

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

Page 1 of 4

CERT ID06934DC02
03-DEC-2010 20:53:13 GMT**PURCHASE ORDER**

20067571

SOLD TO CUSTOMERTIMET Service Center St. Louis
109 Interstate Drive, Wentzville, MO 63385**HEAT NUMBER**

06934DC

GRADE

TIMETAL06-4

SHIP TO ADDRESSTIMET Service Center St. Louis
109 Interstate Drive, Wentzville, MO 63385**TEST NUMBER**

S5568

PRODUCT DESCRIPTION

.080" SQ Sheet

DELIVERY CONDITION

Annealed

Specifications

This material complies with the following specifications:

AMS 4911 L

ASTM F 1472 -08

DMS 1592 G

ISO 5832-3 7/1/96

Melt Method

EB+VAR

Melt/Process LocationTIMET - Morgantown, PA, USA / TIMET - Toronto, OH,
USA**Compliance Statements**

1. In accordance with AMS-T-9046 B cancellation notice, material is tested and certified to Table 1 superseding specification AMS 4911 Rev L.
2. Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
3. Microstructure examined and acceptable to the order 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. TIMET-Toronto has a Quality Management System that is in compliance with ISO 9001:2008, ANSI/ISO/ASQ Q9001-2008 and AS 9100:2001 Revision B, Certificate No. UQA 0113328, through Lloyd's Register Quality Assurance, effective 24-Jul-03.
7. Customer will accept TIMET EXCEPTION to microstructure requirements of ISO 5832-3.



Accredited

Materials Testing Laboratory

ISO/IEC 17025

Nondestructive Testing

Heat Treating

REGISTERED ISO 9001/AS9100 FACILITY

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Page 2 of 4

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PURCHASE ORDER

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SOLD TO CUSTOMERTIMET Service Center St. Louis
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, 15943, US

Sample ID	Fe	V	Al	C	O	N	Y
TOP	0.15	3.96	6.23	0.021	0.19	0.005	<0.0005
BOTTOM	0.14	3.95	6.27	0.020	0.19	0.006	<0.0005

Product Analysis
(Weight percent)

Unless otherwise noted, Product Analysis performed at Toronto Laboratory, 100 Titanium Way, Toronto, OH, 43964, US

Sample ID	H
41	22
48	23

Chemistry Statements

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

Mechanical Properties

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

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

BF 5.0

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	1X105
	P/F
41/48	PASS

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

BF 5.0

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	1X105
	P/F
VARIOUS	PASS

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

BF 5.0

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	20X105
	P/F
VARIOUS	PASS

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ISO/IEC 17025
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REGISTERED ISO 9001/AS9100 FACILITY

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Page 3 of 4

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109 Interstate Drive, Wentzville, MO 63385

RTT - Longitudinal (ASTM E 8)

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	0.2YS ksi	U.T.S. ksi	2inEL %
41	143	151	14
48	150	157	14

RTT - Transverse (ASTM E 8)

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	0.2YS ksi	U.T.S. ksi	2inEL %
41	141	150	12
48	141	151	12

Metallurgical Properties

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

Micro Exam - Transverse

ETTC 4, KROLLS, 100X

Test Condition: Mill Annealed 30 Minutes @ 1400°F AC

Sample ID	MT-PRE Micr	MT-OCC Micr	OVERALL P/F
41	P1	-	PASS
48	P1	-	PASS



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109 Interstate Drive, Wentzville, MO 63385

Tests on Other Material

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

Batch: H15174-C1X (S5581)

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

BF 5.0

Test Condition: Periodic Test: Mill Annealed 30 Minutes @ 1400°F AC + Lab Annealed 20 Minutes @ 1325°F AC

Sample ID 20X105

bend

14

PASS

Batch: H15174-C1X (S5581)

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

%

14

147

155

14

Results are from TIMET Quality Control Records on file

Sales Order # 296122 Item # 20

v.1


Michelle Edwards - Certification Specialist
136

Accredited

Materials Testing Laboratory
ISO/IEC 17025
Nondestructive Testing
Heat Treating

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Titanium Metals Corporation



St. Louis Mill Sales
109 Interstate Drive
WENTZVILLE MO 63385
USA
Tel: 800-753-1550 Fax: 636-887-9098
Shipping Plant: St. Louis Service Center

Attachment to Product Certification

Repeat Printout

Customer P.O. Number/Date

22557 LINE 6/Jul 13, 2010

TIMET Sales Order Number/Date

292023/Jul 13, 2010

TIMET Packing List Number/Scheduled Ship Date

80446767/Dec 10, 2010

TIMET Item #	Material #	Material Description	Quantity	Weight
Customer Item #	Customer Material #			

000010	125153	TIMETAL® 6-4 Titanium Aero Sheet		
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Specifications

: 01 AMS 4911 * L
: 02 AMS-T-9046 * B AB1 COND A
: 03 ASTM B 265 * -09A GR 5
: 04 ASTM F 1472 * -08
: 05 DMS 1592 * G
: 06 MIL-T-9046 J AM2 AB-1 CONDA

Batch Number

: 06934DCY05 133.000LB 133.000LB

Batch Dimensions

: 0.080" X 36.000" X 96.000"

Batch Number of Pieces

: 3.000

Country of Origin

: USA

Heat Number

: 06934DC

Test Number

: S5568

Batch Number

: 06934DCY07 896.000LB 896.000LB

Batch Dimensions

: 0.080" X 36.000" X 96.000"

Batch Number of Pieces

: 20.000

Country of Origin

: USA

Heat Number

: 06934DC

Test Number

: S5568

B-Additional customer req Specs to the Latest Revisions Per President's Spec Sheet GEAE S-400 Approved Laboratory GEAE S-1000 Supplier Quality Req'ts DFARS 252.225-7014 Alt 1 Compliant MCL F-14/F-17/F-23 LCS Controlled Material produced and controlled in accordance with PWA MCL TIMET LCS Supplier Authorization (10-31-99), PWA MCL Section F-17 (7-31-2007) and PWA 300 BJ.

Results are from TIMET Quality Control Records on file. The undersigned has verified that the information on the attached mill product certification meets the requirements of the above referenced order. This Attachment to Product Certification is specific to your referenced order, is an integral part of and amends the physical and chemical test reports attached. All specification(s) and revision(s) that differ from the attached have been approved for inclusion by the producing facility.

Authorized TIMET Signature

Date

DEC 10 2010

BRIAN C. SMITH