



Scalmalloy® High Strength Aluminum Alloy Powder

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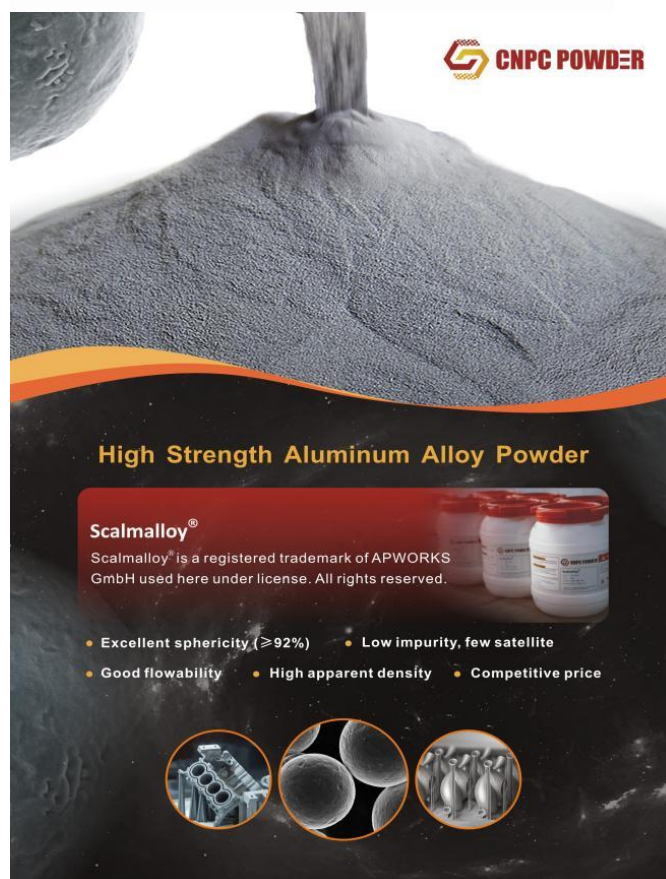
With its advanced and innovative production technology, CNPC Powder has officially become the first domestic powder manufacturer to obtain official authorization from APWORKS for the production and sale of high-strength aluminum alloy Scalmalloy® 3D printing materials.

Scalmalloy® is a high-performance aluminum alloy powder material composed of select elements such as aluminum, magnesium, and scandium, specifically designed for additive manufacturing. It features a bimodal micro structure where fine equiaxed grains are separated by larger columnar grains, with the addition of Sc and Mg at a hypereutectic point (eutectic content of 0.4-0.55 wt%) to refine the grains and enhance strength.

Compared to traditional aluminum alloys, Scalmalloy® exhibits exceptional properties. It has a tensile strength of up to 533 MPa and a yield strength of up to 527 MPa, while maintaining good ductility under high stress, with an elongation at break exceeding 10%, which is superior to traditional 7-series aluminum alloys. Scalmalloy® also has a lower density, being approximately 60% lighter than titanium alloys of the same volume, significantly reducing structural weight and making it suitable for applications where weight reduction is required.

CNPC Powder adopts an innovative AMP process for powder production, which upgrades the traditional single-batch production mode to continuous, uninterrupted production. The resulting powder exhibits excellent sphericity and flowability, with a sphericity exceeding 90% and a uniform particle size distribution between 20-63µm, ensuring high precision and

superior surface quality of the printed parts. Notably, the powder has an extremely high purity, with an oxygen content as low as approximately 300ppm and minimal impurity levels. We strictly control the ratio of hollow and satellite particles and adhere to rigorous production standards, carefully monitoring each batch of powder materials to effectively accelerate the widespread application and popularization of Scalmalloy® in the metal 3D printing industry.





Applications: High-end manufacturing fields with high strength requirements, such as aerospace, automotive, consumer electronics,

medical, low-altitude economy, artificial intelligence, and more.

