



Ti6Al4V Gr23

Titanium Based Alloy

A well-know light alloy characterised by excellent mechanical properties and corrosion resistance combined with low specific weight and biocompatibility. Ideal for many high-performance engineering applications.

Typical Mechanical Properties (Heat Treated)

Ultimate tensile strength	1230 MPa (1020MPa)
Yield strength	1070 MPa (920MPa)
Elongation at break	8% (17%)

Highlights

- Excellent mechanical properties
- Excellent strength to weight ratio
- Excellent corrosion resistance
- Applications in aerospace, motorsport, marine and biomedical sectors
- **Layer thickness: 60µm**
- Density >99.8%
- ASTM standard mechanical properties
- Good productivity
- Minimum controlled features 0.5mm

Process Parameter



Process Readiness Level (PRL)



Ti6Al4V Gr23

Titanium Based Alloy

Balanced Parameter

To learn more,
contact us: [info@
additiveindustries.com](mailto:info@additiveindustries.com)

or visit:
additiveindustries.com

Powder Chemistry^[2,3]

Composition	Ti	V	Al	O	N	H	Fe	C	(Others Total)	(Others Each)
Min (wt%)	Bal	3.5	5.5	0	0	0	0	0	0	0
Max (wt%)	Bal	4.5	6.5	0.13	0.03	0.0125	0.25	0.03	0.4	0.1

Process details

Layer thickness	60	[µm]
Build rate ^[8] (per laser)	32.9	[cm ³ /hr]
Optical density ^[4]	≥ 99.8	[%]
Volumetric density ^[11]	≥ 4.41	[g/cm ³]

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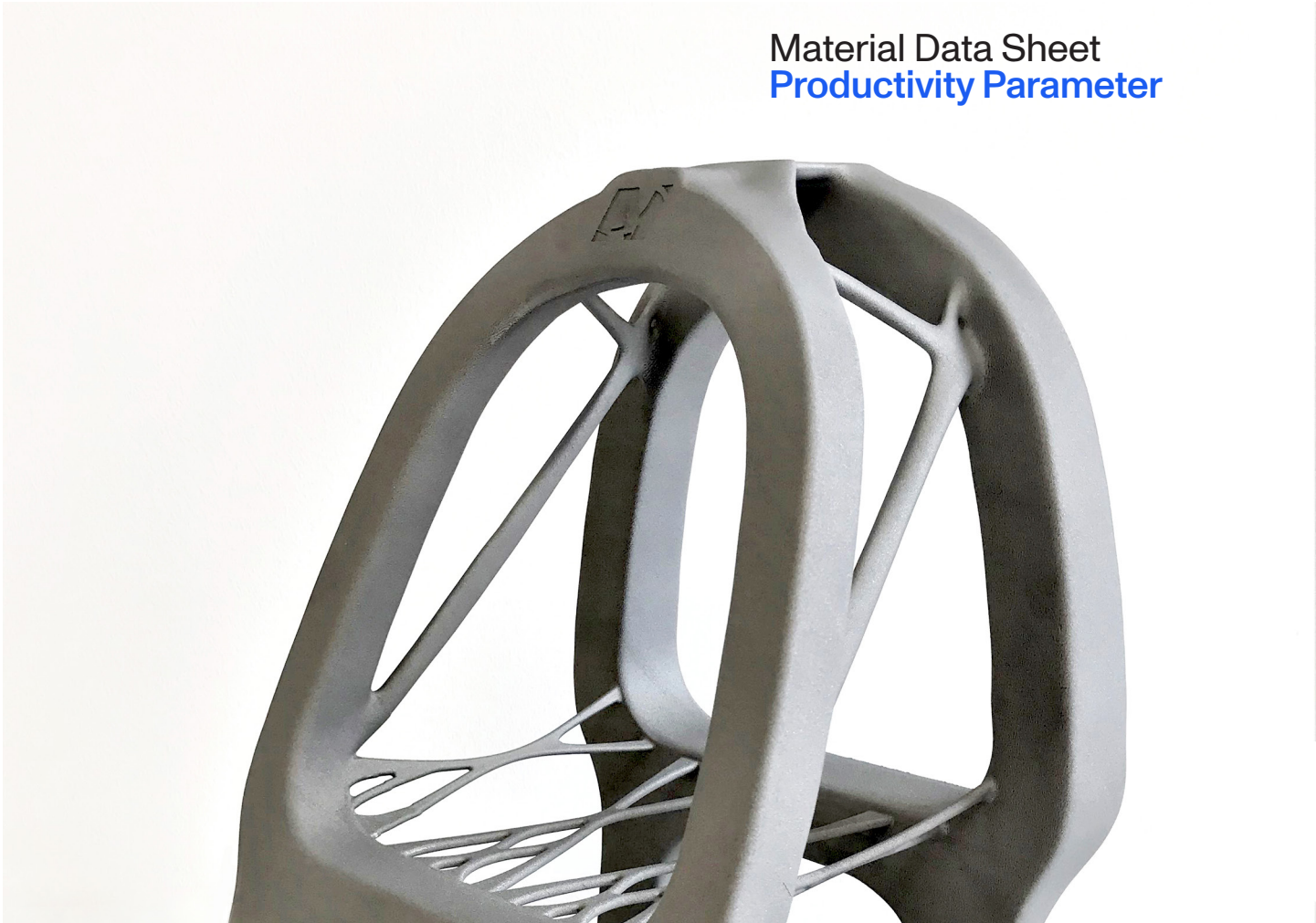
Additive Industries
North America, Inc.
Camarillo, United
States of America
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Mechanical properties ^[5]	Orientation	As-built (Mean)	Standard Dev.	Heat-treat (Mean)	Standard Dev.	Units
Ultimate tensile strength	Horizontal	1230	15	1020	10	[MPa]
	Vertical	1200	15	1000	10	[MPa]
Yield strength	Horizontal	1070	15	920	20	[MPa]
	Vertical	1080	15	900	20	[MPa]
Elongation at break	Horizontal	8	2	17	2	[%]
	Vertical	10	2	19	2	[%]
Youngs modulus	Horizontal	115	5	115	5	[GPa]
	Vertical	115	5	115	5	[GPa]
Vickers Hardness ^[6]		350	10	330	10	[HV10]

