



St. Louis Mill Sales  
109 Interstate Drive  
WENTZVILLE MO 63385  
USA  
Tel:800-753-1550 Fax:636-867-9098  
Shipping Plant: St. Louis Service Center

|                                                                        |  |
|------------------------------------------------------------------------|--|
| <b>Attachment to<br/>Product Certification</b>                         |  |
| Customer P.O. Number/Date<br>23087 Line 01/Dec 20, 2013                |  |
| TIMET Sales Order Number/Date<br>094189/Jan 02, 2014                   |  |
| TIMET Packing List Number/Scheduled Ship Date<br>80895325/Jan 17, 2014 |  |

Sold-to Address

Ship-to Address

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

|                        |        |                                  |             |             |
|------------------------|--------|----------------------------------|-------------|-------------|
| 000010                 | 125688 | TIMETAL® 75A Titanium Aero Sheet | 1,648.000LB | 1,648.000LB |
| Specifications         |        | : 01 AMS 4901 ° S                |             |             |
|                        |        | : 02 ASTM B 265 ° -13A GR 4      |             |             |
|                        |        | : 03 ASTM F 67 ° -13             |             |             |
|                        |        | : 04 ISO 5832-2 ° 1999 GR 4      |             |             |
|                        |        | : 05 MIL-T-9046J AM 2 CP-1       |             |             |
| Batch Number           |        | : GN3156-Y06                     |             |             |
| Batch Dimensions       |        | : 0.032" X 36.000" X 96.000"     |             |             |
| Batch Number of Pieces |        | : 91.000                         |             |             |
| Country of Origin      |        | : USA                            |             |             |
| Heat Number            |        | : GN3156                         |             |             |
| Test Number            |        | : W15038                         |             |             |

B-Additional customer req All specifications shall be to the latest revision DFARS 252.225-7008 compliant DFARS 252.225-7009 compliant DFARS 252.225-7010 compliant Material melted and manufactured in the US Specs to latest revision at time of order placement per President spec sheet (DRW) MCL F-17 LCS CONTROLLED PWA 300 MCL Section F-17 (7/12/2011) and PWA 300 BK. 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. MCL F-17 LCS CONTROLLED: PWA 300BK MCL MANUAL SECTION F-17 REVISION A MCL MANUAL SECTION F-14 REVISION 12/02/2010 "Material produced and controlled in accordance with PWA MCL TIMET LCS Supplier Authorization (11-28-12), PWA MCL Section F-17 Revision A and PWA 300 BK."

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 JAN 16 2014

BRIAN STALEY

Quality Assurance Representative

**Titanium Metals Corporation**

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

**Approved Certificate**

Page 1 of 5

**CERT ID**  
GN3156-B2  
23-OCT-2013 16:54:29 GMT

**PURCHASE ORDER**  
20100744

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

**HEAT NUMBER**  
GN3156

**GRADE**  
TIMETAL075A

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

**TEST NUMBER**  
W15038

**PRODUCT DESCRIPTION**  
0.032" SQ Coil

**DELIVERY CONDITION**  
Annealed & Pickled

**Specifications**

This material complies with the following specifications:

AMS 4901 S

AMS-T-9046 A

ASTM B 265 -13

ASTM F 67 -06

DMS 1536 M

MS-TI 70 3

CP-1

Grade 4

Grade 4

**Additional Specifications**

ASTM B 265 -13a

ASTM F 67 -13

Grade 4

Grade 4

**Melt Method**

ER

**Melt/Process Location**

TIMET - Morgantown, PA, USA / TIMET - Toronto, OH,  
USA



Accredited Materials Testing Laboratory  
Nondestructive Testing  
Metal Testing

REGISTERED ISO 9001/AS9100 FACILITY

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 this certificate may be punished as a felony under federal law.

