GE Additive

13 Al | 24 Cr | 26 Fe | 27 Co | 28 Ni | 29 Cu

ARCAM EBM Q10plus Ti6Al4V Grade 5

ARCAM EBM Q10plus V2.1 with EBM Control 6.1

Data in this material datasheet represents material built with 70µm layer thickness in a vacuum atmosphere on an ARCAM EBM Q10plus V2.1 with EBM Control 6.1 and Process Theme 6.1. Values listed are typical.

Titanium

Parts are fabricated from titanium alloys like ASTM F2924 Ti6Al4V, also known as Ti-64, when low density and high corrosion and oxidation resistance are critical to design. Titanium is used in additive manufacturing to produce a variety of components, including blades, rings, discs, hubs, and vessels; it may also be used for high-performing race engine components such as gearboxes and connecting rods. Ti-64 is also biocompatible and thus has an extensive history in the medical industry as an established material for applications such as large joint and spine implants as well as other medical devices.

ARCAM EBM Q10plus V2.1 Ti-64 Grade 5

The parameters for the Q10plus V2.1 are developed based on the processes developed from previous iterations and information from other machines. The current process has a layer thickness parameter of 70µm and demonstrates properties that meet ASTM F2924 standards.

Thousands of developmental hours and testing have resulted in a parameter with increased productivity and mechanical properties, delivering the best of both worlds.

ARCAM EBM Q10plus V2.1

With appropriate approval* Ti-64 Grade 5 can be used for aerospace, dental, and orthopedic applications

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POWDER CHEMISTRY

Ti-64 Grade 5 powder chemical composition according to ASTM F2924 with a powder size distribution of 45-106 µm. For additional information on Ti-64 Grade 5 powder, visit https://www.advancedpowders.com/powders/titanium/ti-6al-4v-5.

MACHINE CONFIGURATION

- ARCAM Q10plus V2.1
- EBM Control Version 6.1
- Vacuum
- Stainless Steel Start Plate and Recoater

AVAILABLE PARAMETERS

- Process Theme 6.1 – 70µm

THERMAL STATES

1. As-Built

TYPICAL BUILD RATE

	(cm^3/h)
Typical Build Rate[1]	18.7-29.6

[1]Measured by using standard Factory Acceptance Test layout. Range dependent on melt volume

PHYSICAL DATA AT ROOM TEMPERATURE

Tensile Testing according to ASTM E290

Plane	Surface Roughness Ra (µm)	Bend (deg)
XZ	22	>105
YZ	25	>105

	Relative Density (%)		Hardness (HV10)	
Thermal State	H	V	H	V
As-Built	99.91	99.88	334.5	339.8

TENSILE DATA

Tensile Testing according to ASTM E8

Test Temperature: RT	0.2% Yield Strength (MPa)		Ultimate Tensile Strength (MPa)		Elongation (%)		Reduction of Area (%)	
Thermal State	H	V	H	V	H	V	H	V
As-Built	859	932.9	966.7	1027	12.6	16.3	26.8	35.5

H: HORIZONTAL (XY) orientation
V: VERTICAL (Z) orientation

* All of the figures contained herein are approximate only. The figures provided are dependent on a number of factors, including but not limited to, process and machine parameters, and the approval is brand specific and/or application specific. The information provided on this material data sheet is illustrative only and cannot be relied on as binding.

STL NETWORK PROPERTIES

Tensile Adhesion Testing according to ASTM F1147

Diamond Cubic Cell Shape

Unit Cell Size	Tensile Adhesion (MPa)	Network Porosity (%)
1.7 mm	80.35	63.23
1.2 mm	81.05	30.91

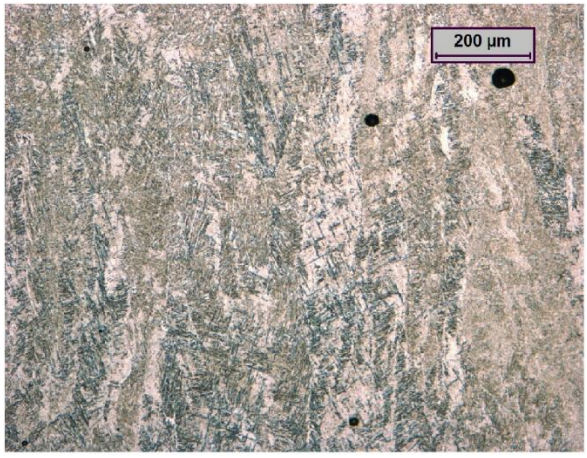
POINT NET NETWORK PROPERTIES

Tensile Adhesion Testing according to ASTM F1147

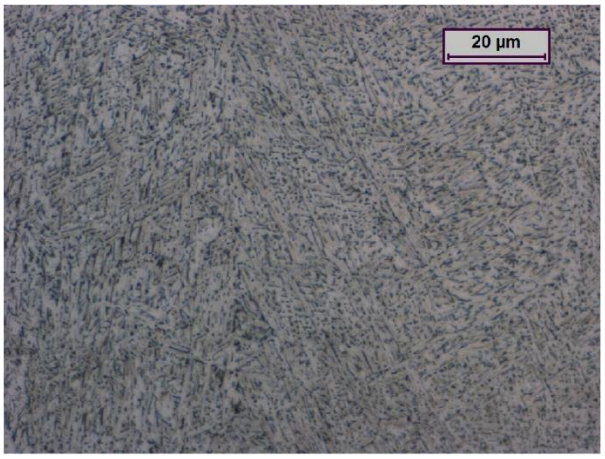
Unit Cell Size	Tensile Adhesion (MPa)	Network Porosity (%)
1.7 mm	80.50	66.98
1.2 mm	80.05	59.67

MICROSTRUCTURE

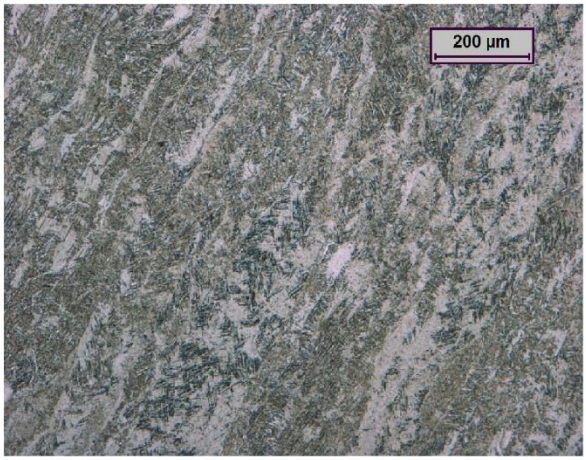
AS-BUILT



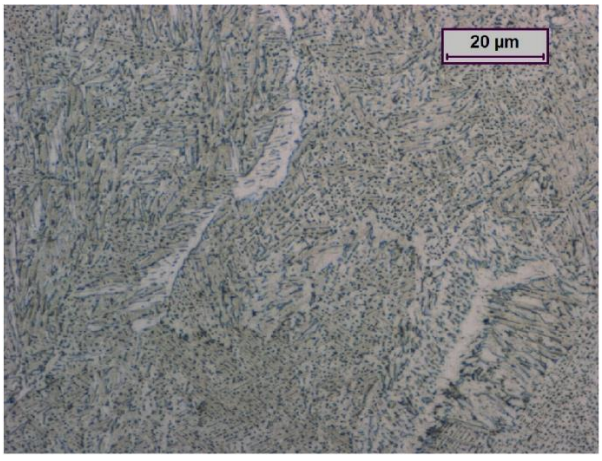
Z-Direction



Z-Direction



X/Y-Direction



X/Y-Direction