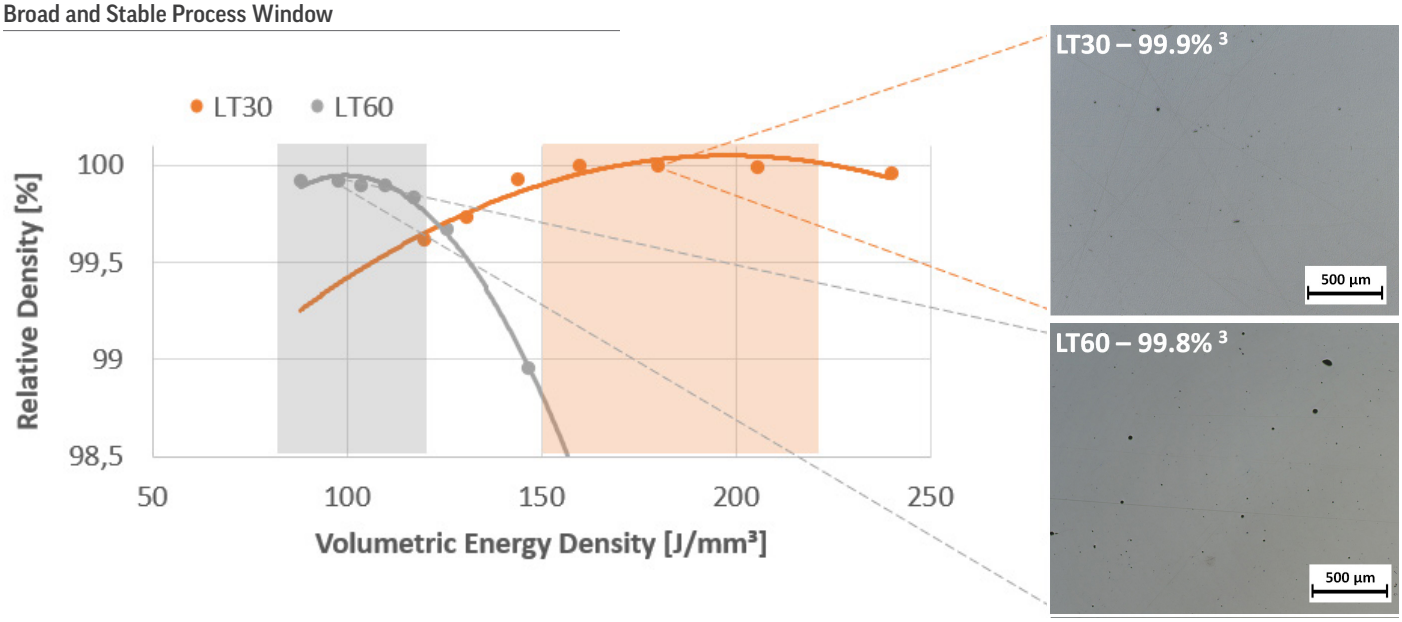




Part height	34.5 mm
Print time	4.5 h (Batch size: 1)
Layer thickness	60 µm

1 Electrical conductivity measured according to ASTM B193. IACS = International Annealed Copper Standard.
2 No surface treatment applied, measured in as printed condition according to ISO 25178.

Broad and Stable Process Window



Heat Exchangers with a Thermal Conducivity up to 390 W/mK[4]

3D printing is a versatile production process that enables the creation of complex shapes with high surface area-to-volume ratios. This flexibility, together with the high thermal conductivity of Certified CuCr2.4, maximizes the thermal efficiency for different types of heat exchanger applications.

Part height	101 mm
Print time	4 h (Batch size: 1)
Layer thickness	60 µm

DMP FLEX 350, DMP FACTORY 350[1,5]	HEAT TREATEMENT 500°C		HEAT TREATEMENT 700°C	
	23°C	427°C	23°C	427°C
Ultimate tensile strength (MPa | ksi)	790 | 114	312 | 45	330 | 48	142 | 20
Yield strength Rp0.2% (MPa | ksi)	725 | 105	278 | 40	222 | 32	138 | 20
Plastic elongation (%)	11	1.0	27	12
Electrical conductivity (% IACS)	~ 61	-	~ 93	-

3 Values based on a limited sample population (<15). Values shown are typical values from density test coupons, may deviate depending on specific part geometry.
4 Calculated with the Wiedemann-Franz law and based on 93% IACS which was measured on printed parts according to ASTM B193.
5 Values based on a limited sample population (<15). Mechanical properties tested using horizontally and vertically oriented ASTM E8 type 4 specimens printed in LT30 and LT60. Tests were conducted at 23°C and at 427°C according to ASTM E21 (soaking time = 20 minutes).

To confirm the suitability of this material for your specific application, please contact the 3D Systems Application Innovation Group (AIG): https://www.3dsystems.com/consulting/application-innovation-group

CuCr2.4 powder with product reference MA-CCR25H can be purchased directly from Mitsui-Kinzoku: kinoufun@mitsui-kinzoku.com