



► A1000-AM (High Thermal Conductivity)

Product Information

Elementum 3D's pure aluminum product is an excellent solution for thermal management systems that require high thermal conductivity while meeting strict weight and strength restrictions. An additive printed pure aluminum is a novel solution for spacecraft construction and electronic packaging applications.

Physical and Chemical Properties

Material composition: Proprietary A1000

Theoretical maximum density: 2.7 g/cm³

Printed relative density: > 99.5%

Ultimate tensile strength^[1]: 14±1 ksi (97 MPa)

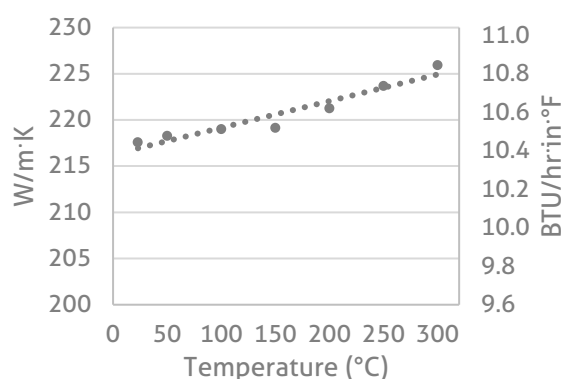
Yield strength^[1]: 11±1 ksi (76 MPa)

Elongation^[1]: 26±3%

Modulus of elasticity^[2]: 9.8 ± 0.2 Msi (68 GPa)

Deposition rate^[4]: 1.09 in³/hr (4.95 mm³/s)

Thermal conductivity^[3]:



Test Temperature		Thermal Conductivity	
°C	°F	W/mK	BTU/hr·in·°F
23	73	218	10.476
50	122	218	10.510
100	212	219	10.545
150	302	219	10.552
200	392	221	10.653
250	482	224	10.770
300	572	226	10.878

Surface roughness as built^[5]:

Angle	Upskin		Downskin	
Deg. °	Ra μm	Ra μin	Ra μm	Ra μin
0 (top)	12.71 $\pm$ 0.82	501 $\pm$ 32		
40	10.72 $\pm$ 0.61	422 $\pm$ 24	15.26 $\pm$ 0.53	601 $\pm$ 21
45	11.94 $\pm$ 1.82	470 $\pm$ 72	14.61 $\pm$ 2.25	576 $\pm$ 89
50	11.39 $\pm$ 1.02	449 $\pm$ 40	14.87 $\pm$ 1.6	586 $\pm$ 63
90 (vertical)	10.51 $\pm$ 1.25	414 $\pm$ 49		

^[1]ASTM E8, ^[2]ASTM E494-15 (ultrasonic velocity), ^[3]ASTM E1461, ^[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]Surface roughness determined by stylus profilometry.

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.