*First in Titanium Worldwide*



**TIMET****Titanium Metals Corporation****Approved Certificate**100 Titanium Way, Toronto, ON M3B 3K1  
Telephone (740) 537-5694, Fax (740) 537-5653

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**CERT ID**  
GN3156-B2  
23-OCT-2013 16:54:29 GMT**PURCHASE ORDER**  
20100744**SOLD TO CUSTOMER**  
TIMET Service Center St. Louis  
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. 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 1536 Issue 8. 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. 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.
7. No weld repair has been performed on this material.
8. Material complies with DFARS 252.225-7008
9. Exception letter for MS-TI-70 Rev. 3 applies.
10. Material certificate in compliance with EN 10204:2004 Type 3.1 in accordance with PED 97/23/EC, Org (C2).
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](http://www.timet.com))



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REGISTERED ISO 9001:2008 FACILITY

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# Titanium Metals Corporation

100 Titanium Way, Toronto, ON M3B 4K4  
Telephone (740) 537-5694, Fax (740) 537-5653

## Approved Certificate

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CERT ID  
GN3156-B2

25-OCT-2013 16:34:29 GMT

PURCHASE ORDER  
20100746

SOLD TO CUSTOMER  
TIMET 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, USA

| Sample ID | Fe   | C     | O    | N     |
|-----------|------|-------|------|-------|
| TOP       | 0.15 | 0.009 | 0.32 | 0.006 |
| BOT       | 0.16 | 0.018 | 0.34 | 0.007 |

### Product Analysis (Weight percent)

Unless otherwise noted, Product Analysis performed at Toronto Laboratory, 100 Titanium Way, Toronto, ON, M3B 4K4, USA

| Sample ID | H  |
|-----------|----|
| F         | 13 |
| B         | 13 |

### Chemistry Statements

- 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: Metallies 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, 0.10% maximum total.
- Balance titanium.

### Mechanical Properties

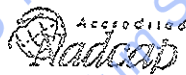
Unless otherwise noted, testing performed at Toronto Laboratory, 100 Titanium Way, Toronto, ON, M3B 4K4, USA

Bend Test, L-Direction, RT, (ASTM E 290)

BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

| Sample ID | 20X105 |
|-----------|--------|
| F         | P/F    |
| B         | PASS   |



Accredited  
Morgantown Process Lab  
Non-destructive Testing  
Metal Testing

REGISTERED ISO 9001:2008 FACILITY

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# Titanium Metals Corporation

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

## Approved Certificate

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### CERT ID

GN3156-B2

25-OCT-2013 16:54:29 GMT

### PURCHASE ORDER

20100744

### SOLD TO CUSTOMER

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

Bend Test, L-Direction, R/T, (ASTM E 290)  
BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

Sample ID 10X180

F P/F  
B PASS  
PASS

Bend Test, T-Direction, R/T, (ASTM E 290)  
BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

Sample ID 20X105

F P/F  
B PASS  
PASS

Bend Test, T-Direction, R/T, (ASTM E 290)  
BF 2.0

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

Sample ID 10X180

F P/F  
B PASS  
PASS

RTT - Longitudinal (ASTM E 8)

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

| Sample ID | 0.2YS | U.T.S. | 2inEL |
|-----------|-------|--------|-------|
|           | ksi   | ksi    | %     |
| F         | 78    | 102    | 22    |
| B         | 76    | 100    | 24    |



Accredited  
Materials Testing Laboratory  
Nondestructive Testing  
Heat Treating

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REGISTERED ISO 9001:2000 FACILITY

First in Titanium Worldwide



# Titanium Metals Corporation

## Approved Certificate

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

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**CERT ID**  
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**PURCHASE ORDER**  
20100744

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

### RTT - Transverse (ASTM E 8)

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

| Sample ID | 0.2YS<br>ksi | UTS.<br>ksi | 2inEL<br>% |
|-----------|--------------|-------------|------------|
| F         | 78           | 97          | 24         |
| B         | 92           | 110         | 29         |

### 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 @ 1420°F + leveling

| Sample ID | GRAIN SIZE<br>Grn |
|-----------|-------------------|
| F         | 8.5               |
| B         | 8.5               |

### Micro Exams - Longitudinal

AMS-T-9046A, KROLLS, 200X

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1420°F + leveling

| Sample ID | OVERALL<br>P/F |
|-----------|----------------|
| F         | PASS           |
| B         | PASS           |

Results are from TIMET Quality Control Records on file  
Sales Order # 383655 Item # 40  
v.1

*Michael G. Gorman*  
Michael Gorman - Certification Specialist



Materials Testing Laboratory  
Nondestructive Testing  
Heat Treating

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