

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

CT PowderRange 316L Stainless Steel is an austenitic stainless steel, which is not age or precipitation hardenable. It delivers good general mechanical properties including high corrosion resistance and toughness to 300°C (572°F).

CT PowderRange 316L is equivalent to AISI 316L. This is chosen because the lower carbon content compared to standard 316 gives a reduced susceptibility to thermal stress driven micro-cracking, making it suitable for Laser Powder Bed Fusion. The chromium and nickel content of CT PowderRange 316L is at the upper range of the AISI 316L specification which delivers the increased corrosion resistance.

Applications

Used for a broad range of applications across many industries, particularly where corrosion resistance is important, including automotive, biomedical and aerospace products.



For worldwide contact details please visit www.carpenteradditive.com

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Chemical composition

Element		Minimum wt%	Maximum wt%
C	Carbon		0.030
Cr	Chromium	17.0	18.0
Cu	Copper		0.75
Fe	Iron	Balance	
Mn	Manganese		2.00
Mo	Molybdenum	2.00	2.50
N	Nitrogen		0.10
Ni	Nickel	12.0	13.0
O	Oxygen		0.10
P	Phosphorus		0.030
S	Sulfur		0.015
Si	Silicon		0.75

Particle size distribution – CT PowderRange 316 L 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
Tensile Strength [1]	Horizontal Direction (XY)	590 - 690 MPa 86-100 ksi
	Vertical Direction (Z)	485 - 595 MPa 70-86 ksi
Yield Strength [1]	Horizontal Direction (XY)	470 - 590 MPa 68-86 ksi
	Vertical Direction (Z)	380 - 560 MPa 55-81 ksi
Young's Modulus [1]	Horizontal Direction (XY)	159 - 175 GPa 23-25 Msi
	Vertical Direction (Z)	117 - 151 GPa 17-22 Msi
Elongation [1]	Horizontal Direction (XY)	25 - 55 %
	Vertical Direction (Z)	30 - 70 %
Hardness [2]	Horizontal Direction (XY)	210 - 214 HV0.5
	Vertical Direction (Z)	114 - 226 HV0.5
Coefficient of Thermal Expansion [3]	16 × 10 ⁻⁶ m/mK	
Thermal Conductivity [3]	15.6 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	316 Stainless Steel
UNS	S31603
Other Generic Names	1.4404; 316L
3D Systems	Stainless 316L
Concept Laser	CL 20ES
EOS	316L
Realizer	N/A
Renishaw	SS 316L-0407
SLM Solutions	1.4404 (316L)
TRUMPF	StainlessSteel 316L-A LMF

Ordering information

CT PowderRange 316L 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 316L 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. 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.