



Certificate of Conformance

Cert Number 198584-6 6/15/2017

TITANIUM METAL SUPPLY INC
12215 KIRKHAM ROAD
STE 300
POWAY, CA 92064

Issued from
Titanium Industries, Inc.
Garden Grove Service Center
7373 Hunt Avenue
Garden Grove, CA 92841

Sold To: TITANIUM METAL SUPPLY INC, 12215 KIRKHAM ROAD, STE 300, POWAY, CA 92064
Ship To: TITANIUM METAL SUPPLY INC, 12215 KIRKHAM ROAD, SUITE 300, POWAY, CA 92064

Customer	12920/0	Your Order	17-9578 (6/13/2017)
Our Order	168254-1-1	Packing List	198584-1 (6/15/2017)

Product Information		Heat	Tag	Pcs	LBS
Titanium Sheet 6AL-4V US Titanium Sheet 0.063" x 36" x 48"		12426DB-S10435	74841A	2	36
Conform To	AMS 4911				

Certificate of Conformance

- All items furnished are in full compliance with purchase order and specification requirements listed, as documented on supplied Mill, Ingot or Lab Report.
- The material supplied did not come in contact with Mercury or Mercury bearing instruments which are not shielded with a double barrier.
- No weld repair has been performed on this material during processing at Titanium Industries.
- The Material supplied meets the visual and dimensional requirements of the Purchase Order
- Raw Material / Product Certification with traceability to manufacturer(s) consisting of inspection test results as required, are included in this certification package.
- Note: The recording of false, fictitious or fraudulent statements or entries on this document may be punished by law.

Authorized Signature: Bajram Ismail Date: 06/15/17

Titanium Industries, Inc
Bajram Ismail
Quality Assurance Representative


Titanium Metals Corporation
Approved Certificate

 100 Titanium Way
 Toronto, OH, 43964

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

Page 1 of 6

CERT ID

 12426DBC01
 22-JAN-2016 21:21:40 GMT

PURCHASE ORDER

20126989

SOLD TO CUSTOMER

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

HEAT NUMBER

12426DB

GRADE

TIMETAL06-4

SHIP TO ADDRESS

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

TEST NUMBER

S10435

PRODUCT DESCRIPTION

0.063" SQ Sheet

DELIVERY CONDITION

Annealed

Specifications

This material complies with the following specifications:

AMS 4911 N

AMS-T-9046 A AB-1 Cond A

ASTM B 265 -13ae1 Gr. 5

ASTM F 1472 -14

BS 2TA59 2009

BS 7252 PART 3 1997

DMS 1592 H

ISO 5832-3 7/1/96

MIL-T-9046 IAM 2 AB-1 Cond A

Additional Specifications

ASTM B 265 -15 Gr. 5

Melt Method

EB+VAR

Melt/Process Location

TIMET - Morgantown, PA, USA /

TIMET - Toronto, OH, USA

This test report shall not be reproduced except in full, without the written approval of TIMET.
 The intentional recording of false, fictitious, or fraudulent statements or entries on the certificate may be punished as a felony under federal law.

First in Titanium Worldwide

**Titanium Metals Corporation****Approved Certificate**100 Titanium Way
Toronto, OH, 43964

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

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CERT ID12426DBC01
22-JAN-2016 21:21:40 GMT**PURCHASE ORDER**

20126989

SOLD TO CUSTOMERTIMET Service Center St. Louis
1250 Interstate Drive, Wentzville, MO 63385**Compliance Statements**

- Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
- 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.
- Microstructure examined and acceptable to the order specifications.
- Bead 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-R1; TIMET-Morgantown, PA, is an approved ingot source per DMS QPL-2442 Issue 20.
- 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.
- TIMET-Toronto has complied with all metal stock producer requirements of AS6279.
- 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.

**Ingot Chemical Analysis
(Weight percent)**

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

	Fe	V	Al	C	O	N	Y	BT
Sample ID								
TOP	0.17	4.00	6.24	0.016	0.18	0.009	<0.0005	1833
BOTTOM	0.15	3.98	6.22	0.015	0.19	0.011	<0.0005	1842

**Product Analysis
(Weight percent)**

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

	H
Sample ID	
29	51
30	62
33	52

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PURCHASE ORDER

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SOLD TO CUSTOMERTIMET Service Center St. Louis
1250 Interstate Drive, Wentzville, MO 63385**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.

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PURCHASE ORDER

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SOLD TO CUSTOMER

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

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

20X105

Sample ID

29/30/33

P/F

PASS

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

BF 4.5

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

20X105

Sample ID

VARIOUS

P/F

PASS

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

BF 4.5

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

10X180

Sample ID

VARIOUS

P/F

PASS

RTT - Longitudinal (ASTM E 8) After Fracture

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

0.2YS

U.T.S.

