



### ► A5083-RAM5 (High strength aluminum, no heat treatment required)

#### Product Information

Elementum 3D's A5083-RAM5 Aluminum Metal-Matrix Composite (MMC) utilizes patented reactive additive manufacturing (RAM) materials technology to combine the 5083 aluminum with the strength and stiffness enhancing properties of ceramic dispersion strengthening.

The A5083-RAM5 material has excellent printability and does not require a post build heat treatment to achieve high specific strength. The material also has exceptionally consistent properties with minimal property variation due print orientation or stress relief. Printed A5083-RAM5 has significantly greater strength than even work hardened wrought 5083 aluminum.

#### Physical and Chemical Properties

Material composition: Proprietary A5083 with 5vol% ceramic

Theoretical maximum density: 2.75 g/cm<sup>3</sup>

Printed relative density: >99.5%

Elastic Modulus: <sup>[1]</sup> 81.7 GPa/ 11.9 Msi

#### Tensile properties for A5083-RAM5<sup>[2]</sup>

Condition	Ultimate Tensile Strength		Yield Strength		Elongation (%)
	(ksi)	(MPa)	(ksi)	(MPa)	
As Built	67.8 ±1.4	467 ±9.7	59.7 ±1.9	413 ±13.1	9.8 ±1.2
Stress Relieved*	69.5 ±1.9	472 ±13.3	61.4 ±1.6	423 ±11.3	10.3 ±0.7



### Surface roughness A5083-RAM5<sup>[3]</sup>

Angle	Upskin		Downskin	
Deg. °	Ra μm	Ra μin	Ra μm	Ra μin
40	5.4±1.2	211±45	11.6±1.4	458±54
45	7.0±0.3	274±11	10.5±1.7	414±68
50	7.2±0.8	283±30	9.9±1.0	388±38
90 (vertical)	8.9±1.6	350±65	8.5±0.9	333±36

All stated values are average values calculated from limited data sets.

<sup>1</sup>ASTM E494-15, <sup>2</sup>tested according to ASTM E8, average values and standard deviations for 30 vertical and 6 horizontal tensile bars in the as-built condition and 6 horizontal bars in the stress relieved condition, stress relief cycle was performed at 300°C for 2 hours after parts were cut off the plate, <sup>3</sup>surface roughness determined by stylus profilometry for 40 μm layer thickness parameters developed on an EOS M290

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](mailto:sales@elementum3d.com) for additional information.