

5884.2.2



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

Approved Certificate

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

TEST NUMBER
S7795

PRODUCT DESCRIPTION
0.020" SQ Sheet

DELIVERY CONDITION
Annealed

Specifications

This material complies with the following specifications:

- AMS 4911 M
- AMS-T-9046 A
- ASTM B 265 -11e1
- ASTM F 1472 -08e1
- BS 2TA59 2009
- BS 7252 PART 3 1997
- DMS 1592 H
- ISO 5832-3 7/1/96

AB-1 Cond A
GR.5

Melt Method
EB+VAR

Melt/Process Location
TIMET - Morgantown, PA, USA / TIMET - Toronto, OH, USA

Compliance Statements

1. Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
2. Microstructure examined and acceptable to the order specifications.
3. Bend testing performed meets or exceeds the requirements of the ordered specifications.
4. 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.
5. 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.
6. Material has not been exposed to radioactive contamination.
7. No weld repair has been performed on this material.
8. Note: The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.
9. Material complies with DFARS 252.225-7008
10. Material certificate in compliance with EN 10204:2004 Type 3.1.
11. 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)
12. Customer will accept TIMET EXCEPTION to microstructure requirements of BS 7252 PART 3 & ISO 5832-3.



Accredited
Materials Testing Laboratory
Nondestructive Testing
Heat Treating

REGISTERED ISO 9001/AS9100 FACILITY

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109 Interstate Drive, Wentzville, MO 63385**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	O	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 Titanium Way, Toronto, OH, 43964, USA.

Sample ID	H
30	76
35	81

Chemistry Statements

1. 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: Metallica 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.
2. Residual elements each less than 0.10% maximum, 0.40% maximum total.
3. Balance titanium.

Mechanical Properties

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

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

BF 4.5

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

Sample ID	20X105
	P/F
30/35	PASS

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109 Interstate Drive, Wentzville, MO 63385

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

BF 4.5

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

Sample ID**20X105****P/F****VARIOUS****PASS**

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

BF 4.5

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

Sample ID**10X180****P/F****VARIOUS****PASS**

RTT - Longitudinal (ASTM E 8)

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

Sample ID**0.2YS****U.T.S.****2inEL****EL 5.65A****ksi****ksi****%****%****30**

140

152

13

12

35

139

150

14

19

RTT - Transverse (ASTM E 8)

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

Sample ID**0.2YS****U.T.S.****2inEL****EL 5.65A****ksi****ksi****%****%****30**

147

158

11

10

35

144

155

10

17

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109 Interstate Drive, Wentzville, MO 63385

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	P1	-	PASS
35	P1	-	PASS

Tests on Other Material

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

Batch: 08630DDA01 (S7809)

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

BF 4.5

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

Sample ID	20X105
	bend
16	PASS

Batch: 08630DDA01 (S7809)

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	0.2YS	U.T.S.	2inEL
	ksi	ksi	%
13	141	150	12

Results are from TIMET Quality Control Records on file

Sales Order # 372103 Item # 10

v.1

Michelle Edwards
Michelle Edwards - Certification Specialist



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Materials Testing Laboratory
Nondestructive Testing
Metal Treating

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