

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

HN4189-M

14-JUN-2019 11:53:24 GMT

PURCHASE ORDER 20152527

HEAT NUMBER

HN4189

GRADE

TIMETAL®50A

SOLD TO CUSTOMER

TIMET Service Center St. Louis

1250 Interstate Drive, Wentzville, MO 63385

SHIP TO ADDRESS

TIMET Service Center St. Louis

1250 Interstate Drive, Wentzville, MO 63385

TEST NUMBER

W17670

PRODUCT DESCRIPTION

0.032" IQ Coil

DELIVERY CONDITION

Annealed & Pickled

Specifications

This material complies with the following specifications:

ASME SB 265 -13 Grade 2

ASTM B 265 -15 Grade 2

ASTM F 67 -13 Grade 2

ISO 5832-2:1999 Grade 2

Additional Specifications

AMS 4902 L

Melt Method

EB

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. 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. Material complies with the applicable sections of ASME Section II Part B dated 2011.
5. TIMET-Toronto complies with the applicable sections of QCP-200 Rev J.
6. No weld repair has been performed on this material.
7. Material complies with DEARS 252.225-7008.
8. Material certificate in compliance with EN 10204:2004 Type 3.1.
9. 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.
10. 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)
11. This revised certificate supersedes all previously issued certificates but does not in any way alter, amend, waive, or modify the terms and conditions of the original sale as contained on TIMET's sales acknowledgement.

This report shall not be reproduced except in full, without the written approval of TIMET.

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First in Titanium Worldwide

Titanium Metals Corporation
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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	0.09	0.012	0.12	0.009
BOT	0.08	0.012	0.12	0.008

Product Analysis
(Weight percent)

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

	H
Sample ID	
F	17
B	21

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 each less than 0.10% maximum, 0.40% maximum total.
3. Balance titanium.

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PURCHASE ORDER 20152527

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 @ 1410°F + leveling

20X105

Sample ID

P/F

F

PASS

B

PASS

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

BF 1.5

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1410°F + leveling

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 @ 1410°F + leveling

20X105

Sample ID

P/F

F

PASS

B

PASS

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PURCHASE ORDER 20152527

Bend Test, 1-Direction, R/T, (ASTM E 290)
BF 1.5

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1410°F + leveling

10X180

Sample ID	P/F
F	PASS
B	PASS

RTT - Longitudinal (ASTM E 8) After Fracture

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1410°F + leveling

	0.2YS	U.T.S.	2inEL
Sample ID	ksi	ksi	%
F	50	73	28
B	49	72	28

RTT - Transverse (ASTM E 8) After Fracture

Test Condition: [MILL] CVA 3 to 14 Minutes @ 1410°F + leveling

	0.2YS	U.T.S.	2inEL
Sample ID	ksi	ksi	%
F	55	73	28
B	56	70	29

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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 @ 1410°F + leveling

GRAIN SIZE

Sample ID	Grn
F	8
B	8

Results are from TIMET Quality Control Records on file
Sales Order # 500865 Item # 10
v.2

Digitally signed
by Kevin Patrick
Date: 2019.06.14
07:54:15 -0400
Kevin Patrick - Certification Specialist

Version History

- v.1 19-APR-2017 Original Version
- v.2 14-JUN-2019 Certificate revised, per customer request, to add AMS 4902L

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