MELTIO

Material Datasheet

Inconel - 718

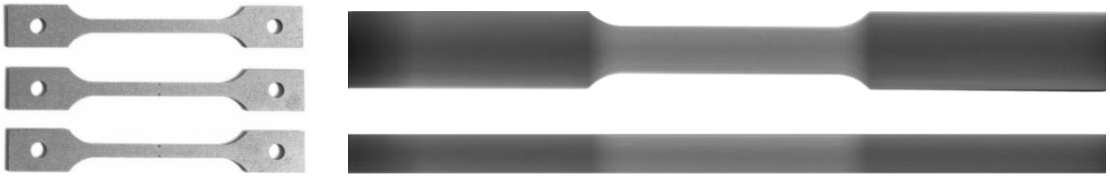
Description Inconel 718 is a high-strength, corrosion-resistant nickel chromium material used at -423° to 1300°F. Poor thermal conductivity, high toughness, and strong work hardening tendency adversely affect its machinability, creating a very good business case for additive manufacturing.

Applications It is used in aerospace industries for its excellent physical, mechanical, and chemical properties.

Composition AMS 5832 Wire classification 1.2mm diameter <0.08% C, <0.35% Mn, <0.35% Si, <0.015% S, <0.015% P, 12-21% Cr, 50-55% Ni, 0.65-1.15% Ti, 2.8-3.3% Mo, 4.75-5.5% Nb, 0.2-0.8% Al, <1% Co, <0.006% B, <0.3% Cu, Balance Fe.

Computed Tomography

Scans cover external and internal surfaces, with micrometre-level resolutions. Full 3D density maps of the samples inspected consistently report 99.998% density, with no trace of voids, porosity, contamination or cracking.



Images represent the tested specimens and the imaging from the computed tomography data for YZ and XY section planes at 60µm resolution.

Mechanical Properties

Results show Meltio's WP-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.

	Wrought Properties	Cast Properties	Meltio XY Properties	Meltio XZ Properties
Tensile Strength (MPa)	1241	802	1308 ± 10	1235 ± 11
Yield Strength (MPa)	1034	758	1128 ± 20	1040 ± 12
Elongation (%)	10	5	6.6 ± 2.1	8.5 ± 0.7

Data represents typical reference values from Wrought (AMS 5662) and Cast (AMS 5383) material classification compared to Meltio horizontal (XY) and vertical (Z) specimens extracted from 3D printed walls and tensile tested according to ASTM E8.

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Notes

Properties reported in this material datasheet are average of a typical batch. The test coupons were extracted from multiple 3D printed walls, cut in horizontal (XY) and vertical (Z) directions for coupon extraction. The walls were 3D printed on a Meltio M450 and the testing was performed according to ASTM E8.

Disclaimer

Version 2.2

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