Composition%	Sc	Mg	Zr	Mn	Al	O
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Powder Characteristics

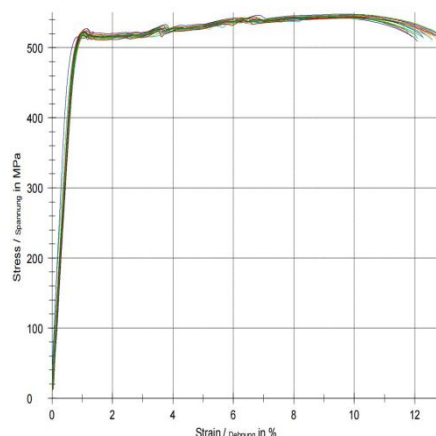
Physical Properties	20-63 μm Powder Laser Particle size Distribution(μm)			Hall flow rate (S/50g)	A.D (g/cm^3)	T.D (g/cm^3)	Sphericity
	D10	D50	D90				
	≥ 20	30~45	55~70	<75	1.3-1.5	≥ 1.6	$\geq 90\%$
Mechanical Properties	Status	Tensile Strength (MPa)		Yield Strength (Mpa)		Elongation (%)	
	Printing	348		285		≥ 12.0	
	Heat treatment 300°C,1h	533		527		≥ 9.5	

This data sheet contains approximate values that are influenced by factors such as part geometry, additives, and environmental conditions. They are based on current experience and knowledge, and therefore the aforementioned characteristics are not legally binding.

Its excellent mechanical properties enable it to perform well in high-stress environments, ensuring the safety and durability of structures. The figure below shows the stress-strain curve of Scalmalloy® measured by CNPC Powder.

Results:

