Material Datasheet

Meltio Nickel 718

Material Group: Nickel Alloys

Nickel 718 is a high-strength, corrosion-resistant nickel-chromium material used at -252°C to 705°C. Poor thermal conductivity, high toughness and strong work hardening tendency adversely affect it machinability, creating a very good business case for additive manufacturing.

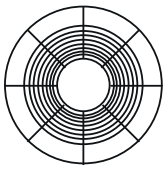
Nomenclature Standards

AWS A 5.9	ERNiFeCr - 2
EN ISO 14343 - A	S Ni 7718 (NiCr19Fe19Nb5Mo3)
Material Nº	2.4667

Chemical Composition

Ni	C	Si	Mn	Cr	Fe	Ti	Mo	Nb +Ta	Al
Base	0.05	0.2	0.2	19	20	0.9	3	5.2	0.5

Spool Specs



Diameter	1 mm
Weight	15 kg
Volume	1829 cm³
Density	8.2 g/cm³
Spool Type	BS300

Applications

Aerospace industries

Chemical industries

Automotive industries

Energy industries

Mechanical Properties

Results show Meltio's wire LMD 3D printed specimens to perform at the same level as conventional manufacturing methods, with low deviations and near isotropic properties between horizontal (XY) and vertical (XZ) print orientations.

		Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HV-30)
Wrought Properties		1241	1034	10	342
Cast Properties		802	758	5	
Meltio As Built	**XY**	833 ± 50	537 ± 32	25 ± 3	245
	XZ				
Meltio Post Heat Stress Relive (HT.1)	**XY**	1016 ± 28	660 ± 10	18 ± 6	285
	XZ	925 ± 86	631 ± 10	15 ± 2	
Meltio Post Heat Aging (HT.1 + HT.2)	**XY**	1256 ± 11	1025 ± 7	11 ± 1	332
	XZ	1208 ± 49	980 ± 2	10 ± 5	

Heat Treatment

HT.1 - Stress Relieve = SR
Solution Heat Treatment (HT reduce residual stresses within component)

- Heat up to 980ºC in 2h
- Hold at 980ºC during 1h

HT.2 - Ageing Treatment(Ag)
Ageing Heat Treatment (HT to improve material properties)

- Heat up to 720ºC in 2h
- Hold at 720ºC during 8h
- Cool down to 620ºC in 1h 50'
- Hold at 620ºC during 8h

Printing Parameters Used

Print Speed	Deposition Width	Layer Height	Laser Power
450 mm/min	1 mm	1.2 mm	1100 W

Tomography

In this tomography we can observe the internal structure of the material and see its good density, absence of porosity or internal defects that put at risk the structure of the sample.
The resolution used for the CT inspection is 24 micrometros por pixel.

Shielding gas: Argon > 99.996% purity.
Machine Used: Meltio M450
Laser System: 6x200W Fiber coupled diode lasers. 976nm wavelength.

* Data represent tyical reference values from Worught and Cast material classification compared to Meltio (M450) horizontal (XY) and vertical (XZ) specimens extracted from 3D printed walls and tensile tested according to UNE EN ISO 6892-1