

Approved Certificate

Titanium Sample Cert TMS

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AAC THAMILION

100 Titanium Way Toronto, OH, 43964

Telephone (740) 537-5694, Fax (740) 537-5653

Page 1 of 6

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CERT ID H31639-C1X

12-FEB-2020 17:29:45 GMT

SOLD TO CUSTOMER

TIMET Service Center St. Louis 1250 Interstate Drive, Wentzville, MO 63385

20160916 PURCHASE ORDER

HEAT NUMBER H31639

GRADE TIMETAL®6-4 SHIP TO ADDRESS

TIMET Service Center St. Louis 1250 Interstate Drive, Wentzville, MO 63385

TWS Titanium

itaniim Sample

TEST NUMBER \$17533

PRODUCT DESCRIPTION 0.063" SQ Sheet

TWS Titanium Sample Cert TMS Titanium Sample Cert ✓ DELIVERY CONDITION Annealed

Specifications

itanium Sample This material complies with the following specifications:

AMS 4911 N

AB-1 COND A

AMS-T-9046 A ASTM B 265 -15

Grade 5

ASTM F 1472 -14

DMS 1592 H

ISO 5832-3 7/1/96

MIL-T-9046 JAM 2

AB-1 COND A

Additional Specifications

AMS 4911 P

AMS 4911 R

ASME SB 265-19

Melt Method

3-VAR

Melt/Process Location

TIMET - Henderson, NV, USA

TIMET - Toronto, OH, USA Stitanium Sample Cert

- ort MS Titani

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- 1. Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
- 2. During the manufacturing process, this material has not come in contact with mercury or radioactive luminescent materials; as such, it is certified to be free of mercury and radioactivity.
- 3. Microstructure examined and acceptable to the order specifications.
- Bend testing performed meets or exceeds the requirements of the ordered specifications.
- TIMET-Toronto is an approved supplier of this product per DMS QPL 1592 Issue 19. Ingot melted in accordance with DMS 2442E R-1; TIMET-Henderson, NV, is an approved ingot source per DMS QPL-2442 Issue 20.
- Ingot calculated beta transus = 1844°F top and 1850°F bottom.
- No weld repair has been performed on this material.
- Material complies with DFARS 252.225-7008.
- Material certificate in compliance with EN 10204:2004 Type 3.1.
- The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under Federal Statutes including federal law, Title 18, Chapter 47.
- 11. TIMET-Toronto has complied with all metal stock producer requirements of AS6279 A.
- TIMET-Toronto has a Quality Management System that is in compliance with ISO 9001:2015, and AS 9100:2016 Revision D. (AS9100 certificate is available at www.timet.com)
- 13. Customer will accept TIMET EXCEPTION to microstructure requirements of ISO 5832-3.
- This revised certificate supersedes all previously issued certificates but does not in any way alter, amend, waive, or modify the terms and conditions of the original sale as contained on TIMET's sales acknowledgement.
- TIMET-Toronto has complied with all metal stock producer requirements of AS6279 B.
- This material is capable of the service center providing LCS compliance.
- 17. TIMET-Toronto is an Approved Process Source for The Boeing Company as specified in D1-4426, processor code number
- 18. Heat treatment in accordance with MIL-H-81200 B, replaced by AMS-H-81200 D.

Ingot Chemical Analysis (Weight percent)

Unless otherwise noted, Ingot Chemical Analysis performed at Henderson Process Lab, 181 N. Water Street, Henderson, NV, 89015, USA

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> Product Analysis (Weight percent)

ample Cert Unless otherwise noted, Product Analysis performed at Toronto Laboratory, 100 Titanium Way, Toronto, OH, 43964, USA Jillin Sample **Citanium**

Sample ID

23 27

1. Hydrogen values reported in PPM. Hydrogen determined by inert gas fusion per ASTM E1447. Carbon determined by out the writed many the statement of the combustion per ASTM E1941. Oxygen and Nitrogen determined by inert gas fusion per ASTM E1409. Henderson Melt: Metallics determined by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) per ASTM F2371. Morgantown Melt: Copper and Boron by atomic spectrometry (ingot only) and all other elements by x-ray fluorescence MS Titanium Sample Cert This Titanium

Hanium Sample Cert. TWS Titanium Samir 2. Residual elements each less than 0.10% maximum, 0.40% maximum total.

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RTT - Transverse (ASTM E 8) After Fracture

Test Condition: [MILL] Annealed 30 Minutes @ 1400°F, AC

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Sample ID	ksi	ksi	C %
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27	142	154	14

Unless otherwise noted, testing performed at Toronto Laboratory, 100 Titanium Way, Toronto, OH, 43964, USA

Micro Exam - Transverse ETTC 4, KROLLS, 100X

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Test Condition: [MILL] Annealed 30 Minutes @ 1400°F, AC

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Sample ID 22 27	Mier P3 P3	Mier	P/F PASS PASS	ert
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Tests on Other Material

Unless otherwise noted, testing performed at Toronto Laboratory, 100 Titanium Way, Toronto, OH, 43964, USA

Batch: H31788-C2R (S17973)

Bend Test, T-Direction, R/T, (ASTM E 290)

Test Condition: Periodic Test: [MILL] Annealed 30 Minutes @ 1400°F, AC + [LAB] Annealed 20 Minutes @ 1325°F, AC mplecent

20X105

RTT - Longitudinal (ASTM E 8) After Fracture
Test Condition: Periodic Test: [MILL] Annealed 30 Minutes @ 1400°F, AC + [LAB] Annealed 20 Minutes @ 1325°F, AC

0.2YS
U.T.S. 2inEL

Sample Id ksi ksi 0/

Results are from TIMET Quality Control Records on file Sales Order # 524065

Givannone

Michael Giovannone 2020.02.12 12:30:43

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AAC Titanium

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TMSTitarit

Michael Giovannone - Certification Specialist

Version History

21-AUG-2019 Original Version

06-FEB-2020

Certificate revised, per customer request, to include AMS 4911 R, AS6279 B, ASME SB 265-19 Grade 5,

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LCS compliance.

INSTITE

12-FEB-2020

Certificate revised to add DI-4426, MIL-H-81200 B and AMS-H-81200 D.

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