IN625-RAM2 (High temperature strength and corrosion resistant)

Product Information

Elementum 3D's IN625-RAM2 nickel superalloy offers excellent mechanical strength and creep resistance at high temperatures, good surface stability, and corrosion and oxidation resistance, while maintaining high strength, hardness, and wear. IN625-RAM2 is targeted towards aerospace and power industry applications such as turbine blades and jet/rocket engines, industrial gas turbines, heat exchangers and nuclear components. Elementum 3D can offer the IN625-RAM2 in 40µm, 60µm and 80µm layer printing parameters.

Physical and Chemical Properties

Material composition: based on IN625-RAM2 with a 2 volume % RAM addition

Relative printed density[8]: 8.39 g/cm^3 (>99.8%) ASTM B311

Thermal conductivity[5]: 16.5 (W/m.k)

Infill Deposition rate[4]: *(Further print speed optimization possible)*

- 40µm layer 4.2 mm^3/s
- 60µm layer 6.5 mm^3/s
- 80µm layer 10.5 mm^3/s

Modulus: Room Temperature[3]: 200 GPa (29.0 Msi)

Hardness ASTM E18[2]:

- AS Fabricated (29 HRC)
- Heat treated (26 HRC)

Table 1: Surface finish for Elementum 3D's printing layer offerings[6]:

	40µm	60µm	80µm
45° Ra Up Surface	8.5	6.2	10
45° Ra Down Surface	18.1	12.8	17

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Table 2: Elevated Temperature Mechanical Testing[1][7]:

Temperature		Print Layer Height	Ultimate Tensile Strength		Yield Strength		Elongation
°C	°F	µm	MPa	ksi	MPa	ksi	%
25	77	40	1289	187	999	145	23
25	77	60	1351	196	1038	150	23
25	77	80	1361	197	1043	151	21
760	1400	40	839	122	647	94	49
760	1400	60	808	117	607	88	59
760	1400	80	777	113	590	86	56
980	1796	40	159	23	120	17	75

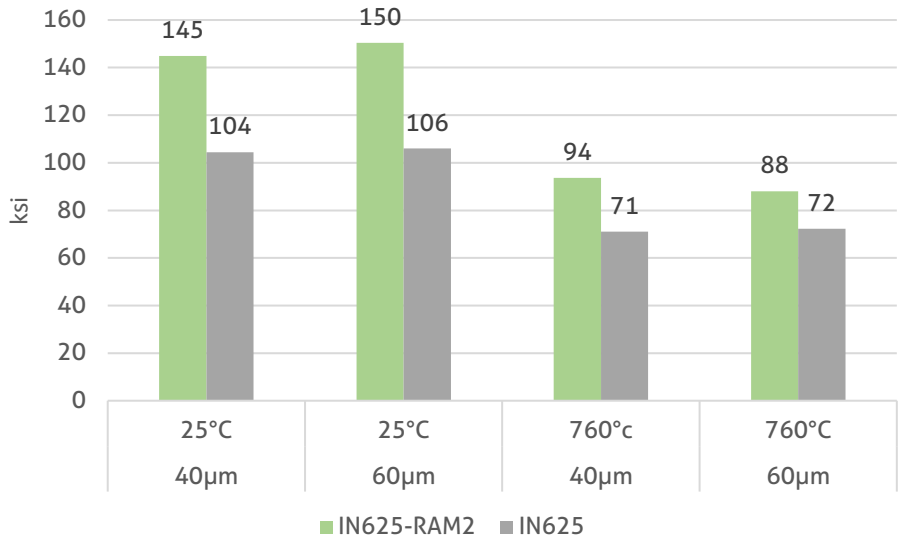

Figure 1: AS-printed IN625-RAM2 yield strength compared to AM IN625 at 25°C and 760°C for 40µm and 60µm print layers.

[1]ASTM E8, [2]ASTM E18, [3]ASTM E494--15, [4]Deposition rate calculation is for comparison purposes on an EOS M290 and does not include recoating time, laser migration time, contour exposures, etc., [5]ASTM E1461, [6]Surface roughness determined by stylus profilometry, [7]ASTM E21, [8]ASTM B311

All stated values are approximate values. All details given above are our current knowledge and experience, and are dependent on the equipment, parameters, and operating conditions. The data provided in this document is subject to change and only intended as general information on a material set that is continually improving and developing. The data does not provide a sufficient basis for engineering parts. All samples were produced on an EOS M290. All tensile tests were performed at third party certified test labs such as Westmoreland Mechanical Testing & Research and Product Evaluations Systems.

Please contact us at sales@elementum3d.com for additional information