Surface Roughness ^[7]	Mean	Standard Deviation	Units
Vertical Surface Roughness (Ra)	9	1	[µm]
Vertical Surface Roughness (Rz)	54	10	[µm]
45° Surface Roughness (Ra)	18	5	[µm]
45° Surface Roughness (Rz)	93	25	[µm]

Notes

1. The material is processed under Argon shielding atmosphere.
2. Powder Chemistry as per Additive Industries specification O2333 Rev. 2.0 compliant with ASTM F2924
3. Additive Industries consolidated material is in compliance with ASTM B348
4. Density measured by Optical Measurement Method as per internal process. This is the minimum guaranteed value that is achieved under standard processing conditions, manufactured using Additive Industries' qualification jobs.
5. Tensile test samples were produced as round blanks. These were machined to size and tested in accordance with ASTM E8m at a NADCAP approved supplier.
6. Hardness measured in accordance with DIN EN ISO6507-1:2018 as per internal process. Hardness values measured in XY and XZ planes from components manufactured using Additive Industries' qualification jobs.
7. Surface Roughness measured in as-printed condition in accordance with internal process. Roughness measurement conducted on specimens with varying unsupported manufacturing angle.
8. Build Rate stated is a typical value per laser. It is calculated using the formula: Layer Thickness x Laser Scan Speed x Hatch Distance.
9. Parameter released: Ti64_60_BAL_MF1A64_3.0.
10. Heat Treatment : 850 °C for 4 hours in a vacuum environment.
11. Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.



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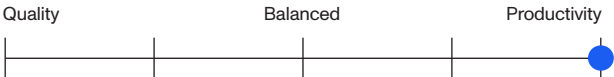
Typical Mechanical Properties (Heat Treated)

Ultimate tensile strength	1241 MPa (1050MPa)
Yield strength	1097 MPa (948MPa)
Elongation at break	8% (17%)

Highlights

- Excellent mechanical properties
- Excellent strength to weight ratio
- Excellent corrosion resistance
- Applications in aerospace, motorsport, marine and biomedical sectors
- **Layer thickness: 120µm**
- Density >99.8%
- ASTM standard mechanical properties
- High productivity
- Minimum controlled features 1mm

Process Parameter



Process Readiness Level (PRL)



Ti6Al4V Gr23

Titanium Based Alloy

Productivity Parameter

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Powder Chemistry^[2,3]

Composition	Ti	V	Al	O	N	H	Fe	C	(Others Total)	(Others Each)
Min (wt%)	Bal	3.5	5.5	0	0	0	0	0	0	0
Max (wt%)	Bal	4.5	6.5	0.13	0.03	0.0125	0.25	0.03	0.4	0.1

Process details

Layer thickness	120	[µm]
Build rate ^[8] per laser	64.8 (259.2 quad laser)	[cm ³ /hr]
Optical density ^[4]	≥ 99.8	[%]
Volumetric density ^[11]	≥ 4.41	[g/cm ³]

