

### 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 625 S Nickel Chromium Alloy is a Ni-Cr superalloy with significant mass fractions of molybdenum and niobium. The addition of molybdenum and niobium gives the alloy high strength and toughness in the annealed condition. Although it can be precipitation strengthened, it is considered a solid solution strengthened superalloy. As a consequence, it has superior properties in the 'as processed' state with Laser Powder Bed Fusion relative to PowderRange 718 that requires additional heat-treating steps to achieve maximum mechanical properties.

### Applications

PowderRange 625 has a wide range of applications within aerospace, automotive and the marine industry, and its particularly suitable for applications where corrosion and oxidation resistance at high temperatures is required.



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

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## Chemical composition

Element		Minimum wt%	Maximum wt%
Al	Aluminum		0.40
C	Carbon		0.10
Co	Cobalt		1.0
Cr	Chromium	20.0	23.0
Cu	Copper		0.50
Fe	Iron		5.0
Mn	Manganese		0.50
Mo	Molybdenum	8.0	10.0
N	Nitrogen		0.02
Nb+Ta	Niobium + Tantalum	3.15	4.15
Ni	Nickel	Balance	
O	Oxygen		0.03
P	Phosphorus		0.015
S	Sulfur		0.015
Si	Silicon		0.50
Ti	Titanium		0.40

## Particle size distribution – CT PowderRange 625 S

Size	Value	Method
-15 µm	10 Volume %	Laser Size Diffraction
+45 µm	15 Weight %	Sieve Analysis
D10	10-18 µm	Laser Size Diffraction
D50	26-28 µm	Laser Size Diffraction

### Mechanical properties (indicative only)

Property		As built
Tensile Strength [1]	Horizontal Direction (XY)	950 - 1050 MPa 138-152 ksi
	Vertical Direction (Z)	875 - 950 MPa 127-138 ksi
Yield Strength [1]	Horizontal Direction (XY)	700 - 750 MPa 102-109 ksi
	Vertical Direction (Z)	575 - 625 MPa 83-91 ksi
Young's Modulus [1]	Horizontal Direction (XY)	165 - 185 GPa 24-27 msi
	Vertical Direction (Z)	135 - 155 GPa 20-22 msi
Elongation [1]	Horizontal Direction (XY)	30 - 35 %
	Vertical Direction (Z)	35 - 45 %
Hardness [2]	300 - 330 HV0.5	
Coefficient of Thermal Expansion [3]	$12.8 \times 10^{-6}$ m/mK	
Thermal Conductivity [3]	9 - 10.5 W/mK	

1. As built. Mechanical testing in accordance with ISO 6892

2. As built. Hardness test in accordance with ASTM E384-11

3. In the range of 20°C (68°F) to 100°C (212°F)

Range of mechanical properties encompasses expected values across multiple machine platforms

### Similar materials

Company	Alternative Title
LPW	625 Nickel Chromium Alloy
UNS	N06625
Other Generic Names	Inconel 625
3D Systems	N/A
Concept Laser	CL 101NB
EOS	IN625
Realizer	N/A
Renishaw	In625-0402
SLM Solutions	Inconel 625
TRUMPF	N/A

### Ordering information

CT PowderRange 625 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 625 S	Standard Laser Powder Bed Fusion metal powder	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).