



TECHSPEC, INC.  
P.O. Box 88, Y STREET = DENNY, WA 16827  
PHONE: 724/884-2718 = FAX: 724/884-6306  
www.techspec.com



### CERTIFICATION

Date: 6/22/2017  
Cust PO No.: 4500819947  
TSI WO No.: 169063

#### SOLD TO:

Timet Henderson  
Accounting Dept  
PO Box 2128  
Henderson, NV 89009  
USA

GRADE	SIZE / QUANTITY	MELT SOURCE / HEAT NUMBER
T64TD	Diameter: .7500" 8,145 Lbs	Timet - Henderson YZ7722

SPECIFICATIONS		
AMS-4928V AMS-4965L (cap.) MIL-T-9047G Cond. A Am. 2 Not 1.2 ASTM B381-13 F-5 sec. 5.1 DMS-1570C CMMF015Z	AMS-6931C AMS-4967L EN10204:2004 Type 3.1 ASME SB348-13 Gr. 5 ISO 5832-3-96 BMS7-247H, Cap.(sec. 5.6)	AMS-4963D AMS-T-9047 Cond.A Orig.Rev.A ASTM B348-13 Gr. 5 ASTM F1472-14,-08el BS3TA11-09

**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/Henderson. Method - 3XVAR. Chemistry performed by Timet (GE S400 code 87869).
- Final product testing performed by WMTR, Inc. (GE S400 code T7869).
- GE S1000 (1-19-17) Supplier Quality Requirements Compliant, as applicable.
- Bar product was produced from ingot by open die forging and formed on a bar mill. Machined surface finish to a tolerance of +/-0.002".
- Periodic test data for this AMS-4928 size range is available upon request.
- Product conforms to the technical requirements of the specification(s) and the requirements of the purchase order.
- Melted and manufactured in the United States. Product complies with DFARS 252.225-7008, 252.225-7009, and 252.225-7014, Alt. 1
- TSI Titanium has complied with all producer requirements of AS6279A (4.1.3)

**HEAT TREAT CONDITION**

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

AMS-4967L:  
Test sample solution treated: 1750F, 1.53 hours at temperature. Water Quenched. Aged: 1000F, 5.12 hours at temperature. Air Cooled.

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

**METALLOGRAPHY**

Macro and micro acceptable per applicable specifications.  
Alpha case free.

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The specifications and additional information set forth in this certificate are accurate with respect to the materials described herein as of the date set forth above. Any subsequent thermo-mechanical or similar processing (including any such processing to change the gauge, condition or specification of materials described herein) shall nullify the information set forth in this certificate and TechSpec, Inc. shall have no responsibility for, and makes no representations or warranties with respect to, any such processing or the materials resulting therefrom.



**TECHSPEC, INC.**  
 P.O. Box 80, Y STREET in DEER, PA 16827  
 PHONE: 724/804-2718 or FAX: 724/804-6306  
 www.techspec.com

**Titanium Specialists**

- ▶ TITANIUM
- ▶ SALES, CONVERSION
- ▶ FORGING, ROLLING

**CERTIFICATION**

**SOLD TO:**

Timet Henderson  
 Accounting Dept  
 PO Box 2128  
 Henderson, NV 89009  
 USA

Date: 6/22/2017  
 Cust PO No.: 4500819947  
 TSI WC No.: 169063

**NON-DESTRUCTIVE TESTING**

Immersion ultrasonic, including circumferential shear wave, acceptable per:  
 AMS-2631D Gr.1 CL. AA, A1, A  
 AMS-STD 2154 Orig. and Rev. A Type 1. CL. AA, A  
 MIL-STD-2154 Type 1 CL. AA, A  
 NAS 824 Rev. 1 and 2 Gr. A  
 Inspection performed by West Penn NDT  
 Reported rejected areas have been removed.

**CHEMICAL ANALYSIS - WGT%**

HEAT NO.: H27722

	C	Mn	P	S	Si	Cr	Ni	Cu	Mo	W	Fs
T	0.050										0.21
B	0.049										0.22
	Co	Tl	Al	V	N	Zr	Sn	B	O	H	Y
T		Bal.	6.46	3.86	0.008				0.17		<0.0004
B		Bal.	6.48	3.91	0.008				0.18		<0.0004

Beta Transus: T- 1867 B-1867

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**TECHSPEC, INC.**  
 P.O. Box 60, Y STREET @ DERRY, PA 15027  
 PHONE: 724/804-2718 FAX: 724/804-5300  
 www.enr.titanium.com

**Titanium Specialists**

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- ▶ SALES, CONVERSION
- ▶ FORGING, ROLLING

