



St. Louis Mill Sales  
 109 Interstate Drive  
 WENTZVILLE MO 63386  
 USA  
 Tel:800-753-1550 Fax:636-887-9096  
 Shipping Plant: TIMET Precision Forged Product

**Attachment to  
 Product Certification**

Customer P.O. Number/Date  
 23162/Jun 23, 2014

TIMET Sales Order Number/Date  
 411679/Jun 30, 2014

TIMET Packing List Number/Scheduled Ship Date  
 80638374/Oct 31, 2014

TIMET Internal Revision #: 1

Sold to Address

Ship to Address

TIMET Item #	Material #	Material Description	Quantity	Weight
Customer Item #	Customer Material #			
000010	60289	TIMETAL® 6-4 Titanium SQ Billet	5,696.000LB	5,696.000LB
	Specifications	: 01 AMS 4928 * U		
		: 02 AMS 6931 * C		
		: 03MIL-T-9047 * G AM1&2		
	Tolerances	: 12-14 FT R/L		
	Batch Number	: H21785-2		
	Batch Dimensions	: 5.000" X 20.000" X RL		
	Batch Number of Pieces	: 2.000		
	Country of Origin	: USA		
	Heat Number	: H21785		
	Metal ID	: B1 > B2		

000012595



St. Louis Mill Sales  
 109 Interstate Drive  
 WENTZVILLE MO 63385  
 USA  
 Tel:800-753-1550 Fax:636-887-9098  
 Shipping Plant: TIMET Precision Forged Product

Attachment to Product Certification	
Customer P.O. Number/Date	23162/Jun 23, 2014
TIMET Sales Order Number/Date	411679/Jun 30, 2014
TIMET Packing List Number/Scheduled Ship Date	80638374/Oct 31, 2014
TIMET Internal Revision #:	1

Sold-to Address

Ship-to Address

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

B-Additional customer req  
 All specs to latest revision at time of Shipment

12-14 ft Random Length per Email

From: Shawn MacLeod [mailto:shawn@presidenttitanium.com]  
 Sent: Wednesday, June 25, 2014 8:05 AM  
 To: Williams, Stephanie  
 Subject: Re: 5" Rec Bar

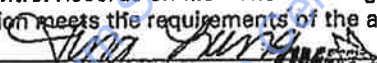
we can take 12ft to 14ft r/l if that works with you?

Shawn L. MacLeod, vp  
 President Titanium Co., Inc.  
 Ph 781-294-0000, Fax 781-293-3753

\*All quotes are FOB Hanson, MA 02341  
 ----- Original Message -----  
 From: Williams, Stephanie  
 To: Shawn MacLeod  
 Sent: Tuesday, June 24, 2014 4:59 PM  
 Subject: RE: 5" Rec Bar

Another questions on this PO#what lengths can you accept/prefer?

Thanks!  
 Stephanie  
 636-887-9062

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.  
 Authorized TIMET Signature  Date 10/21/14





**Titanium Metals Corporation**

14281 Franklin Ave.

Tustin, CA, 92780

Telephone (714) 573-1000, Fax (714) 573-2777

**Approved Certificate**

Page 1 of 4

**CERT ID**

H21785-2

20-JAN-2015 00:34:32 GMT

**PURCHASE ORDER**

23162

**SOLD TO CUSTOMER**

**HEAT NUMBER**

H21785

**GRADE**

TIMETAL06-4

**SHIP TO ADDRESS**

**PRODUCT DESCRIPTION**

5 X 20" SQ RECT Billet

**DELIVERY CONDITION**

Mill Annealed

**Specifications**

This material complies with the following specifications:

AMS 4928 U

AMS 6931 C

MIL-T-9047 G Am1&2

**Additional Specifications**

EN 10204 2004 "type 3.1"

