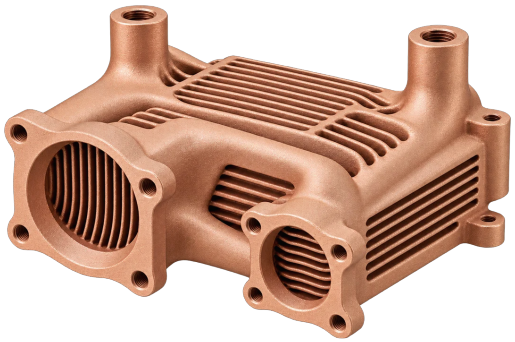
DIRECT METAL LASER SINTERING

Copper CuCrZr

High-Conductivity Copper Alloy for Thermal and Electrical Parts



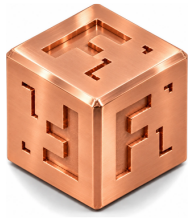
Copper CuCrZr is a chromium-zirconium copper alloy that combines high electrical and thermal conductivity with good mechanical properties after heat treatment. Printed by DMLS, rocket engine parts, heat exchangers and induction coils come out as one part with their cooling channels inside, instead of a machined and brazed assembly.

SURFACE FINISHES



Standard Finish Natural

Supports are carefully removed and parts are shot peened to a uniform matte surface, which also helps relieve residual stresses. Critical features may receive light machining for tighter tolerances.



Machining & Polishing Enhanced

Precision machining and polishing enhance surface quality for critical applications, achieving tighter tolerances and a smooth, high-gloss metallic finish.



Performance Paint Premium

An automotive-grade coating that enhances aesthetics and durability. Each part is hand-finished with professional-grade equipment for exceptional adhesion, in matte to semi-gloss with custom colour matching.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
250 × 250 × 325 mm	From 12 business days	0.08 mm	±0.3% (min ±0.3 mm)

MECHANICAL PROPERTIES

Copper CuCrZr trades some strength for conductivity, so the condition a part ships in matters more than it does for steel. The first rows give EOS M 290 values as manufactured and heat treated; the conductivity-optimized and tensile-optimized rows show how far each EOS heat treatment moves strength, ductility, stiffness and hardness.

Every condition stays ductile, which suits coils, liners and thin-walled exchangers that see repeated thermal cycling. After the conductivity-optimized cycle, horizontal values run higher than vertical ones, so orient load paths along the build plate where strength matters.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength (Heat Treated)	**340 MPa**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Yield Strength Rp0.2 (Heat Treated)	**210 MPa**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Elongation at Break (Heat Treated)	**25 %**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Tensile Strength (As Manufactured)	**210 MPa**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Yield Strength Rp0.2 (As Manufactured)	**160 MPa**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Elongation at Break (As Manufactured)	**40 %**	EN ISO 6892-1 (EOS M 290 1kW, 80 µm)
Tensile Strength, Conductivity-Optimized HT (Horizontal / Vertical)	**410 / 350 MPa**	ISO 6892-1 (EOS M 400-1, 80 µm)
Yield Strength Rp0.2, Conductivity-Optimized HT (Horizontal / Vertical)	**255 / 230 MPa**	ISO 6892-1 (EOS M 400-1, 80 µm)
Elongation at Break, Conductivity-Optimized HT (Horizontal)	**30 %**	ISO 6892-1 (EOS M 400-1, 80 µm)
Elongation at Break, Conductivity-Optimized HT (Vertical)	**36 %**	ISO 6892-1 (EOS M 400-1, 80 µm)
Elastic Modulus, Conductivity-Optimized HT (Horizontal / Vertical)	**130 / 115 GPa**	EN ISO 6892-1 Method A (EOS M 400-1, 80 µm)
Tensile Strength, Tensile-Optimized HT (Horizontal / Vertical)	**590 / 540 MPa**	ISO 6892-1 (EOS M 400-1, 80 µm)
Yield Strength Rp0.2, Tensile-Optimized HT (Horizontal / Vertical)	**510 / 495 MPa**	ISO 6892-1 (EOS M 400-1, 80 µm)
Elongation at Break, Tensile-Optimized HT (Horizontal and Vertical)	**18 %**	ISO 6892-1 (EOS M 400-1, 80 µm)
Elastic Modulus, Tensile-Optimized HT (Horizontal / Vertical)	**120 / 125 GPa**	EN ISO 6892-1 Method A (EOS M 400-1, 80 µm)
Hardness, Conductivity-Optimized HT	**120 HV10**	ISO 6507-1 (EOS M 400-1, 80 µm)
Hardness, Tensile-Optimized HT	**190 HV10**	ISO 6507-1 (EOS M 400-1, 80 µm)

THERMAL PROPERTIES

EOS publishes the two ageing cycles behind the heat-treated values. Both run under an inert gas atmosphere and end with slow cooling, and the choice between them sets the balance of conductivity and strength in the finished part.

