

SS 316L-0407

POWDER FOR ADDITIVE MANUFACTURING

DESCRIPTION

316L-0407 alloy is an austenitic stainless steel which comprises iron alloyed with chromium of mass fraction up to 18%, nickel up to 14% and molybdenum up to 3%, along with other minor elements. The alloy is an extra-low carbon variation on the standard 316L alloy.

Due to its low carbon content, 316L-0407 is resistant to sensitisation (carbide precipitation at grain boundaries) and displays good welding characteristics. It also has low stress to rupture and tensile strength at high temperatures.

PROCESS SPECIFICATION

POWDER DESCRIPTION	Stainless steel powder
LAYER THICKNESS	50 μm
LASER POWER	200 W
ADDITIVE MANUFACTURING SYSTEM	AM250

MATERIAL PROPERTIES

- High hardness and toughness
- High corrosion resistance
- High machine-ability
- Can be highly polished

APPLICATIONS

- Plastic injection and pressure die-casting moulds, extrusion dies
- Surgical tools
- Cutlery and kitchenware
- Maritime components
- Spindles and screws
- General engineering

GENERIC DATA - WROUGHT MATERIAL

DENSITY	7.99 g/cm ³
THERMAL CONDUCTIVITY	16.2 W/mK
MELTING RANGE	1 371 °C to 1 399 °C
COEFFICIENT OF THERMA EXPANSION (SEE NOTE 1)	16 10 ⁻⁶ K ⁻¹

Note 1 - In the range of 0 °C to 100 °C.

Note 2 - Tested at ambient temperature by Nadcap and UKAS accredited independent laboratory. Test ASTM E8. Machined prior to testing

Note 3 - Tested to ASTM E384-11, after polishing

Note 4 - Tested to JIS B 0601-2001(ISO 97), after bead blasting.

COMPOSITION OF POWDER

ELEMENT	MASS (%)
Iron	Balance
Chromium	16.00 to 18.00
Nickel	10.00 to 14.00
Molybdenum	2.00 to 3.00
Manganese	≤ 2.00
Silicon	≤ 1.00
Nitrogen	≤ 0.10
Oxygen	≤ 0.10
Phosphorus	≤ 0.045
Carbon	≤ 0.03
Sulphur	≤ 0.03

MECHANICAL PROPERTIES OF ADDITIVELY MANUFACTURED COMPONENTS

	AS BUILT
Upper tensile strength (UTS) (See note 2)	
Horizontal direction (XY)	676 MPa \pm 2 MPa
Vertical direction (Z)	624 MPa \pm 17 MPa
Yield strength (see note 2)	
Horizontal direction (XY)	547 MPa \pm 3 MPa
Vertical direction (Z)	494 MPa \pm 14 MPa
Elongation at break (see note 2)	
Horizontal direction (XY)	43% \pm 2%
Vertical direction (Z)	35% \pm 8%
Modulus of elasticity (see note 2)	
Horizontal direction (XY)	197 GPa \pm 4 GPa
Vertical direction (Z)	190 GPa \pm 10 GPa
Hardness (Vickers) (see note 3)	
Horizontal direction (XY)	198 HV0.5 \pm 8 HV0.5
Vertical direction (Z)	208 HV0.5 \pm 6 HV0.5
Surface roughness (Ra) (see note 4)	
Horizontal direction (XY)	4 μ m to 6 μ m
Vertical direction (Z)	4 μ m to 6 μ m