

Titanium Metals Corporation

Approved Certificate

100 Titanium Way, Toronto, OH 43964 Telephone (740) 537-5694, Fax (740) 537-5653

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CERT ID 09392DAB01 20-JUN-2013 14:54:04 GMT

PURCHASE ORDER 20094785

SOLD TO CUSTOMER TIMET Service Center St. Louis 109 Interstate Drive, Wentzville, MO 63385

HEAT NUMBER 09392DA

GRADE TIMETAL®6-4

SHIP TO ADDRESS TIMET Service Center St. Louis 109 Interstate Drive, Wentzville, MO 63385

ium Sample Cert

Je Cert TMS

TEST NUMBER S7795

> PRODUCT DESCRIPTION 0.020" SQ Sheet

DELIVERY CONDITION Annealed TMSTitanii

Specifications

This material complies with the following specifications:

AMS 4911 M

AMS-T-9046 A

AB-1 Cond A

ASTM B 265 -11el

GR.5

ASTM F 1472 -08e1 BS 2TA59 2009 BS 7252 PART 3 1997

DMS 1592 H ISO 5832-3 7/1/96

Melt Method

Melt/Process Location

EB+VAR

3 Titanium Sample TIMET - Morgantown, PA, USA / TIMET - Toronto, OH,

USA

Compliance Statements

- Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
- 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 18. Ingot melted in accordance with DMS 2442; TIMET-Morgantown, PA, is an approved ingot source per DMS QPL-2442 Issue 18.
- 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.
- Material has not been exposed to radioactive contamination.
- No weld repair has been performed on this material.
- Note: The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.
- Material complies with DFARS 252,225-7008
- Material certificate in compliance with EN 10204:2004 Type 3.1. 10.
- TIMET-Toronto has a Quality Management System that is in compliance with ISO 9001:2008, and AS 9100:2009 Revision C. (AS9100 certificate is available at www.timet.com)
- Customer will accept TIMET EXCEPTION to microstructure requirements of BS 7252 PART 3 & ISO 5832-3.



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Ingot Chemical Analysis

(Weight percent)

Unless otherwise noted, Ingot Chemical Analysis performed at Morgantown Process Lab, 900 Hemlock Road, Morgantown, PA, 19543, USA

Sample ID	Fe	v ,	Al	C	0	N	Y	BT
TOP	0.16	3.94	6.10	0.017	0.18	0.007	<0.0005	1828
BOTTOM	0.15	3.92	6.22	0.014	0.18	0.007	< 0.0005	1829

Product Analysis (Weight percent)

Unless otherwise noted, Product Analysis performed at Toronto Laboratory, 100 Thanium Way, Toronto, OH, 43964, USA

Sample ID	CH
30	76
35	81

Chemistry Statements

Cert TMS Tranium Hydrogen values reported in PPM. Hydrogen determined by inert gas fusion per ASTM E1447. Carbon determined by 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 E2371. Morgantown Melt: Copper and Boron by atomic spectrometry (ingot only) and all other elements by x-ray fluorescence spectrometry.

Residual elements each less than 0.10% maximum, 0.40% maximum total.

Balance titanium.

Mechanical Properties

TMS Titanium Sample Cert A3964, US, GAI Unless otherwise noted, testing performed at Toronto Laboratory, 160 Trianium Way, Toronto, OH, 43964, USA tanium Sample Cert

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

BF 4.5

PF 4.5
Test Condition: [MILL] Annealed 30 Minutes @ 1400°F, AC

Sample ID 20X105
P/F
30/35 PASS P/F PASS zample Cert TMST



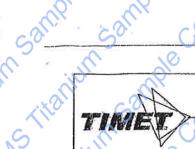
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Metallurgical Properties

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

Micro Exam Transverse ETTC 4, KROLLSS, 100X

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

Sample ID	MT-PRE	MT-OCC	OVERALL
	Micr	Micr	P/F
30	Pi 🔨	- (1)	PASS
35	PI	-(1)	PASS

Tests on Other Material

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

Batch: 08630DDA01 (\$7809)

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

Sample ID 20X105 bend PASS

16

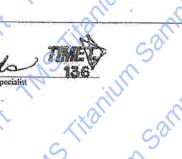
Batch: 08630DDA01 (\$7809) RTT - Longitudinal (ASTM E 8)

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

Sample ID 2inEL ksi ksi % 141 150 12 13

Results are from TIMET Quality Control Records on file

Sales Order # 372103 Item # 10





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