**Melt Date**

02-JUN-2014

**Melt Country of Origin**

US

**Melt Location**

TIMET - Henderson, NV, USA

**Compliance Statements**

1. Surface free from contamination.
2. Microstructure and Macrostructure examined and acceptable.
3. Immersion Ultrasonic Inspected and accepted per AMS 2631D CL A and AMS-STD-2154A TY I CL A.
4. Forged Size 1X Wide.
5. Forging performed at Press Forge.
6. Heat Treated at Aircraft (Certification#467601)
7. Laboratory Testing performed at Dickson Testing. (Lab #14107034-00)
8. Ultrasonic Testing performed at Mitchell Laboratories. (Control #267996)
9. TIMET Precision Forged Products has a Quality Management System that is in compliance with ISO 9001:2008, ANSI/ISO/ASQ Q9001-2008 and AS 9100:2009 Revision C, Certificate No. UQA 0113326, through Lloyd's Register Quality Assurance, effective 02-May-12.

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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*

000012545



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**PURCHASE ORDER**  
23162

**SOLD TO CUSTOMER**

**Ingot Chemical Analysis**  
(Weight percent)

Unless otherwise noted, Ingot Chemical Analysis performed at Henderson Process Lab, 181 N. Water Street, Henderson, NV, 89015, USA

	Fe	V	Al	C	O	N
<b>Sample ID</b>						
<b>Min Lim</b>	-	3.50	5.50	-	-	-
<b>Max Lim</b>	0.30	4.50	6.75	0.080	0.20	0.050
<b>TOP</b>	0.19	4.02	6.29	0.016	0.17	0.007
<b>BOTTOM</b>	0.18	4.01	6.37	0.015	0.18	0.010

**Product Analysis**  
(Weight percent)

Unless otherwise noted, Product Analysis performed at Dickson Testing, 11126 Palmer Avenue, South Gate, CA, 90280, USA

**H**

<b>Sample ID</b>	
<b>Min Lim</b>	-
<b>Max Lim</b>	0.0125
<b>B1-1</b>	0.0047

**Chemistry Statements**

1. Residual elements: < 0.10% each, < 0.40% total.
2. Balance Titanium.
3. 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 determined by atomic spectrometry (ingot only) and all other elements determined by x-ray fluorescence spectrometry.

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Tustin, CA, 92780

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**PURCHASE ORDER**

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**SOLD TO CUSTOMER**

**Mechanical Properties**

Unless otherwise noted, testing performed at Dickson Testing, 11126 Palmer Avenue, South Gate, CA, 90280, USA

**RTT - Longitudinal (ASTM E 8)**

Test Condition: [MILL] Annealed 2 Hrs @ 1350F, AC

	0.2YS	U.T.S.	4DEL	R.A.
<b>Sample ID</b>	ksi	ksi	%	%
<i>Min Lim</i>	120	130	10	20
<i>Max Lim</i>	-	-	-	-
B1-1	123	137	12	23
B2	124	135	14	29

**RTT - Short Transverse (ASTM E 8)**

Test Condition: [MILL] Annealed 2 Hrs @ 1350F, AC

	0.2YS	U.T.S.	4DEL	R.A.
<b>Sample ID</b>	ksi	ksi	%	%
<i>Min Lim</i>	120	130	8	15
<i>Max Lim</i>	-	-	-	-
B1-1	123	136	15	28
B2	123	138	13	22

**RTT - Transverse (ASTM E 8)**

Test Condition: [MILL] Annealed 2 Hrs @ 1350F, AC

	0.2YS	U.T.S.	4DEL	R.A.
<b>Sample ID</b>	ksi	ksi	%	%
<i>Min Lim</i>	120	130	10	20
<i>Max Lim</i>	-	-	-	-
B1-1	130	140	13	29
B2	130	141	15	31

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H21785--2  
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**PURCHASE ORDER**  
23162

**SOLD TO CUSTOMER**

Results are from TIMET Quality Control Records on file  
Sales Order # 411679 Item # 10  
v.2



Tina Luns - Quality Engineer

**Version History**

- v.1 22-OCT-2014 Original Version
- Ⓢ v.2 20-JAN-2015 Amended to add EnN 10204 Type 3.1.



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