In copper alloys, thermal conductivity rises and falls with electrical conductivity, so the electrical rows are the guide to how well a part moves heat in each condition.

PROPERTY	VALUE	TEST STANDARD
Ageing, Conductivity-Optimized (3 h, inert gas, slow cool below 100 °C)	**550 °C**	EOS heat treatment
Ageing, Tensile-Optimized (1 h, inert gas, slow cool below 100 °C)	**490 °C**	EOS heat treatment

PHYSICAL PROPERTIES

Part density and the low defect percentage describe a near-solid copper part, which matters for pressure-tight channels and for conductivity, since porosity interrupts the path for heat and current. The minimum wall thickness sets the thinnest fin or channel wall the process builds.

Surface roughness depends on orientation: vertical faces are the smoothest, while down-facing surfaces grow much rougher as they flatten, so internal channels are best oriented steeply or sized with that in mind. The composition rows are the EOS powder limits, and solid parts match the powder chemistry.

PROPERTY	VALUE	TEST STANDARD
Part Density	**≥ 8.84 g/cm³**	EN ISO 3369
Average Defect Percentage	**0.2 %**	EOS method
Minimum Wall Thickness	**0.8 mm**	EOS M 400-1, 80 µm
Surface Roughness Ra, As Manufactured (vertical faces)	**≈ 14 µm**	EOS MDS chart (EOS M 400-1, 80 µm)
Surface Roughness Ra, As Manufactured (45° down-skin)	**≈ 49 µm**	EOS MDS chart (EOS M 400-1, 80 µm)
Chemical Composition	**Corresponds to C18150 / CW106C**	EOS MDS
Copper (Cu)	**Balance**	EOS MDS
Chromium (Cr)	**0.45–1.15 wt%**	EOS MDS
Zirconium (Zr)	**0.05–0.25 wt%**	EOS MDS
Iron (Fe)	**≤ 0.08 wt%**	EOS MDS

ELECTRICAL PROPERTIES

Electrical conductivity is the headline property of Copper CuCrZr, given in % IACS, relative to the International Annealed Copper Standard. As-manufactured parts conduct far less than heat-treated ones, so parts that carry heat or current should be aged after printing.

EOS measured these values with the eddy-current method of ASTM E1004-17 on sample cubes, reading each cube from five faces.

PROPERTY	VALUE	TEST STANDARD
Electrical Conductivity (Heat Treated)	**> 80 % IACS**	ASTM E1004-17 (EOS M 290 1kW, 80 µm)
Electrical Conductivity (As Manufactured)	**> 20 % IACS**	ASTM E1004-17 (EOS M 290 1kW, 80 µm)
Electrical Conductivity, Conductivity-Optimized HT	**88 % IACS**	ASTM E1004-17 (EOS M 400-1, 80 µm)
Electrical Conductivity, Tensile-Optimized HT	**76 % IACS**	ASTM E1004-17 (EOS M 400-1, 80 µm)
Electrical Conductivity, As Manufactured (M 400-1)	**23 % IACS**	ASTM E1004-17 (EOS M 400-1, 80 µm)

COMPLIANCE

EOS states that the chemical composition of CuCrZr corresponds to C18150 and European CW106C, the chromium-zirconium coppers already called out on drawings, so specifications can be checked against supplier data.

These entries describe chemistry rather than product certification. EOS does not develop or certify the powder as a medical device.

STANDARD	STATUS
UNS C18150 (CuCr1Zr) EOS states the chemical composition corresponds to C18150 chromium-zirconium copper	Composition per EOS
CW106C (CuCr1Zr) EOS states the chemical composition corresponds to European CW106C	Composition per EOS

MANUFACTURING

Heat treatment	**Conductivity- or tensile-optimized ageing**