

Attention: The copying of extracts of this certificate is inadmissible!
Falsified, fictitious or fraudulent statements or entries may be punished as a felony under federal law.

Laboratory Test Report No.: B329442**LOT NO.: 16419262**

The parts contained in this shipment have been manufactured and inspected in accordance with the applicable requirements of the drawings and specifications. In addition we certify conformance with the following: surface roughness, finish, dimensional attributes, head and thread grain flow. Inspection records are on file and are available on request of the procuring agency.

Part threads are manufactured and inspected in accordance with AS-8879 / HS 387.

Magnetic particle inspection and fluorescent penetrant inspection as applicable has been performed in accordance with applicable specification.

Negatives of metallurgical mounts are retained 10 years for review.

Reviewed by



Date 03.06.2008

Setup Date 29.05.2008

Customer: **M & M Aerospace Hardware**Material: **Ti6AL-4V DYNALUBE**P.O.NO.: **0EL734**Mat'l Spec.: **VSM1365K/AMS4928
Q/AMS4967H**Part Number: **HL10VF6-7** Rev. 15.11.06 40Prod. Spec.: **HS 342**Quantity: **25000**Mag/pen: **ASTM E 1417**Lot Quantity: **35000**Heat. No.: **8818066**

Inspection Report No.:

HeatTreatment Spec.: **AMS 2801
(WL 3.7164.7)**

Request for Deviation No.:

Raw Material Lot. No.: **R322354**

Change Notice No.:

Wo. No.: **04020268**Lot. No.: **16419262**Remarks: **VS47789**Surface: **Surface coat. Type1,color blue
Cetyl alcohol HS 305****HS 306**

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Laboratory Test Report No.: B329442

LOT NO.: 16419262

Micro Examination	Fatigue	Tensile	Shear
Sample Size 10	High= 4003 N / Low= 400 N	Req. Value 11120 N	Req. Value 23931 N
Material Type Ti6AL-4V DYNALUBE	Req. Cycles 15/30/60 X 1000	N/DIA/N/mm ² /Loc.	N/DIA/N/mm ²
Surface Contamination O.K.	60000 cycl.	14382 N	27033 N
Grain Size R/C N/A	60000 cycl.	14534 N	26937 N
Macro Structure O.K.	60000 cycl.	14866 N	26657 N
Micro Structure O.K.	60000 cycl.	14485 N	26237 N
Magnification 100x	60000 cycl.	14160 N	25464 N
Hydrogen (ASTM E 1447) 60 ppm	60000 cycl.	14428 N	26492 N
Discontinuities O.K.	60000 cycl.	14089 N	26721 N
Broach Cracks None	60000 cycl.	14285 N	26423 N
IGC	60000 cycl.	14491 N	26581 N
Plate Thickness 0,0000 mm	60000 cycl.	14943 N	26699 N
	Ø: 60000 cycl.	Ø: 14466 N	Ø: 26524 N
	d: 0,000	d: 280,549	d: 451,694
Torque			
Req. Value NA			
Sample Size			
Analyses			
Hardness			
Req. Value NA			
Sample Size			
Analyses			
Max.			
Min.			
Ø =			
σ _{B-1} =			
Stress Durability: NA			
Material		Etching Solution	
Ti6Al4V		650 ml H ₂ O/50 ml HF (70%)	
Ti 5-5-5		200 ml H ₂ O/2 ml HF/12 ml HNO ₃	
8740/4340/H11/1.6604/1.7720		125 ml CH ₃ OH/6 ml HNO ₃	
A286/1.4944/431/17-4PH/Ph13-8Mo		85 ml CH ₃ OH/5 ml HNO ₃ /10 ml HCl	
Inco 718/Nimonec		85 ml CH ₃ OH/15 ml HNO ₃ /25 ml HCl	
MP35N		25 ml H ₂ O/3g (NH ₄) ₂ CuCl ₄ /50 ml HCl/15g FeCl ₃	

12322354



195 Museum Road
Washington, PA 15301
Phone 724.228.1000
Fax 724.229.4195

PRODUCT CERTIFICATION
WORK ORDER 067377
SALES ORDER / RLS 018564 / 1

SOLD TO

Carpenter Technology (Europe)
Rue Edouard Bellin 11
Mont-Saint-Guibert, 1435
Belgium

