

### Introduction

PowderRange metal Additive Manufacturing powders from Carpenter Additive are developed with the needs of the busy AM facility in mind.

- ▶ Easy ordering
- ▶ Standard specifications
- ▶ 24-hour shipment
- ▶ Sold in easy-to-handle multiples of 10 kgs
- ▶ Easy repeat orders to optimize inventory management

This leaves you free to concentrate on the design and build of your AM parts, confident that PowderRange metal AM powders from Carpenter Additive will add reliability and consistency to your AM built parts.

### Characteristics

PowderRange XLC is a solid solution strengthened nickel-chromium-iron base superalloy and is a low carbon equivalent of Hastelloy® X. It is not considered precipitation hardenable and achieves optimum material properties through solution treatments. It possesses high strength at room and elevated temperatures and exceptional oxidation and stress-corrosion cracking resistance

PowderRange XLC displays significantly reduced crack susceptibility compared to the nominal Hastelloy® X composition. Its low carbon content and additional solid solution strengthening maximises its compatibility with laser AM processing. Although solution treatment is required for optimum high temperature performance, as processed PowderRange XLC displays mechanical properties equivalent to wrought material at both room and elevated temperatures.

### Applications

Widely used throughout multiple industries including aerospace and petrochemical due to its properties at elevated temperatures. For aerospace, this includes components for combustion zones in gas turbine engines, and in the chemical industry, furnace baffles and flash drier components.



For worldwide contact details please visit [www.carpenteradditive.com](http://www.carpenteradditive.com)

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## Chemical composition

Element		Minimum wt%	Maximum wt%
C	Carbon	0.05	0.15
Co	Cobalt	0.50	2.50
Mn	Manganese		1.00
Si	Silicon		1.00
P	Phosphorus		0.040
S	Sulfur		0.030
Cr	Chromium	20.50	23.0
Mo	Molybdenum	8.0	10.0
W	Tungsten	0.6	1.0
Fe	Iron	17.0	20.0
B	Boron		0.01
Cu	Copper		0.15
Ni	Nickel		Balance
O	Oxygen		0.03
N	Nitrogen		0.03

## Particle size distribution- CT PowderRange XLC F

Size	Value	Method
-15 µm	5 Volume %	Laser Size Diffraction
+45 µm	3 Weight %	Sieve Analysis
D10	18-24 µm	Laser Size Diffraction
D50	32.5-34.4 µm	Laser Size Diffraction

### Mechanical properties (indicative only)

Property		As built (room temperature)	As built (@760 °C)
Tensile Strength [1]	Horizontal Direction (XY)	800 - 950 MPa 116 - 138 ksi	550 - 750 MPa 80- 109 ksi
	Vertical Direction (Z)	625 - 725 MPa 91- 105 ksi	500 - 700 MPa 73- 102 ksi
Yield Strength [1]	Horizontal Direction (XY)	675 - 800 MPa 98- 116 ksi	400 - 550 MPa 58- 80 ksi
	Vertical Direction (Z)	500 - 600MPa 73- 87 ksi	400 - 550 MPa 58- 80 ksi
Elongation [1]	Horizontal Direction (XY)	30 - 40 %	20 - 30 %
	Vertical Direction (Z)	35 - 45 %	20 - 35 %

1. Mechanical testing in accordance with ASTM E8

Range of mechanical properties encompasses expected values across multiple machine platforms

### Ordering information

PowderRange XLC F is available from stock and dispatched within 24 hours of receipt of order. Our PowderRange metal AM powders are sold in multiples of 10 kgs giving you the flexibility to order just the volume you need to maintain efficient material stock levels.

All our PowderRange materials are supplied with a full metal powder certification to Carpenter Additive's standard material specification, reporting size distribution, flow, chemistry and morphology.

Code	Description	Unit volumes
CT PowderRange XLC F	Flexible material developed to be suitable for a wide range of powder bed fusion machines and applications	10 kgs

### Further information

To make an enquiry, please contact [powderrange@carpenteradditive.com](mailto:powderrange@carpenteradditive.com). Alternatively, for EU/Row, call +44 (0)1928 240 530 and for USA call +1-412-788-2856. You can visit us at [www.carpenteradditive.com](http://www.carpenteradditive.com).