



DYNAMET
A Carpenter Company

195 Museum Road
Washington, PA 15301

Phone 724.228.1000
Fax 724.229.4195

PRODUCT CERTIFICATION

WORK ORDER
519826

SALES ORDER / RLS
065755 / 001

CUSTOMER P.O. PTG59620 ✓	CUSTOMER PART 111DD2FTA05000	QUANTITY ✓ 505	LADING NO. lbs 00095757	SHIPMENT DATE 09/05/2018						
PART INFORMATION TI 6AL 4V CG Bar - 0.500" Dia. Specifications: AS6279 Rev: A; AMS 2241 Rev: S; AMS 2631 Rev: E; AMS 4928 Rev: W; AMS 4967 Rev: L; AMS 6931 Rev: D; AMS-T-9047 Rev: 03; MIL-T-9047 TI 6-4 Rev: G; AMS-STD-2154 Rev: C; MIL-STD-2154 Rev: 82; AMS-H-81200 Rev: D; MIL-H-81200 Rev: B; DMS 1570 Rev: C; ASTM B 348 Gr5 Rev: 13; ASTM F 1472 Rev: 14; ASME SB-348 Gr5 Rev: 2015; S-400 Rev: 16; S-1000 Rev: 2017; EN 10204 3.1 Rev: 04; 100679343 Per Exceptions Rev: AB; SH620001 Rev: AE Size: 0.500" Dia. +/- 0.0005" Length: 10' to 12' Random Length										
Chemical Report (Wt.%)										
Heat H7L69	Al T 6.12	Al B 6.20	C T .029	C B .029	Fe T .16	Fe B .20	N T .017	N B .014	O T .16	O B .16
V T 3.87	V B 4.04	Y T <.0009	Y B <.0009	Ti RAL	Ot E .05	TOE .20				
Hydrogen (As Shipped)										
Hydrogen (%) 0.0028										
As Shipped Properties										
UTS #1 (psi) 161100	YS 0.2% #1 (psi) 148500	EL #1 (%) 15	RA #1 (%) 48							
UTS #2 (psi) 161000	YS 0.2% #2 (psi) 148200	EL #2 (%) 16	RA #2 (%) 48							
Hardness (HRC) 38										
Capability@1750°F (954°C) 1hr WQ +1000°F (538°C) 4hrs AC										
UTS #1 (psi) 177100	YS 0.2% #1 (psi) 165500	EL #1 (%) 15	RA #1 (%) 46							
Hardness (HRC) 43										
Capability@1740°F 1hr WQ +1000°F 4hrs AC										



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PTG59620		805 lbs	00095757	09/05/2018
UTS #1 (psi) 176300	YS 0.2% #1 (psi) 163900	EL #1 (%) 14	RA #1 (%) 48	
UTS #2 (psi) 176200	YS 0.2% #2 (psi) 163500	EL #2 (%) 13	RA #2 (%) 44	
Hardness (HRc) 42				
✓ Metallurgy Results				
Macrostructure Acceptable Microstructure Alpha-Beta Alpha Case Material Free of Alpha Case				
✓ Material Data				
Melt Origin USA		Bt Tr °F 1826		
Melt Source ATI Bakers North Operation		Bt Tr °C 997		
✓ Certification Information				
As Shipped Condition Annealed 1300°F 2 Hours A/C				



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CUSTOMER P.O.	CUSTOMER PART	QUANTITY	LADING NO	SHIPMENT DATE
PTG59620		205	lbs 00095757	09/05/2018

CERTIFICATION REQUIREMENTS

- Material designation; UNS R56400
- Material free of alpha case, or other surface contamination.
- Macrostructure and microstructure meet all requirements of MIL-T-9047.
- Material annealed in accordance with MIL-H-81200 and AMS-H-81200.
- Hydrogen analysis from final product.
- Material immersion ultrasonic inspected in accordance with MIL-STD-2154 CL AA Type 1, AMS-STD-2154 CL AA Type 1 and AMS 2831 CL AA Grade 1 #2 FBH - ALL ACCEPTED.
- Material free of mercury and radioactive contamination.
- Material certified to the requirements of MIL-T-9047G Cond.A (Dated - 12/15/78), MIL-T-9047G Amendment 2 (Dated - 09/30/86), MIL-T-9047G Notice 1 (Dated - 2/8/93) and MIL-T-9047G Notice 2 (Dated - 4/4/98).
- DRC Conflict Free Material
- Material conforms to RoHS Directive 2011/65/EU.
- Mechanical properties; Hydrogen analysis, and microstructure evaluations performed at Product Evaluation System. Matcap & GE approved. GE Vendor Code T9377. 100679343 per exceptions Rev: AB- Paragraph 4.6 Documents retained per QA-31. Complete copy of the original material chemistry attached

Steven R. Dockus
Q. A. Lab Manager

End of Certification

This is to certify that the above test results are correct as contained in the records of the company.

Certification shall not be reproduced except in full without the approval of Dynamet Inc. The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under Federal Law.

 ATI Specialty Materials ATI Richburg Operations, 4374 Lancaster Highway, Richburg, SC 29729 US	CERTIFICATE OF TEST Cert No.166870 Rev.1	Batch - 161616 Heat - H7L69
	 Donald W. James Certification Auditor Date : February 12, 2018	

Customer Name & Address	Purchase Order No	Part No	Sales Order No	Sales Order Line No
		838649	88340	1.1

Size (in)	Cross section	No Pcs	Weight (lbs)	Alloy
4.0000	Round	38	14,014	ATI 6-4" Alloy

Remarks:
 BCA-65325-1194
 Purchased For: Dynamet
 Customer PO#: 008314 & Item# 002
 Customer P/N: 111PX6-4.000
 TMX W/O: K16405
 TMX Part#: 838649

Specifications

Spec Name	Rev	Compliance Condition
DI-1036	C	Compliant
DI-2111	B	Compliant

Reference Specifications

Spec Name	Rev	Class	Compliance Condition
AMS 4926	V		Capable Of
ASTM B348	2013	GRADE=5	Capable Of
D1-4426	JW		Compliant
D6-81628	B		Compliant
D6-82479	G		Compliant

Remarks:
 Capable Of: ATI Specialty Materials guarantees material will meet specification requirements in the final product after additional appropriate processing but may not be tested in the 'As Shipped' condition.