Quality System is registered
to ISO 9001:2000 and AS9100:2001

CUSTOMER P.O. VSD071895	CUSTOMER PART AU5-01-0-18925-0-18975C	QUANTITY 3,686 lbs	COILS LADING NO 13 00028870	SHIPMENT DATE 12/17/2007						
PART INFORMATION: 111DB4AAN01895 TI 6AL 4V Fastener Quality Custom Tolerance Dynalube - 0.1895" Dia. Specifications: VSM 1365 Rev: K; AMS 4928 Rev: Q; AMS 4967 Rev: H Size: 0.1895" Dia. +/- 0.00025"										
Chemical Report (Wt.%)										
Heat 8818066	Al 6.07	V 3.95	C .016	Fe .18	N .008	O .16	Y <.005	Ti BAL	Other <.05	TOE <.30
Hydrogen by Tag Number - As Shipped (Wt. %)										
Tag Nbr	H(T)	H(W)								
8818066-005	.0043	.0043								
8818066-006	.0041	.0036								
8818066-007	.0042	.0044								
8818066-008	.0042	.0034								
8818066-009	.0037	.0037								
8818066-010	.0034	.0040								
8818066-011A	.0043	.0040								
8818066-011B	.0043	.0040								
8818066-012	.0043	.0043								
8818066-013	.0044	.0042								
8818066-014	.0043	.0036								
8818066-015	.0035	.0040								
8818066-016	.0048	.0044								
As Shipped Properties										
TEST	YS 0.2% #1 (Mpa)	YS 0.2% #1 (Mpa)	EL #1 (%)	RA #1 (%)						
UTS #1 (Mpa)	1040	863	19.5	48						
UTS #2 (Mpa)	1079	881	17.5	48						

Alcoa Fastening Systems Hildesheim

shipdate ex stock BRU: 17/3/2008

PO 7009653-34

coil weights 283 - 285 - 289 - 335lbs
283 - 167 - 111lbs

Page 1 Total shipweight: 1753 lbs 795 kg
Date Printed 12/17/2007



DYNAMET
A Carpenter Company

195 Museum Road
Washington, PA 15301
Phone 724.228.1000
Fax 724.229.4195

PRODUCT CERTIFICATION

WORK ORDER 067377
SALES ORDER / RLS 018564 / 1

CUSTOMER P.O. VSD071895	CUSTOMER PART AU5-01-0-18925-0-18975C	QUANTITY 3,686 lbs	COILS 13	LADING NO 00028870	SHIPMENT DATE 12/17/2007
Shear 0° #1 (Mpa) 641	Shear 90° #1 (Mpa) 646	Shear 0° #2 (Mpa) 641	Shear 90° #2 (Mpa) 647		
Shear 0° #3 (Mpa) 641	Shear 90° #3 (Mpa) 647	Hardness (HRC) 32			
Capability@1750°F (954°C) 1hr WQ +1000°F (538°C) 4hrs AC					
TEST					
UTS #1 (Mpa) 1293	YS 0.2% #1 (Mpa) 1168	EL #1 (%) 10.4	RA #1 (%) 48		
UTS #2 (Mpa) 1219	YS 0.2% #2 (Mpa) 1102	EL #2 (%) 10.4	RA #2 (%) 48		
Shear 0° #1 (Mpa) 772	Shear 90° #1 (Mpa) 772	Shear 0° #2 (Mpa) 767	Shear 90° #2 (Mpa) 767		
Shear 0° #3 (Mpa) 772	Shear 90° #3 (Mpa) 778	Hardness (HRc) 38			
Metallography Results					
Microstructure					
Alpha/Beta					
Material Data					
Melt Source RMI Titanium		Melt Origin USA		BT °F 1818	
Certification Information					
As Shipped Condition					
Annealed 1450°F 1hr. A/C.					
CERTIFICATION REQUIREMENTS					
Material Free Of Alpha Case.					
Capable Of AMS 4928Q, AMS 4967H.					
Material tested in 1" gage length.					
This shipment of raw material contains no radioactive contamination.					
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.					
					<i>Terry J. Whitfield</i> Terry J. Whitfield Q.C. Lab Manager

