AMDAP™ Series - Metal Powders for 3D Printing

Ni based alloy powder AMDAP™ R718

Ar gas atomized spherical metal powder with high flowability suitable for Selective Laser Melting type (SLM) additive manufacturing.

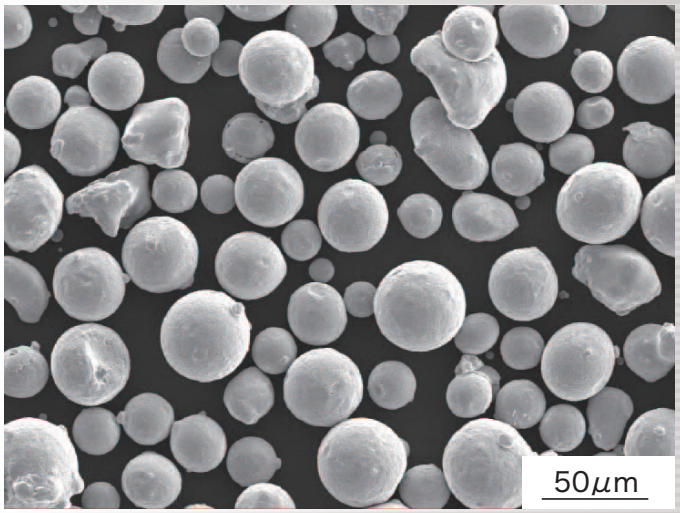
Characteristics

- AMDAP™ R718 is a precipitation hardening Ni based alloy with high-temperature strength and corrosion resistance.
- Suitable for SLM additive manufacturing thanks to its superior flowability.
- Good tensile and creep rupture strength up to 700 °C.

Major applications

- **Gas turbine components**
- **Liquid fuel and exhaust systems**
- **Jet engine and high-speed airframe parts**
- **Measuring instruments**
- **High temperature engineering**

Powder shape



Typical chemical composition

Product	Chemical composition (mass%)							
	C	Ni	Cr	Mo	Ti	Al	Nb+Ta	Fe
AMDAP™ R718	0.03	53	19	3	1	0.5	5.1	Bal.

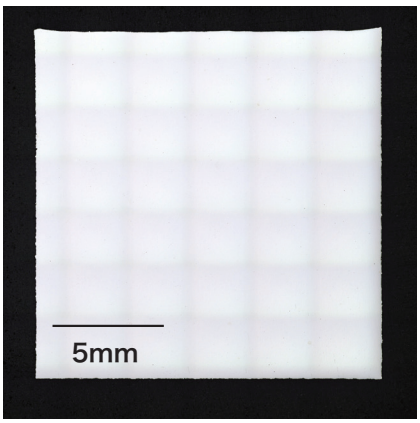
Typical particle size

Particle size(μm)
-53/+25

Typical printed microstructure *1

Cross-section

As-printed density (Area ratio) : >99.9%
Average density : 8.23g/cm^3



Microstructure

As-printed



After HT *2



Mechanical Properties *1

Tensile properties *3

	Direction	Test temperature	Condition of test specimen	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Reduction of area (%)
AMDAP™ R718	XY-direction (Horizontal)	Room temperature	As-printed	819	1108	27	38
			HT *2	1333	1546	14.3	18.2
		649°C	HT	1113	1258	11.5	14.1
	Z-direction (Vertical)	Room temperature	As-printed	637	973	36	49
			HT	1212	1389	19.2	32.3
		649°C	HT	1004	1144	23.6	35.1
(Reference) AMS 5662	XY-direction	Room temperature	HT	≧1034	≧1241	≧6	≧8
		649°C	HT	≧862	≧965	≧6	≧8
	Z-direction	Room temperature	HT	≧1034	≧1276	≧12	≧15
		649°C	HT	≧862	≧1000	≧12	≧15

Creep rupture properties *4 (649°C, 689MPa)

	Direction	Condition of test specimen	Time for rupture (h)	Elongation (%)	Reduction of area (%)
AMDAP™ R718	XY-direction (Horizontal)	HT *2	125	1.3	2.5
	Z-direction (Vertical)	HT	123	10.9	11.7
(Reference) AMS 5662	—	HT	≧23	—	—

*1 Printed by EOS M290

*2 HT : Heat treatment condition (AMS5662)

1. Solution Annealing : 968°C ×1h, water cool
2. Aging treatment : 718°C ×8h→56°C/h furnace cool→621°C×8h, air cool

*3 Test method : (Room temperature) ASTM E8
(649°C) ASTM E21

*4 Test method : ASTM E139 (Smoothed test-piece)

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