3D Metal Printing (SLM Process) Material Performance Manual
3D金属打印(SLM工艺)材料性能手册

Aluminum alloy 6061 material（铝合金6061材料）

1, Material features: Aluminum alloy 6061 heat treatment can strengthen the alloy, has good formability, weld ability, machinability, at the same time has moderate strength, can still maintain better ability after annealing operation. **材料特点：** 铝合金6061热处理可强化合金，具有良好的可成型性、可焊接性、可机加工性，同时具有中等强度，在退火后仍能维持较好的操作性；

2.Powder propertya（粉末性能a）

Element / 元素	Al	Si	Mg	Fe	Cu	Mn	Ni	Ti	Zn	Pb	Sn
Min value wt% / 最小值 wt%	Bal.	0.3	0.35	0	0	0	0	0	0	0	0
Max value wt% / 最大值 wt%	Bal.	0.7	0.8	0.5	0.1	0.03	0.05	0.01	0.01	0.01	0.01
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 20975.25-2020
b. Particle size distribution(粒度分布): GB/T 19077-2016

3.Component performance（制件性能）

Density / 密度	~2.75g/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]	≧7 μm

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 properties（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	202±40	260±40	14±5	90±10
Heat treatment 热处理[f]	indoor temperature	250±20	300±20	10±5	120±30

e. Test standard(检测标准): GB/T 228.1-2015。
f. Heat treatment process(热处理工艺):180℃保温10h,空冷(180 heat preservation for 10h, air cooling.)

Aluminum alloy 6061 is a reinforcing alloy by heat treatment. Through our heat treatment, it is conducive to the generation of Si-Mg reinforced phase, thus significantly improving its mechanical properties. (铝合金6061属热处理可强化合金，通过我司的热处理，有利于Si-Mg强化相的生成，从而明显提高其力学性能.)