		☒ RMI TITANIUM COMPANY 1000 WARREN AVE. NILES, OHIO 44448		DATE	SALES ORDER NO.	GRADE	PAGE 1 of 1
		☐ RTI TRADCO 1701 WEST MAIN ST. WASHINGTON, MO 63080		CUSTOMER NAME	93183	6AL-4V	PACKING LIST NO. 80168340
IDENTIFICATION & REFER		INGOT NO.	LOT	S-R	MATERIAL		CUSTOMER ORDER NO.
MATERIAL NUMBER		8818066	01	00	DYNAMET INC.		014758
PRODUCTION ORDER		30109971		SPECIFICATION			
				DI-1004 REV. 1			
				BETA FORGED & CONDITIONED TITANIUM			
CHEMISTRY:							
☒ INGOT (AVERAGE of TOP-CENTER-BOTTOM) ☐ INGOT (AVERAGE of TOP-BOTTOM) ☐ FINAL PRODUCT							
ELEMENT	TOP	CENTER	BOTTOM	TEST	TEST INFORMATION	FRACTURE TOUGHNESS KSI V IN	
C	.017	.017	.016	ALL	RMI Titanium, Niles, OH	Seechmen Size:	
N	.008	.009	.009			ID	Toughness # Val. Ck
Fe	.18	.17	.17				
Al	6.08	6.11	6.06				
V	3.85	3.93	3.95				
O	.16	.16	.16				
Y	<.05 PPM	<.05 PPM	<.05 PPM		RESIDUAL ELEMENTS, EACH <.05%		
B	<.05 PPM	<.05 PPM	<.05 PPM		RESIDUAL ELEMENTS, TOTAL <.30%		
Cu	<.01	<.01	<.01		CHEMISTRY TEST METHODS:		
Si	.01	.01	.01		ALLOY CHEM: SPARK OES		
					O2N2: ASTM E 1409		
					HYDROGEN: ASTM E 1447		
					CARBON: ASTM E 1941		
TI	BALANCE						
FINAL	OXY						
PRODUCT	HYDROGEN	TIA 13	BIA 2	TIA 28 (1/4" BELOW SURFACE)	BIA 25 (1/4" BELOW SURFACE)	(PPM)	
PROPERTIES							
ULTIMATE KSI	L					This certificate shall not be reproduced except in full without written approval of the RTI International Metals, Inc. lab at which it was prepared. The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under federal law.	
YIELD (2% OFFSET)	L						
% ELONGATION (INCHES)	L						
% REDUCTION IN AREA	L						
BEND 105	L						
HARDNESS	L						
BETA TRANSUS	DATA: TIA (815°F +/- 10°F) BIA 1820°F +/- 10°F			STATIC NOTCH:			
CREEP							
ULTRASONIC							
HEAT TREAT/TEST FORCE							
SHIPPING							
NO. OF PIECES	8			OTHER DATA:			
WEIGHT (LBS)	18.0720W			INGOT WAS MELTED AT RMI TITANIUM COMPANY, NILES, OHIO. PRODUCED AND			
SIZE (IN)	9.00" X RCS X R/L			CONTROLLED IN ACCORDANCE WITH RMI/DYNAMET FIXED PROCESS AGREEMENT #IC DTD			
EST. PIECES	X X			5-1-01 MELT METHOD: 2X VAR. MATERIAL IS FREE OF MERCURY, RADIUM, ALPHA SOURCE			
THIS IS TO CERTIFY THAT THE ABOVE TEST RESULTS ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY AND CONFORM TO ORDER REQUIREMENTS				AND LOW MELTING OR ALLOY CONTAMINATION. RMI CERTIFIES THAT ALL PROCESSING			
				PERFORMED AT RMI TITANIUM NILES IS FREE OF RADIOACTIVE CONTAMINATION			
				CHEMISTRY RESULTS SHOWN ABOVE WERE PERFORMED AT RMI TITANIUM COMPANY, 1000			
				WARREN AVE., NILES, OHIO. RMI HAS BEEN ACCREDITED BY THE PERFORMANCE REVIEW			
				INSTITUTE FOR THE FASTENER QUALITY ACT WHICH EXPIRES ON APRIL 30, 2008.			
				SPONGE SOURCE: LISTAIRBUS SPONGE. MELT DATE: 6-14-07.			

NAME/TITLE: LISA NICKLASH, MANAGER OF CERTIFICATIONS

SIGNED: *L. Nicklash*

DATE: Aug 15, 2007



P.O. Box 025263, Miami, FL 33102-5263 • Tel: 305.925.2600 • Fax: 305.507.7191
Plant Location: 10000 N.W. 15th Terrace, Miami, FL 33172 • SITA: MIAMMCR
www.KLXaerospace.com

Shipped From: 10000 NW 15 TERRACE, MIAMI, FL 33172

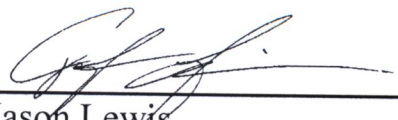
Material Certification

The items set forth on the purchase order referred to below have been visually inspected and the dimensions thereof have been measured by us, and based on the aforesaid, as well as the representation made to us by the manufacturers of the items subject of such purchase order, we hereby certify that such items are in conformity with all current governmental and manufacturer's requirements, specifications, drawings, and conform to the purchase order requirements. Said items are in new condition and have not been obtained from any U.S. Government or Military source and are traceable to KLX Aerospace Solutions.

FIRM: AJ WALTER AVIATION LTD

PURCHASE ORDER#: CP15814

QUANTITY	U/M	PART-NUMBER	CUST REF#	LOT-NUMBER	Eff Date	EXP DATE
15	EA	HL10VF6-7		16419262		



Jason Lewis
Senior Director, Global Quality

03/25/16

Inv # 03/25/16