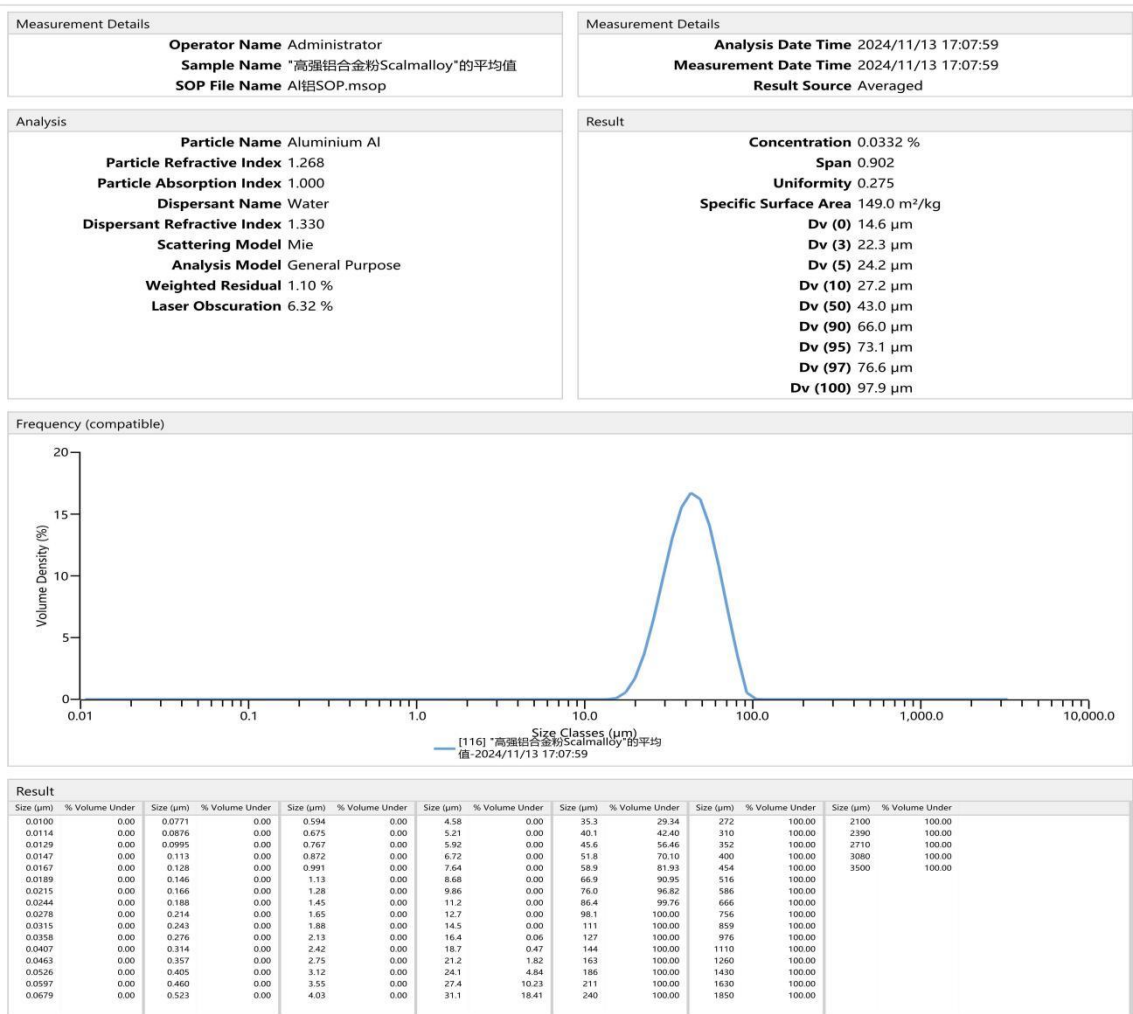
	Specimen no.	d_0 mm	S_0 mm^2	L_0 mm	L_U mm	σ_{low} MPa	σ_{high} MPa	E regression GPa	$R_{p0.2}$ MPa	R_m MPa	A_{max} %	Z %
Legende												
max									---	---	---	
min									450	490	8.0	
	0202_1_1_Q01	6.00	28.27	30	33.7	200	300	67.5	517	545	12.3	21
	0202_1_1_Q02	6.01	28.37	30	34.0	180	300	67.4	513	542	13.3	27
	0202_1_1_Q03	5.99	28.18	30	33.9	200	300	85.9	511	542	13.0	26
	0202_1_1_Q04	6.00	28.27	30	34.0	200	300	67.8	511	543	13.3	26
	0202_1_1_Q05	6.00	28.27	30	33.9	200	300	68.4	515	542	13.0	26
	0202_1_1_Q06	6.00	28.27	30	34.2	200	300	67.2	514	543	14.0	25
	0202_1_1_Q07	6.00	28.27	30	34.2	200	300	71.4	515	543	14.0	25
	0202_1_1_Q08	6.00	28.27	30	34.1	200	300	70.2	513	543	13.7	25
	0202_1_1_Q09	6.00	28.27	30	33.9	200	300	75.6	510	544	13.0	24
	0202_1_1_Q10	5.99	28.18	30	33.9	200	300	70.0	521	548	13.0	27
	0202_1_1_Q11	6.00	28.27	30	34.1	200	300	67.2	520	546	13.7	25
	0202_1_1_Q12	5.99	28.18	30	34.2	200	300	73.8	516	547	14.0	28
	0202_1_1_Q13	6.00	28.27	30	34.2	200	300	69.6	516	545	14.0	24
	0202_1_1_Q14	5.99	28.18	30	33.6	200	300	69.0	517	546	12.0	23
	0202_1_1_Q15	6.00	28.27	30	34.2	200	300	70.2	517	544	14.0	28
	0202_1_1_Q16	6.00	28.27	30	34.3	200	300	68.4	515	547	14.3	24





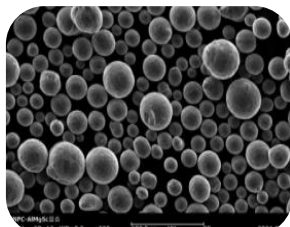
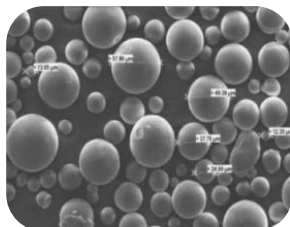
Powder Size Distribution

CNPC POWDER CHINA LTD.

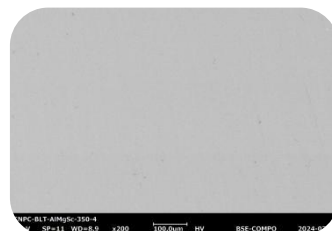
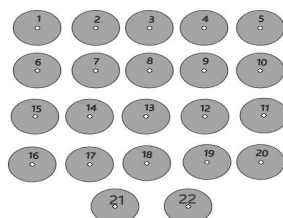




Powder Morphology



Microstructure



Package Delivery

tips: The net weight is 5 kg(6L/22.04Lbs) per small drum.

The outer packing wooden case can hold 150 kg(net weight) per case.

