



# Certified CuNi30 (A)

CuNi30 is a low-conductive copper alloy offering excellent corrosion resistance in salt water, good strength and ductility, and exhibiting stable material properties in cryogenic environments. Powder chemistry is in accordance with UNS 96400.

3D Systems offers a print parameter database license for Certified CuNi30 (A) on the DMP Flex and Factory 350 metal 3D printers that can be applied using the integrated additive manufacturing workflow software, 3DXpert. The print parameter database license available for CuNi30 has been developed in a close collaboration between 3D Systems and Huntington Ingalls Industries' Newport News Shipbuilding division.

For companies looking to develop new applications and processes with CuNi30, please contact the 3D Systems Application Innovation Group (AIG).

## Material Description

This copper alloy with 30 wt.% nickel (UNS 96400) exhibits excellent corrosion resistance especially in salt water, steam, and acidic environments. CuNi30 exhibits stable mechanical, physical, and thermal properties ranging from high temperatures (400 °C) to cryogenic temperatures (-270 °C).

CuNi30 is a single-phase material, in which the high solubility of nickel in copper results in outstanding corrosion resistance with low conductivity properties. The high nickel content improves the printability of the copper alloy. The additions of Fe and Nb ensures an excellent combination of strength and ductility.

## Typical Mechanical Properties

DMP FLEX 350, DMP FACTORY 350 – LT 30 <sup>1,2,3</sup>	TEST METHOD	METRIC	US	UNS 96400
Ultimate tensile strength (MPa   ksi   ksi)	ASTM E8	515	75	60
Yield strength Rp0.2% (MPa   ksi   ksi)		440	64	32
Plastic elongation (%)		28	28	20

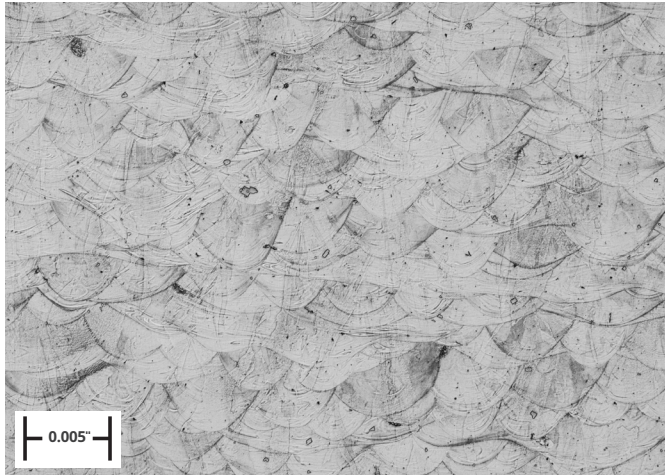
## Typical Printed Part Properties

DMP FLEX 350, DMP FACTORY 350 – LT 30 <sup>3</sup>	TEST METHOD	METRIC	US
Relative density (%)	Optical method (pixel count)	99.8	99.8
Surface Roughness - Vertical side surface (µm   µin)	Contact profilometer	10, typical	393, typical
Hardness (Rockwell B)	ASTM E18	82.3	

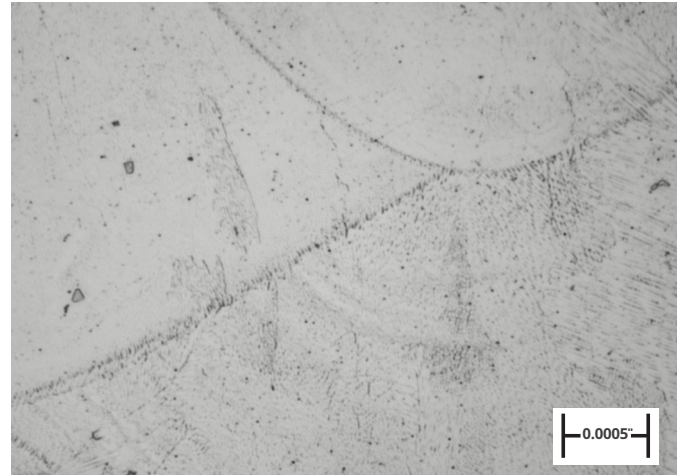
<sup>1</sup> No Heat Treatment.  
<sup>2</sup> Machined and tested according to ASTM E8 using round tensile test specimen type 4. Typical values, averaged over 3 vertical and 3 horizontal tensile coupons.  
<sup>3</sup> Parts manufactured with standard parameters and protocols on DMP ProX 320, Config B using layer thickness 30 µm. May deviate depending on specific part geometry. The standard part parameters are compatible with DMP Flex 350, DMP Factory 350 and DMP ProX 320 machines. The standard parameters are targeting maritime applications.

## As-Printed Microstructure:

Homogeneous, fine-grained microstructure yielding outstanding corrosion resistance and excellent strength exceeding UNS 96400 requirements.



100x magnification



1000x magnification

## Application Focus:

### MARITIME, SHIPBUILDING & REPAIR — PIPE FITTINGS & FLANGES

CuNi30 is a well-known reference material for marine applications, thanks to its outstanding corrosion resistance in salt water and anti-algae properties. Direct Metal Printing (DMP) drastically reduces the lead time for small-volume or repair components such as pipe reducers, pipe couplings, and pipe elbows.

### OFFSHORE OIL & GAS — PUMPS & VALVES

CuNi30 offers excellent corrosion resistance in salt water, petroleum and corrosive gases.

### CRYOGENIC, CHEMICAL & NUCLEAR EQUIPMENT — COOLING TUBES & GUIDES

Exploit the stress-corrosion resistance and stable mechanical, physical, and thermal properties of the CuNi30 alloy, ranging from high temperatures (400 °C) to cryogenic temperatures (-270 °C).

### SIMPLIFIED ASSEMBLY IN 3DXPERT

Benefit from the 3DXpert automated nesting features to simplify assembly during build file preparation of cylindrical and ring-shaped components, such as pipe fittings.



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>

CuNi30 powder with product reference "Cu-190-N40" can be purchased directly from Praxair: <https://www.praxairsurfacetechologies.com/en/materials-and-equipment/materials/additive-manufacturing-powders>

3D Systems thanks Huntington Ingalls Industries' Newport News Shipbuilding Division for this fruitful, application-driven collaboration