

Attachment to Product Certification

Customer P.O. Number/Date
15-7616 Rel 1/Mar 23, 2015

TIMET Sales Order Number/Date
437223/Mar 24, 2015

TIMET Packing List Number/Scheduled Ship Date
80662082/Mar 27, 2015

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

Sold-to Address
Titanium Metal Supply
12215 Kirkham Road, Suite 300
POWAY CA 92064
USA

Ship-to Address
Titanium Metal Supply
12215 Kirkham Road, Suite 300
POWAY CA 92064
USA

TIMET Item #	Material #	Material Description	Quantity	Weight
Customer Item #	Customer Material #			
000010	125530	TIMETAL® 65A Titanium Aero Sheet		
Specifications		: AMS 4900 * P		
		: AMS-T-9046 * A CP-2		
		: MIL-T-9046J AM-2 CP-2		
Batch Number		: HN2152-Y61	8.000PC	25.000LB
Batch Dimensions		: 0.020" X 36.000" X 27.000"		
Batch Number of Pieces		: 8.000		
Country of Origin		: USA		
Heat Number		: HN2152		
Test Number		: W15522		
Batch Number		: GN3149-Y31	6.000PC	19.000LB
Batch Dimensions		: 0.020" X 36.000" X 27.000"		
Batch Number of Pieces		: 6.000		
Country of Origin		: USA		
Heat Number		: GN3149		
Test Number		: W14928		
Batch Number		: HN2660-Y18	76.000PC	241.000LB
Batch Dimensions		: 0.020" X 36.000" X 27.000"		
Batch Number of Pieces		: 76.000		
Country of Origin		: USA		
Heat Number		: HN2660		
Test Number		: W15944		
B-Additional customer req DFARS 252.225-7008				
000020	300203	MISC SALES - PACKING BOXES/LUMBER		
		1.000EA	0.000LB	

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Customer Item #	Customer Material #			

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 _____



Titanium Metals Corporation

Approved Certificate

100 Titanium Way

Toronto, OH, 43964

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

Page 1 of 3

CERT ID

HN2152-B

24-JUL-2014 19:41:08 GMT

PURCHASE ORDER

20109736

SOLD TO CUSTOMER

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

HEAT NUMBER

HN2152

GRADE

TIMETAL065A

SHIP TO ADDRESS

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

TEST NUMBER

W15522

PRODUCT DESCRIPTION

0.020" SQ Coil

DELIVERY CONDITION

Annealed & Pickled

Specifications

This material complies with the following specifications:

AMS 4900 N

AMS-T-9046 A CP-2

ASTM B 265 -13a Grade 3

ASTM F 67 -06 Grade 3

MS-TI 55 3

Additional Specifications

ASTM B 265 -13ac1 Grade 3

ASTM F 67 -13 Grade 3

Melt Method

EB

Melt/Process Location

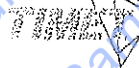
TIMET - Morgantown, PA, USA /

TIMET - Toronto, OH, USA

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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



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109 Interstate Drive, Wentzville, MO 63385

Compliance Statements

1. Surface free from alpha case and product conforms to the other technical requirements of the referenced specification(s).
2. Bend testing performed meets or exceeds the requirements of the ordered specifications.
3. 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.
4. No weld repair has been performed on this material.
5. Material complies with DFARS 252.225-7008.
6. Material certificate in compliance with EN 10204:2004 Type 3.1.
7. 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.
8. Material melted in accordance with DMS 2442E R-1.
9. TIMET-Morgantown, PA, is an approved ingot source supplier of the Boeing Company per DMS QPJ-2442 Issue 19.
10. TIMET-Toronto is an Approved Process Source for The Boeing Company as specified in D1-4426, processor code number BE10041722.
11. TIMET's Quality System is in compliance with Boeing Quality Management System (BQMS) D6-82479 Appendix A.
12. 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)

Ingot Chemical Analysis
(Weight percent)

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

	Fe	C	O	N
Sample ID				
TOP	0.12	0.011	0.22	0.005
BOT	0.12	0.010	0.21	0.008

Product Analysis
(Weight percent)

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

	H
Sample ID	
F	20
B	23

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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: 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.
2. Residual elements 0.05% maximum each, 0.30% 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 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

20X105

Sample ID	P/F
F	PASS
B	PASS

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

BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

10X180

Sample ID	P/F
F	PASS
B	PASS

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

BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

20X105

Sample ID	P/F
F	PASS
B	PASS

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109 Interstate Drive, Wentzville, MO 63385

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

BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

10X180

Sample ID

P/F

F

PASS

B

PASS

RTT - Longitudinal (ASTM E 8)

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

0.2YS

U.T.S.

2inEL

Sample ID

ksi

ksi

%

F

62

86

26

B

61

85

25

RTT - Transverse (ASTM E 8)

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

0.2YS

U.T.S.

2inEL

Sample ID

ksi

ksi

%

F

73

90

25

B

69

86

24

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Metallurgical Properties

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

Grain Size (ASTM E 112)

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

GRAIN SIZE

Sample ID	G _{rn}
F	8.5
B	8.5

Micro Exam - Longitudinal

AMS-T-9046A, KROLLS, 200X

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1345°F

OVERALL

Sample ID	P/F
F	PASS
B	PASS

Results are from TIMET Quality Control Records on file
Sales Order # 402905 Item # 10

Michael Giovannone

MJG

Digitally signed by
Michael Giovannone

Date: 2014.07.24

15:43:23 -04'00'

Michael Giovannone - Certification Specialist

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