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PHYSICAL ANALYSIS							
ID	UTS		% ELONG		%RA	Hardness	Hyd Final - %
	PSI	PSI	Elong 4 D	Elong 5 D			
10L	156,500	149,300	15.0	13.0	46.0		0.0036
11L	159,400	151,000	15.0	13.0	44.0		0.0034
12L	155,300	148,900	16.0	13.0	47.0		0.0034
13L	156,400	148,800	15.0	13.0	46.0		
14L	156,700	148,600	14.0	12.0	46.0		
15L	156,200	149,000	15.0	12.0	45.0		
16L	158,400	149,900	14.0	12.0	43.0		
17L-4967HT	157,000	154,500	14.0	12.0	53.0		
1L	157,900	149,000	15.0	13.0	43.0		
2L	157,200	149,400	14.0	12.0	44.0		
3L	155,800	148,200	16.0	14.0	47.0		
4L	158,800	149,500	15.0	13.0	45.0		
5L	157,800	149,200	15.0	13.0	46.0		
6L	153,700	146,800	16.0	13.0	47.0		
7L	156,400	148,300	15.0	13.0	46.0		
8L	158,100	150,200	15.0	12.0	45.0		
9L	157,100	148,700	15.0	12.0	45.0		

BY: *[Signature]* 6-22-17  
 Joseph Janke, Quality Assurance Technician

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St. Louis Mill Sales  
 1250 Interstate Drive  
 WENTZVILLE MO 63385  
 USA  
 Tel:800-763-1550 Fax:636-887-9098

**Attachment to Product Certification**  
 Customer P.O. Number/Date  
 TIMET Sales Order Number/Date  
 510379/Jun 28, 2017  
 TIMET Packing List Number/Scheduled Ship Date  
 80784829/Jul 10, 2017  
 TIMET Internal Revision #: 1

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

000010	11271	TIMETAL® 6-4 Titanium SQ Bar		
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**Specifications**

- ✓: 01 AMS 2631 \*D CLASS AA
- ✓: 02 CMMP015 \* REV E
- ✓: 03 EN 10204 \* 2004 TYPE 3.1
- ✓: 04 ASME SB 348 \* -13 GRADE 5
- ✓: 05 AMS-H-81200 \* D
- ✓: 06 MIL-H-81200 \* B
- ✓: 07 AMS 4928 \* V
- ✓: 08 AMS 4967 \* L
- ✓: 09 ASTM B 348 \* -13 GRADE 5
- ✓: 10 AMS 6931 \* C
- ✓: 11 AMS-T-9047 \* A COND A
- ✓: 12 MIL-T-9047 \* G AM2 COND A
- ✓: 13 ASTM F 1472 \* -14
- ✓: 14 AMS-STD-2154 \*A TYP 1 CL AA
- ✓: 15 MIL-STD-2154 TYPE 1 CL AA

**Tolerances**

- AS6279 A
- D1-4426 \* WEB
- CUSTOMER ORDERING 10-14' RL
- GRAIN WITH LENGTH
- SUPPLY W/ ONE HEAT OF MATERIAL
- H27722-Y26 944.000LB 944.000LB

**Batch Number**

- Batch Dimensions
- Batch Number of Pieces
- Country of Origin
- Heat Number
- Metal ID

- ✓: 0.750" Dia X RL
- 97.000
- USA
- H27722
- WO# 169063
- H27722-Y27 258.000LB 258.000LB

**Batch Number**

- Batch Dimensions
- Batch Number of Pieces
- Country of Origin
- Heat Number
- Metal ID

- ✓: 0.750" Dia X RL
- 25.000
- USA
- H27722
- WO# 169063



St. Louis Mill Sales  
 1250 Interstate Drive  
 WENTZVILLE MO 63385  
 USA  
 Tel:800-753-1660 Fax:636-887-9098

Attachment to Product Certification	
Customer P.O. Number/Date	
TIMET Sales Order Number/Date	510379/Jun 28, 2017
TIMET Packing List Number/Scheduled Ship Date	80784829/Jul 10, 2017
TIMET Internal Revision #:	1

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

- B-Additional customer req
- ✓ GEAE S-400 approved supplier
- ✓ GEAE S-1000 Supplier Req'ts
- ✓ DFARS 252.225-7008
- ✓ UNS R56400
- AMS 2631 \*D CLASS AA
- ✓ Grade 1 or Non Premium Material Immersion method
- Supply from one heat of material
- Line mark as required by spec and add size
- ✓ Gauge Tolerance  $\pm .002$ "
- During Manufacturing, handling, testing, and inspection this material did not come in contact with mercury or any device employing a single boundary of containment.
- ✓ This Titanium product contains no purposeful addition of any element regulated by the Dodd-Frank Conflict Minerals law.
- ✓ "Except where an exemption under the Annex to REACH Directive (European Union Environmental Regulations (EC No.1907/2006) applies, none of the titanium materials supplied on this order to your company, exceed the concentration limits for the substances named in the REACH / RoHS Directives."
- \*\*\*\*DO NOT TAPE PACKING LIST DIRECTLY ON MATERIAL\*\*\*\*



St. Louis Mill Sales  
 1250 Interstate Drive  
 WENTZVILLE MO 63385  
 USA  
 Tel:800-753-1550 Fax:636-887-9098

Attachment to Product Certification	
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TIMET Sales Order Number/Date	510379/Jun 28, 2017
TIMET Packing List Number/Scheduled Ship Date	80784829/Jul 10, 2017
TIMET Internal Revision #:	1

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

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. This Attachment to Product Certification is specific to your referenced order, is an integral part of and amends the physical and chemical test reports attached. All specification(s) and revision(s) that differ from the attached have been approved for inclusion by the producing facility.

Authorized TIMET Signature



Date

JUL 12 2017

**BRIAN STALEY**  
 Quality Assurance Representative