Titanium Metals Corporation
100 Titanium Way
Toronto, OH, 43964
Telephone (740) 537-5694, Fax (740) 537-5655

Approved Certificate

SOLD TO CUSTOMER

CERT ID
HN2633-B1
31-MAY-2019 21:25:13 GMT

PURCHASE ORDER 7106 line 4

HEAT NUMBER
HN2633

GRADE
TIMETAL®45A

SHIP TO ADDRESS

TEST NUMBER
W18683

PRODUCT DESCRIPTION
0.037" IQ Coil

DELIVERY CONDITION
Annealed & Pickled

Specifications

This material complies with the following specifications:
ASTM B 265 -15 Grade 2

Melt Method	*Melt/Process Location*
EB	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. TIMET-Toronto has a Quality Management System that is in compliance with ISO 9001:2015, and AS 9100:2016 Revision D. (AS9100 certificate is available at www.timet.com)
4. Customer accepts material (random width) per attached electronic mail message dated 23-May-19.

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	0.05	0.010	0.09	0.006
BOT	0.05	0.009	0.10	0.009

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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.

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TMS Titanium Sample Cert

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Product Analysis
(Weight percent)

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

Sample ID	H
F	95
B	24

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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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 @ 1440°F + leveling

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 @ 1440°F + leveling

10X180

Sample ID	P/F
F	PASS
B	PASS

Bend Test, T-Direction, R/T, (ASTM E 290)
BF 1.5
Test Condition: [MILL] CVA 3 to 14 Minutes @ 1440°F + leveling

20X105

Sample ID	P/F
F	PASS
B	PASS

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Bend Test, T-Direction, R/T, (ASTM E 290)
BF 1.5
Test Condition: [MILL] CVA 3 to 14 Minutes @ 1440°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 @ 1440°F + leveling

Sample ID	0.2YS ksi	U.T.S. ksi	2inEL %
F	43	64	30
B	42	63	30

RTT - Transverse (ASTM E 8) After Fracture
Test Condition: [MILL] CVA 3 to 14 Minutes @ 1440°F + leveling

Sample ID	0.2YS ksi	U.T.S. ksi	2inEL %
F	43	62	29
B	43	62	28

Results are from TIMET Quality Control Records on file
Sales Order # 583109 Item # 10
v.1

Michelle Edwards

Digitally signed by Michelle Edwards
DN: c=US, st=OH, l=Toronto, o=Titanium Metals Corporation, cn=Michelle Edwards, email=Michelle.Edwards@timet.com
Date: 2019.05.31 17:27:04 -04'00'

Michelle Edwards - Certification Specialist

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