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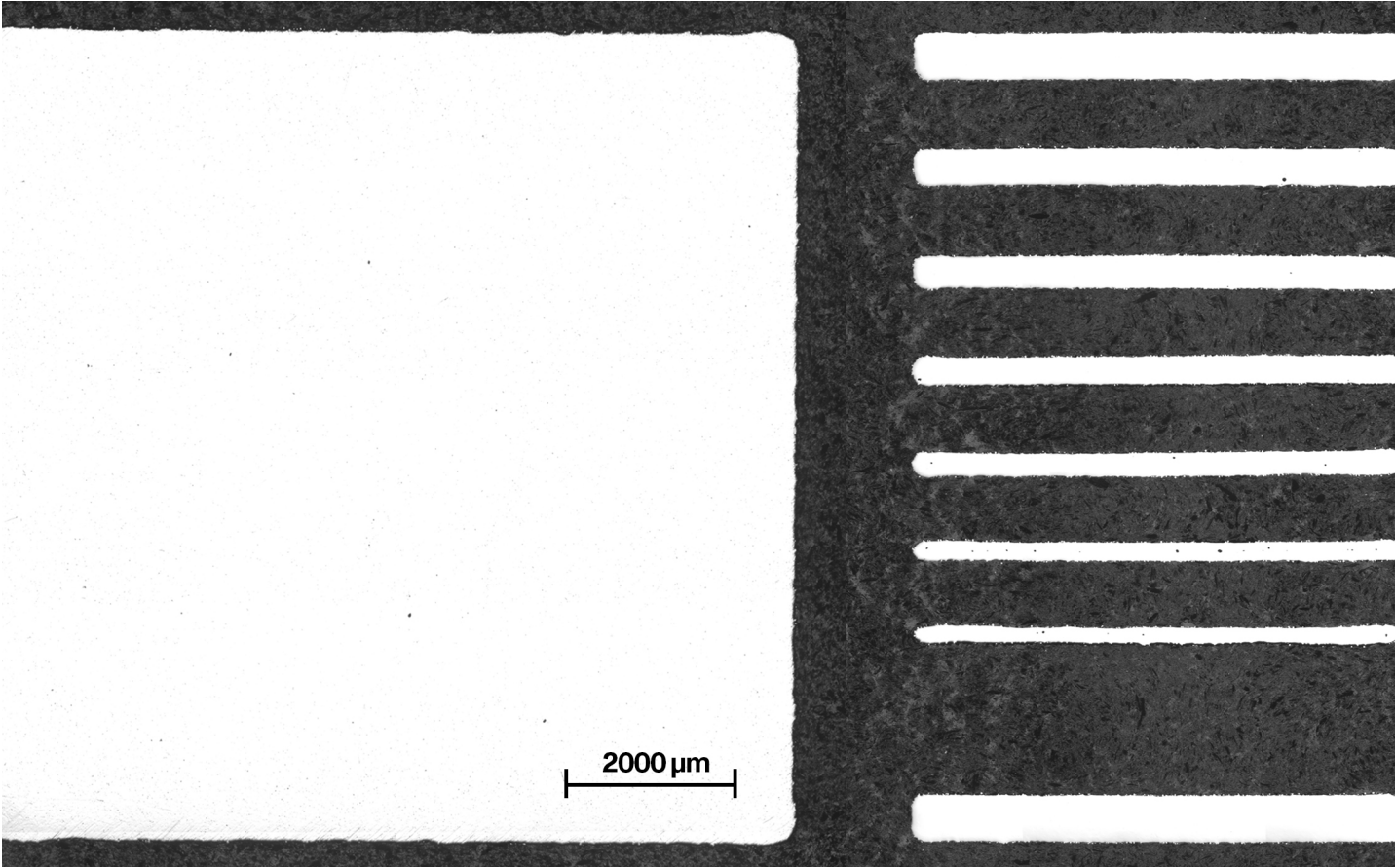
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Mechanical properties ^[5]	Orientation	As-built (Mean)	Standard Dev.	Heat-treat (Mean)	Standard Dev.	Units
Ultimate tensile strength	Horizontal	1241	20	1050	10	[MPa]
	Vertical	1187	5	1051	5	[MPa]
Yield strength	Horizontal	1097	20	948	10	[MPa]
	Vertical	1077	10	954	10	[MPa]
Elongation at break	Horizontal	8	5	17	2	[%]
	Vertical	11	5	19	2	[%]
Youngs modulus	Horizontal	117	20	109	30	[GPa]
	Vertical	115	5	111	30	[GPa]
Vickers Hardness ^[6]		343	10	335	5	[HV10]

Surface Roughness ^[7]	Mean	Standard Deviation	Units
Vertical Surface Roughness (Ra)	11	1	[µm]
Vertical Surface Roughness (Rz)	57	5	[µm]
45° Surface Roughness (Ra)	20	1	[µm]
45° Surface Roughness (Rz)	103	5	[µm]

