# A7050-RAM2™

*(High Strength and Corrosion Resistant)*

## Product

Elementum 3D's A7050-RAM2 is an aerospace and specialty AM aluminum alloy that features a combination of high toughness, high strength, and good stress corrosion cracking resistance. A7050-RAM2 requires a HIP and either a T74 (high corrosion resistance) or T6 (high strength) heat treatment to achieve typical properties reported here.

## Properties

**Nominal Composition:** A7050 (Al-2.3Cu-2.3Mg-6.2Zn) with 2% RAM additives

**Theoretical maximum density:** 2.86 g/cm$^3$

**Printed relative density:** >99.7%

**Deposition rate**[1]: 1.54 in$^3$/hr (7.02 mm$^3$/s)

| Condition | Ultimate Tensile Strength (ksi/MPa)[2] | 0.2% Offset Yield Strength (ksi/MPa)[2] | Elongation (%)[2] | Hardness (HRB)[3] | Young's Modulus (Msi/GPa)[4] | Stress Corrosion Cracking[5] |
|---|---|---|---|---|---|---|
| HIP & T74 | 73 ± 2.3 / 504 ± 16 | 68 ± 1.8 / 469 ± 12 | 6.0 ± 1.3 | 88 | 11.0 ± 0.1 / 76 ± 0.7 | None observed after 40 days at 62 ksi |
| HIP & T6 | 85 ± 0.7 / 586 ± 4.8 | 80 ± 0.7 / 504 ± 4.8 | 3.5 ± 1.0 | - | | |

**Surface roughness as built**[6]**:**

| Angle | Upskin | | Downskin | |
|---|---|---|---|---|
| Deg. ° | Ra µm | Ra µin | Ra µm | Ra µin |
| 0 (top) | 2.27±0.3 | 89±12 | NA | NA |
| 40 | 9.98±1.3 | 391±52 | 22.9±1.2 | 898±46 |
| 45 | 9.35±1.6 | 367±63 | 19.2±0.8 | 751±31 |
| 50 | 8.21±0.7 | 322±29 | 18.1±1.5 | 711±59 |
| 90 (vertical) | 12.08±1.7 | 473±65 | NA | NA |



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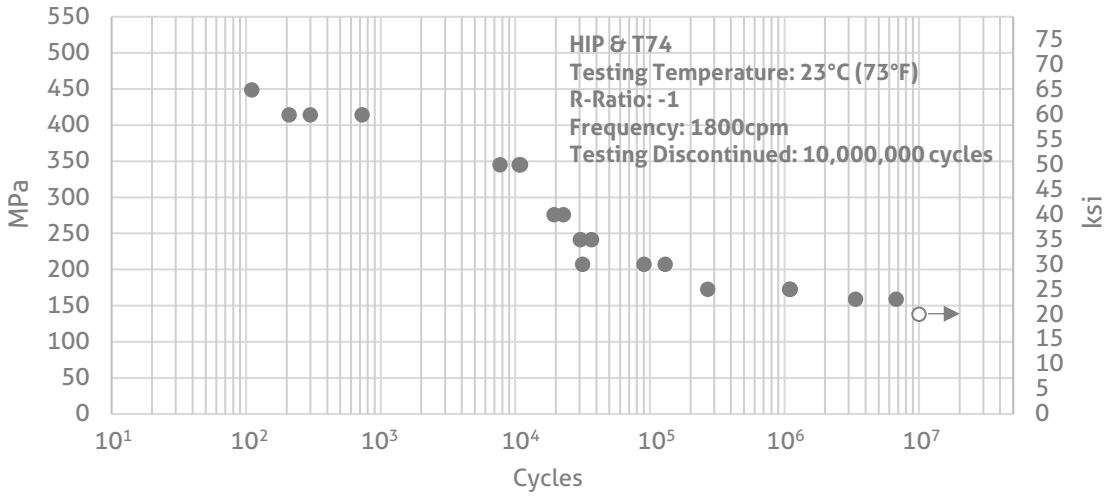
**Fatigue[7]:**




**Elevated temperature tensile[8]:**

| Temperature (°C) | Ultimate Tensile Strength (ksi) | 0.2% Offset Yield Strength (ksi) | Elongation (%) |
|---|---|---|---|
| 50 | 72.5 | 68.0 | 8.5% |
| 100 | 64.0 | 63.8 | 11.6% |
| 150 | 55.4 | 55.4 | 16.7% |
| 200 | 12.9 | 11.7 | 66.7% |

Properties stated on this data sheet are in the Elementum 3D prescribed HIP and T74 condition.
[1]Deposition rate calculation is for comparison purposes on an EOS M290 and does not include recoating time, laser migration time, contour exposures, etc. [2]ASTM E8, [3]ASTM E18, [4]ASTM E494-20 (ultrasonic velocity), [5]ASTM G47, tested in HIP & T74 state [6]Surface roughness determined by stylus profilometry, 30 µm layer thickness parameters [7]ASTM E466,[8]ASTM E21.

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.

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