



TECHSPEC, INC.

P.O. Box 69, Y STREET ■ DERRY, PA 15627

PHONE: 724/694-2716 ■ FAX: 724/694-5305

www.tsititanium.com

Titanium Specialists

▶ TITANIUM  
▶ SALES, CONVERSION  
▶ FORGING, ROLLING

## SOLD TO:

Titanium Industries, Inc.  
Corporate Materials  
18 Green Pond Road  
Rockaway, NJ 07866  
USA

## CERTIFICATION

Page 1 of 2

Date: 4/10/2019  
Cust PO No.: CRP-20798-LT  
TSI WO No.: 180841 ✓TI  
QA  
93TI  
QA  
124

GRADE	SIZE / QUANTITY	MELT SOURCE / HEAT NUMBER
Ti CP-2 ✓	Diameter: 1.7500" ✓ 265 Lbs	Timet Morgantown HN6865 ✓

## SPECIFICATIONS

ASTM B348-13 Gr. 2, 2H ASME SB348-13, -17 Gr. 2, 2H ISO15156-3/MR0175-2009	ASTM B381-13 sec.5.1 Gr.F-2,F-2H ASME SB381-13 sec.5.1 Gr.F-2,F-2H MR0103-2012	ASTM F67-13(2017) Gr. 2 EN10204:2004 Type 3.1
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## COMPLIANCE STATEMENTS

No weld repair. Mercury free during processing.  
No exposure to radioactive materials.  
Material Safety Data Sheets (MSDS) available upon request  
Melt source - Timet, Morgantown. Method - EBSM. Chemistry performed by Timet.  
Residual elements each less than 0.10%; less than 0.40% total.  
Final product testing performed by Product Evaluation Systems, Inc.  
Bar product was produced from ingot by open die forging (Cartech Latrobe: ingot to 8.00" RCS) and formed on forging and mill operations at TSI Titanium. Machined surface finish to a tolerance of +/-0.003".  
Product conforms to the technical requirements of the specification(s) and the requirements of the purchase order.  
Product complies with TI form QA200.  
Melted and manufactured in the United States. Product complies with DFARS 252.225-7008, 252.225-7009, and 252.225-7014, Alt. 1

## HEAT TREAT CONDITION

Annealed per AMS-H-81200D: 1300F, 2.00 hours at temperature. Air Cooled.

TSI Titanium is Nadcap accredited for Heat Treating and can be found on the Nadcap Qualified Manufacturers List.

## METALLOGRAPHY

Micro acceptable per applicable specifications.  
Alpha case free.  
Grain size, Informational: ASTM No.6.0TI  
QA  
124

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Our Order 242864-1-1 Your Order PO-00006949

Packing List 282696-1 (20/06/2019) Image 567480 (20/06/2019)

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## NON-DESTRUCTIVE TESTING

Immersion ultrasonic, including circumferential shear wave, acceptable per:

AMS-263 IE CL. A1, A Gr. 1

AMS-STD 2154C Type 1. CL. A

MIL-STD-2154 Type 1 CL. A

NAS 824 Rev. 2 Gr. A

Inspection performed by West Penn NDT.

Reported rejected areas have been removed.

HEAT NO.: HN6865

## CHEMICAL ANALYSIS - WGT%

	C	Mn	P	S	Si	Cr	Ni	Cu	Mo	W	Fe
T	0.01										0.07
B	0.01										0.05
	Co	Ti	Al	V	N	Zr	Sn	B	O	H	Y
T		Bal.			0.002				0.18	<0.001	
B		Bal.			0.002				0.20	<0.001	

Beta Transus: T-

B-

## PHYSICAL ANALYSIS

ID	UTS	.2%YS	% ELONG				
	PSI	PSI	Elong 4 D	Elong 5 D	%RA	Hardness	Hyd Final - %
1L	80,000	50,200	24.8	22.5	44.5	97 HRBW	0.0025
2L	78,900	46,500	25.1	22.1	45.8		0.0019

BY Matthew J. Wojton 4/10/2019  
Matthew J. Wojton, QA Certification Manager



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Registered ISO 9001/ AS9100 Company

TSI 16-001 02/20/2013