2inEL

EL 5.65A

Sample ID

29

30

33

ksi

147

146

144

ksi

156

155

153

%

12

12

13

%

16

15

17

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Toronto, OH, 43964

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CERT ID

12426DBC01

22-JAN-2016 21:21:40 GMT

PURCHASE ORDER

20126989

SOLD TO CUSTOMERTIMET Service Center St. Louis
1250 Interstate Drive, Wentzville, MO 63385**RTT - Transverse (ASTM E 8) After Fracture**

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

	0.2YS	U.T.S.	2inEL	EL 5.65A
Sample ID	ksi	ksi	%	%
29	144	153	12	18
30	146	156	12	17
33	144	153	12	17

Metallurgical Properties

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

**Micro Exam - Transverse
ETTCA, KROLLS, 100X**

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

	MT-PRE	MT-OCC	OVERALL
Sample ID	Micr	Micr	P/F
29	P4	-	PASS
30	P4	-	PASS
33	P8	-	PASS

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PURCHASE ORDER

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SOLD TO CUSTOMER

TIMET Service Center St. Louis

1250 Interstate Drive, Wentzville, MO 63385

Tests on Other Material

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

Batch: 12668DDA01 (S10697)

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

20X105

Sample Id

bend

6

PASS

Batch: 12668DDA01 (S10697)

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

%

6

143

153

14

Results are from TIMET Quality Control Records on file
Sales Order # 442393 Item # 60

v.1



Digitally signed by Kevin Patrick

Date: 2016.01.22 16:23:25 -05'00'

Kevin Patrick - Certification Specialist

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First in Titanium Worldwide



St. Louis Mill Sales
 1250 Interstate Drive
 WENTZVILLE MO 63385
 USA
 Tel:800-763-1650 Fax:636-887-9098
 Shipping Plant: St. Louis Service Center

**Attachment to
 Product Certification**

Customer P.O. Number/Date
 CRP-251211-KS LINE 3/Dec 01, 2015
 TIMET Sales Order Number/Date
 457999/Dec 01, 2015
 TIMET Packing List Number/Scheduled Ship Date
 80708358/Feb 19, 2016
 TIMET Internal Revision #: 2

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

000010	125141	TIMETAL® 6-4 Titanium Aero Sheet	15.000PC	535.000LB
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Specifications

- : 08 AMS 4911 * N
- : 09 AMS-T-9046 * A AB-1 CND A
- : 10 ASTM B 265 * -13AE1 GR-5
- : 11 MIL-T-9046 J AM 2 AB-1 CND A
- : 12 ASTM F 1472 * -14
- : 13 DMS 1592 * H
- : 14 ISO 5832-3 * 7/1/96
- : 15 PWA 300 * REV BN
- : 16 EN 10204.3.1 * 2004
- : 17 BS 2TA59 * 2009

Batch Number

- : 12426DBY02
- Batch Dimensions : 0.063" X 36.000" X 96.000"
- Batch Number of Pieces : 15.000
- Country of Origin : USA
- Heat Number : 12426DB
- Test Number : S10435



St. Louis Mill Sales
 1250 Interstate Drive
 WENTZVILLE MO 63385
 USA
 Tel:800-753-1550 Fax:636-887-9098
 Shipping Plant: St. Louis Service Center

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 Product Certification**

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 80708358/Feb 19, 2016
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TIMET Item #	Material #	Material Description	Quantity	Weight
Customer Item #	Customer Material #			

~~B-Additional customer req **Titanium Industries shall be notified prior to shipment of any deviation or variation from process or requirements as listed on the PO** Quality Systems per EN10204 Type 3.1 GEAE S400 Approved Laboratory GEAE S1000 Supplier Quality Req'ts INSPECTION TOLERANCE PER LN 9297 MCL F-17 LCS CONTROLLED PWA 300 MCL SECTION F-17 (Materials, Parts & Assemblies Subject to Laboratory Control at Source) F-14 (Wrought or Extruded Bar, Rod, Tube, Plate, Sheet, Strip & Wire for Non-Rotor Applications) F-22 (Chemical & Metallurgical Processing) F-23 (Test & Calibration Requirements for Commercial & In # House Laboratories) ASQR-01 * REV 9 Original Mill Test Reports required with shipment and invoice and to include melt source certificate. BILLING IS BASED ON THE PRICE PER PIECE Fax copy of bill of lading, packing slip and test reports at time of shipment to Ti Inds Inc. Rockaway NJ Location. ATTN: K. Speer - Fax# 973-983-8015 or e-mail kspeer@titanium.com. Order will be produced to the latest revision of the specification at the time of order acknowledgement Above date is for information only, TIMET to advise firm ship date. TIMET Certifies: 1. During manufacturing, handling, testing and inspection this material did not come in direct contact with Mercury or any device employing a single boundary of containment 2. The recording of false, fictitious or fraudulent statements or entries maybe punishable as a felony under federal statutes including federal law, title 18 Chapter 47. 3. No weld repair has been performed on this material 4. Material has not been exposed to radioactive contamination. Melted and Manufactured in the USA DFARS 252.225-7008 DFARS 252.225-7009 DFARS 252.225-7010 Flatness to be measured IAW TIMETS Procedure outlined in e-mail dtd 02/11/09 ***AMOUNT IS REQUIRED QTY # DO NOT SHORT SHIP*** LCS Controlled per MCL Manual Sections F-17, Revision C F-14, Revision C F-22, Revision B F-23, Revision C *Material produced and controlled in accordance with PWA MCL TIMET LCS Supplier Authorization (11-28-12), PWA MCL Section F-17 Revision C and PWA 300 BN."~~

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

FEB 18 2016

BRIAN STALEY
 Quality Assurance Representative