



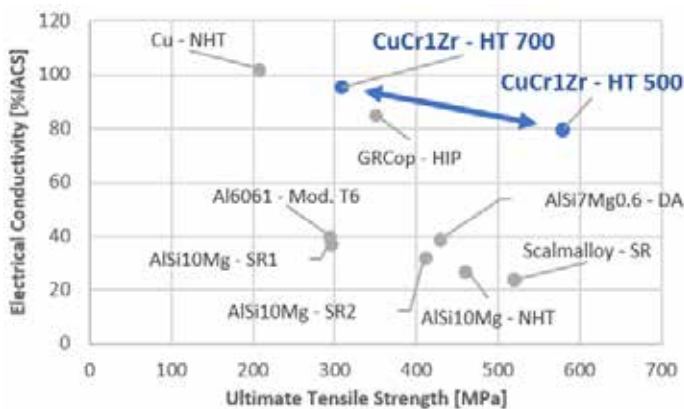
## Certified CuCr1Zr (A)

Certified CuCr1Zr (A) is a high strength copper alloy with electrical conductivity that can exceed 90% IACS when applying the appropriate heat treatment.

3D Systems offers application development and part production using the integrated additive manufacturing (AM) workflow software, 3DXpert®, and the DMP Flex and Factory 350 metal 3D printers. 3D Systems' Certified CuCr1Zr parameters were developed, tested, and optimized on real heat management applications in cooperation with 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 CuCr1Zr, our Application Innovation Group (AIG) can support and accelerate application development.

### Electrical Conductivity exceeding 90% IACS<sup>1</sup>



### Typical Applications

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

1. Electrical Conductivity measured according to ASTM B193. IACS = International Annealed Copper Standard. Values based on a limited sample population (<10).  
 2. Relative density values shown are typical values from density test coupons and may deviate depending on specific part geometry. Values based on a limited sample population (<10).

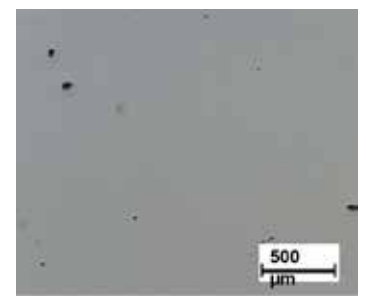
### Material Description

Certified CuCr1Zr is a standard alloy that has been used in traditional manufacturing for a long time. The addition of chromium improves the mechanical properties by precipitation strengthening. Zirconium is reported to enhance the resistance to stress relaxation of the Cu-Cr alloy.

3D Systems offers this standard alloy, compliant to UNS C18150 and EN CW106C requirements, now as a solution for additive manufacturing. The extremely low oxygen environment of the DMP Flex and Factory 350 vacuum chamber architecture minimizes oxygen pickup, ensuring the best conductivity properties.

Different heat treatments can be applied for balancing strength and conductivity. Our AIG professionals have the experience to select the appropriate heat treatment to meet your application requirements.

### Layer Thickness 30 Relative Density Typically 99.7%<sup>2</sup>



Part height	39 mm
Print time	6 h (Batch size: 1)
Layer thickness	30 µm
Surface roughness Ra	Typically 20 µm for vertical surfaces <sup>3</sup>



Part height	33 mm
Print time	2.5 h (Batch size: 1)
Layer thickness	30 µm

## Mechanical Properties can be Finetuned

DMP FLEX 350, DMP FACTORY 350 - LT30 <sup>1,4</sup>	TEST METHOD	HEAT TREATMENT 500°C	HEAT TREATMENT 700°C
Ultimate tensile strength (MPa   ksi)	ASTM E8	580   84	305   44
Yield strength Rp0.2% (MPa   ksi)		490   71	170   24
Plastic elongation (%)		25	35
Electrical conductivity (% IACS)	ASTM B193	80	94

## Increase System Efficiency with 3DXpert Designs

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 and electrical conductivity of Certified CuCr1Zr, maximizes the efficiency for different types applications:

### HEAT EXCHANGERS

3DXpert has features specifically developed for the design of heat exchanger systems with complex internal geometries. Define patterns or structures and generate baffles automatically. Tie these definitions to separate volumes, define inlets and outlets and optimize via integrated analysis along volumes, areas or sections.

### INDUCTION COILS

Design induction coils that simultaneously benefit from the high thermal conductivity and 3D printing design freedom to optimize internal cooling channels and maximize coil performance.

### ELECTRICAL CONTACTS

Marrying strength and electrical conductivity renders Certified CuCr1Zr an ideal solution for complex electrical contacts or small series production.



Part height	76 mm
Print time	4 h (Batch size: 1)
Layer thickness	30 µm

<sup>4</sup> Mechanical properties tested using horizontally oriented ASTM E8 type 4 specimens printed with layer thickness 30 µm. Values based on a limited sample population (<5).

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>