

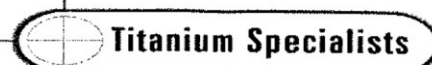


TECHSPEC INC.

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

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

www.tsititanium.com



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CERTIFICATION

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Date: 4/10/2019

Cust PO No.: CRP-20798-LT

TSI WO No.: 180841

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

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.6.0

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NON-DESTRUCTIVE TESTING

Immersion ultrasonic, including circumferential shear wave, acceptable per:

AMS-2631E 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		%RA	Hardness	Hyd Final - %
	PSI	PSI	Elong 4 D	Elong 5 D			
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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