

Additive Manufacturing Analysis Report



Part name: Additive_Minds_Example_Part

July 18, 2023 11:18 AM

Part Information

Project name: Additive_Minds_Example_Part.stl

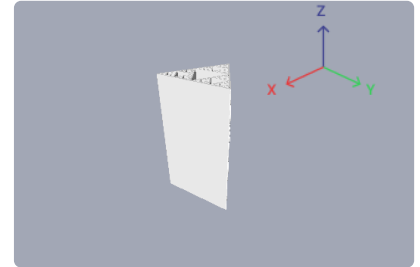
Part name: Additive_Minds_Example_Part

Original material: Ti-6Al-4V Solution treated and aged (SS)

Dimensions [mm]: 23.24 x 24.34 x 42.5

Volume [mm3]: 4620

Tray Orientation



Additive manufacturing solution

Best Match \$ 🕒 🌐 🏠 BUY/FLY 5

Result	Cost estimation	Production Time	Recommended printer	Recommended material
✔️ Printable with changes	Production cost: \$19 - 23 Product life cycle: Low volume production (Qty: 50)	3 days for first shipment	M 400-4	EOS Titanium Ti64

3D Printing vs. CNC

Manufacturing method	3D printing ✔️ Printable with changes	CNC
Total part cost [\$]	\$ 19 - 23	200.00
Production Time (days)	🕒 3	83
Material	EOS Titanium Ti64	Ti-6Al-4V Solution treated and aged (SS)

Cost Parameter

Product life cycle	Low volume production
Surface area machining added	-
Initial technology setup costs	✔️
Complex part	✔️
Estimated yearly production quantity	50 parts

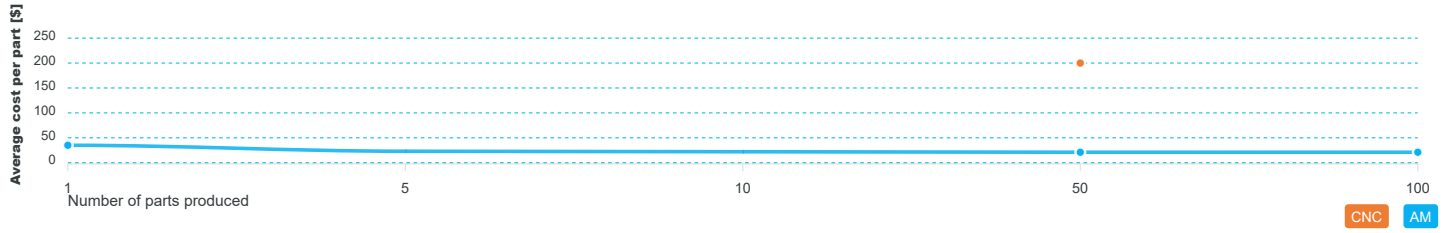
Material Analysis

Comparison	Printed Material	Original Material	% Deviation
Material	EOS Titanium Ti64	Ti-6Al-4V Solution treated and aged (SS)	—
Ultimate Tensile Strength [MPa]	XY: 1290 Z: 1240	1020 ± 122	+21%
Elongation At Break [%]	XY: 7 Z: 10	11 ± 1	-37%
Stiffness (Youngs Modulus) [GPa]	110	105 ± 3.5	+4%
Yield Strength [MPa]	XY: 1140 Z: 1120	827 ± 121	+35%
Density [g/cm ³]	4.41	4.4	0%
Thermal Conductivity [W/(m·K)]	—	7.2 ± 0.1	—
Accuracy [µm]	30	—	—

Geometry Analysis

✔ Part size	Dimensions are 23.24 x 24.34 x 42.50 mm, volume is 4,620 mm ³ . Packing density is 1.22%
✔ Thickness	The part passed 0.4 mm minimal thickness test.
✔ Tolerance	No tolerance requirement set in CAD file or by user.
✔ Holes	The part passed the minimal holes diameter size test.
✔ Threads	No threads found in the part.
✔ Internal Cavities	No internal cavities detected.
⚠ CAD file intact	Issues might effect the print, depends on the severity, slicer or printer. The object in the CAD has a non manifold geometry. The object in the CAD has a self-intersected geometry.
✔ Material properties match	Properties match found.
✔ Milling metal supports	Part's surfaces are accessible for CNC milling machine, removing supports is possible.
✔ Heat deformation	Heat deformation is not likely to occur during printing

Financial break-even analysis of 3D printing compared with CNC



5 The part is cost effective

Cost analysis table view

Comparison	M 400-4	CNC
Material	EOS Titanium Ti64	Ti-6Al-4V Solution treated and aged (SS)
Production [\$]	19 - 23	200
Material [\$]	6.89 - 9.32	
Machine [\$]	3.56 - 5.75	
Consumables [\$]	0 - 0.01	
Post process (Mandatory) [\$]	6.68	
Labor [\$]	0.87 - 0.90	

Production time analysis of 3D printing compared with CNC



50 out of 50 parts will be delivered in 3 days when using AM
 31 out of 50 parts will be delivered in 62 days when using CNC