As Shipped Condition

Heat Treat	Hot Work Type
No Heat Treat	Forged
Surface Finish	
Peel/Shave & Polish	

Melt Method Details

Primary Melt	Facility	Address	
Vacuum Arc Remelt	ATI Bakers North Operations	ATI Bakers North Operations 6400 Alloy Way, Monroe, NC 28110-8329 US	
Remelt	Facility	Address	Date
Vacuum Arc Remelt	ATI Bakers North Operations	ATI Bakers North Operations 6400 Alloy Way, Monroe, NC 28110-8329 US	12/10/2017

Batch - 161616

Heat - H7L69

CHEMISTRY

Sample Source			Top	Bottom
Test Facility			ATI Monroe Operations	ATI Monroe Operations
Elements	UOM	Method		
Al	%	XRF	6.12	6.20
V	%	XRF	3.87	4.04
Fe	%	XRF	0.16	0.20
O	%	GAS	0.16	0.16
C	%	CS	.029	.029
N	%	GAS	.017	.014
Cu	%	WET	<0.01	<0.01
B	%	WET	<0.0009	<0.0009
Si	%	XRF	<0.01	<0.01
Y	%	WET	<0.0009	<0.0009
Ti	%	XRF	BAL	BAL

Test Comments: Other Elements (each) = 0.05 wt.% max.
Total Other Elements = 0.20 wt.% max.

Remarks:

CS = Combustion/IR Detection

GAS = Inert Gas Fusion

XRF = X-Ray Fluorescence

WET = Inductively Coupled Plasma Emission

Piece ID			T1-1-1-1	B3-3-3-2
Test Facility			ATI Monroe Operations	ATI Monroe Operations
Elements	UOM	Method		
H	%	GAS	0.0014	0.0017

Test Description: Hydrogen: Billet - 0.25" Below Surface

Remarks:

Test Methods: C = ASTM E1941 (2010/2016); O/N = ASTM E1409 (2013); H = ASTM E1447 (2009/2016); ICP = ASTM E2371 (2013); XRF = ASTM E539 (2011)

METALLOGRAPHY**Remarks:**

Beta Transus Calculated by Chemistry:

1829 F. = TOP

1823 F. = BOTTOM

Ultrasonic

Test Facility: ATI Richburg Operations

Remarks:

Material ultrasonically inspected and found acceptable to the following specifications:
AMS 2631 Class A1
AMS-STD-2154 Type I Class A

Macro

Test Facility	Etchant	Magnification
ATI Monroe Operations	Ammonium Bifluoride	1X

Remarks:

Material macro evaluated top, middle and bottom of each ingot and found acceptable.

Outside Source Addresses

Outside Testing Laboratory	
Facility	Address
ATI Monroe Operations	2020 Ashcraft Avenue, Monroe, NC 28110 USA

Maps Attached**Attached File Description(s):**

1) BAR MAPS

Other Attached Files**Attached File Description(s):**

1) QF 315-178A

Special Remarks

Material produced and controlled in accordance with T.I. SSA Dynamet-001 Rev.004

Batch - 161616

Heat - H7L69

Remarks

Material has been produced, sampled, inspected and tested in accordance with the acknowledged customer purchase order and referenced specifications and conforms to the requirements unless otherwise noted in this Certificate of Test or in other communications regarding purchase order clarifications, specification exceptions, or long term agreements."

If customer purchase order does not specifically reference a revision to a specification, ATI Specialty Materials will work to the latest revision on file and in effect at the time of order placement.

✓ATI Specialty Materials has complied with all producer requirements of AS6279.

Any chemical elements analyzed and found to have values below the actual limits of detection may be reported as < less than or reported at the detection level.

When values are reported to the significant places called for in the specifications, rounding will be done in accordance with ASTM E29.

✓This is to certify that during the manufacturing, handling, testing and inspection, this material did not come in direct contact with mercury or any device employing a single boundary of containment.

ATI Specialty Materials products have not come in contact with radioactive materials during manufacturing or processing.

No weld repair has been performed on this material.

✓Material melted and manufactured in the United States of America unless otherwise noted in this Certificate of Test.

Material Safety Data Sheets (MSDS) - View or print from our site: www.atimetals.com

Printed copies are available upon request from the ATI Specialty Materials Sales Department.

✓ATI Specialty Materials certifies that it has procedures in place to provide reasonable assurance that any non-scrap/non-recycled Conflict Minerals (Columbite-Tantalite/Coltan and its derivative metal Tantalum; Cassiterite and its derivative metal Tin; Wolframite and its derivative metal Tungsten; and Gold) included in the materials supplied under this purchase order do not originate from the Democratic Republic of Congo or specified adjoining countries (Covered Countries) as defined by and in accordance with Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2012. ATI Specialty Materials will provide a CMRT form annually upon request.

The recording of false, fictitious, or fraudulent statements or entries on this document may violate Federal statutes, including but not limited to Title 18, Chapter 47 of the United States Code and may be punishable as a felony.

This Certificate of Test shall not be reproduced, except in full, without the written approval of ATI Specialty Materials Quality.