

3D Metal Printing (SLM Process) Material Performance Manual

3D金属打印(SLM工艺)材料性能手册

Stainless steel of 316L material (不锈钢316L材料)

1. **Material features:** stainless steel 316L has excellent corrosion resistance and wide applications.

材料特点: 不锈钢316L具有优异的耐腐蚀性, 有广泛的应用;

2. powder property^a (粉末性能^a)

Element / 元素	Fe	Cr	Ni	Mo	C	Mn	P	S	N	Si
Min value wt% / 最小值 wt%	Bal.	16.0	10.0	2.0	0	0	0	0	0	0
Max value wt% / 最大值 wt%	Bal.	18.0	14.0	3.0	0.03	2.0	0.025	0.03	0.1	1.00
Particle size distribution ^b / 粒度分布 ^b		15-53 μm								
a. Test standard(检测标准) & Material composition(材料成分): GB/T 3850-2015										
b. Particle size distribution(粒度分布): GB/T 40389-2021										

3. Component performance (制件性能)

Density / 密度	$\sim 7.9 \text{ g/cm}^3$
Density (metallographic method) ^c / 致密度(金相法) ^c	$> 99.9 \%$
Surface roughness-in the sandblasted state ^d / 表面粗糙度-喷砂态 ^d	$\geq 6 \mu\text{m}$
c. Test standard(检测标准) & Material composition(材料成分): GB/T 3850-2015	
d. Surface roughness(表面粗糙度): GB/T 40389-2021	

4. Mechanical property^e (力学性能^e)

State 状态	Test condition 测试条件	Yield strength /MPa 屈服强度/MPa	Tensile strength /MPa 抗拉强度/MPa	Extensibility / % 延伸率/%	Hardness / HRB 硬度/HRB
Print state 打印态	indoor temperature	510 $\pm$ 100	700 $\pm$ 100	35 $\pm$ 10	93 $\pm$ 3
Heat treatment ^f 热处理 ^f	indoor temperature	520 $\pm$ 100	720 $\pm$ 100	32 $\pm$ 10	93 $\pm$ 3
e. Test standard(检测标准): GB/T 228.1-2015, GB/T 230.1-2018					
f. Heat treatment process(热处理工艺): 800 $^{\circ}\text{C}$ holding 2h, furnace cooling.(800 $^{\circ}\text{C}$ 保温2h, 炉冷)					