Notes

1. The material is processed under Argon shielding atmosphere.
2. Powder Chemistry as per Additive Industries specification O2333 Rev. 2.0 compliant with ASTM F2924
3. Additive Industries consolidated material is in compliance with ASTM B348
4. Density measured by Optical Measurement Method as per internal process. This is the minimum guaranteed value that is achieved under standard processing conditions, manufactured using Additive Industries' qualification jobs.
5. Tensile test samples were produced as round blanks. These were machined to size and tested in accordance with ASTM E8m at a NADCAP approved supplier.
6. Hardness measured in accordance with DIN EN ISO6507-1:2018 as per internal process. Hardness values measured in XY and XZ planes from components manufactured using Additive Industries' qualification jobs.
7. Surface Roughness measured in as-printed condition in accordance with internal process. Roughness measurement conducted on specimens with varying unsupported manufacturing angle.
8. Build Rate stated is a typical value per laser. It is calculated using the formula: Layer Thickness x Laser Scan Speed x Hatch Distance.
9. Parameter released: Ti64_120_PRD_MF1A55_INT_1.0.
10. Heat Treatment : 850 °C for 4 hours in a vacuum environment.
11. Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.



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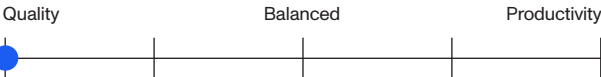
Typical Mechanical Properties (Heat Treated)

Ultimate tensile strength	1251 MPa (1005MPa)
Yield strength	1071 MPa (906MPa)
Elongation at break	11.5% (18.7%)

Highlights

- Excellent mechanical properties
- Excellent strength to weight ratio
- Excellent corrosion resistance
- Applications in aerospace, motorsport, marine and biomedical sectors
- **Layer thickness: 60μm**
- Density >99.9%
- ASTM standard mechanical properties
- High productivity
- Minimum controlled features 0.25mm

Process Parameter



Process Readiness Level (PRL)



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Quality Parameter

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Powder Chemistry^[2,3]

Composition	Ti	V	Al	O	N	H	Fe	C	(Others Total)	(Others Each)
Min (wt%)	Bal	3.5	5.5	0	0	0	0	0	0	0
Max (wt%)	Bal	4.5	6.5	0.13	0.03	0.0125	0.25	0.03	0.4	0.1

Process details

Layer thickness	60	[μm]
Build rate ^[8] per laser	24.6	[cm^3/hr]
Optical density ^[4]	≥ 99.9	[%]
Volumetric density ^[11]	≥ 4.42	[g/cm^3]

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Mechanical properties ^[5]	Orientation	As-built (Mean)	Standard Dev.	Heat-treat (Mean)	Standard Dev.	Units
Ultimate tensile strength	Horizontal	1251	10	1005	5	[MPa]
	Vertical	1217	5	994	5	[MPa]
Yield strength	Horizontal	1071	10	906	5	[MPa]
	Vertical	1070	10	894	5	[MPa]
Elongation at break	Horizontal	11.5	2	18.7	1	[%]
	Vertical	12.4	2	18.7	1	[%]
Youngs modulus	Horizontal	111	5	114	5	[GPa]
	Vertical	111	5	114	5	[GPa]
Vickers Hardness ^[6]		339	5	325	5	[HV10]

Surface Roughness ^[7]	Mean	Standard Deviation	Units
Vertical Surface Roughness (Ra)	9	1	[μm]
Vertical Surface Roughness (Rz)	44	5	[μm]
45° Surface Roughness (Ra)	14	4	[μm]
45° Surface Roughness (Rz)	72	15	[μm]

Notes

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- Surface Roughness measured in as-printed condition in accordance with internal process. Roughness measurement conducted on specimens with varying unsupported manufacturing angle.
- Build Rate stated is a typical value per laser. It is calculated using the formula: Layer Thickness x Laser Scan Speed x Hatch Distance.
- Parameter released: TI64_60_QUA_MF1A64_INT_2.0.
- Heat Treatment : 850 °C for 4 hours in a vacuum environment.
- Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.



Disclaimer

The data presented in this material datasheet is valid only for Additive Industries' released powder, machine, and parameter sets, processed under the defined shielding atmosphere. The properties of the printed parts have been measured on test coupons according to industry standards where available, and the data correspond to our state-of-the-art at the time of publication. These results are based on Additive Industries' signoff build layout and reflect material performance under the specified conditions; for more information, please contact Additive Industries. Users should be aware that variations in the presented values may arise due to differences in process conditions, including but not limited to thermal management, build plate temperature, job-specific heat accumulation, inter-layer time, part positioning, and overall machine calibration. The data provided do not warrant any guarantee for printed parts, and it remains the responsibility of the producer or purchaser to verify the ultimate properties of the printed material for their specific application. The listed data are subject to change without notice as we continuously strive to develop and improve our machine performance and the properties of printed materials. Users are advised to exercise caution and consider material selection, build layout, and machine configuration when interpreting and applying this information.

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