



Verkhaya Salda
Metallurgical Production Association

1. Parkovaya St., Verkhaya Salda, Sverdlovsk reg.
624 000, RUSSIA
Phone (34345) 2-38-32, 2-17-66
Fax (34345) 2-47-36 2-05-00
Telex 348176, 348177 "SEVER"

**INSPECTION
CERTIFICATE**

IN 10214.31E ISO 9002 CERT No 09 10056260

CERTIFICATE № 03378V04A

date 13.04.2004

Purchaser: VSMPO TRUS. U.S.A.
Qualify/alloy: Ti6Al4V

Condition of delivery: Hot Rolled, Machined, & Pickled

Contract: 84021101TMV Annex 1
Purchaser order: 11542
Terms of delivery: C50TF22-S15 Cl.F, S470G



Item № 283

Units Weight, (kg/LB)

1654/3646

Object Forging stock

Dimensions (mm/inch) or Drawing
dia 22.23x3050 - 3666/0.875x120-144
min dia 22.25; max dia 22.31

Heat No 8-42-2336

Lot No 663

Chemical Composition %

Requirement	Ti-remainder					Residuals, %													
	Al	Min	Mo	max	V	Zr	Cu	Sn	C	Fe	Y	B	O ₂	N ₂	H ₂	each	total	In part, %	
C50TF22-S15 Cl.F ASTM F 1472 -08e1	5.5-	max			3.5-	max				max	max	max	max	max	max	max	max	max	
M000196 M	6.75	0.10	0.10	4.5	0.10	0.10	0.10	0.05	0.05	0.073	0.005	0.0314	0.20	0.05	0.0125	0.10	0.20		
TOP	6.44	0.004	0.022	3.81	0.020	0.008	0.006	0.004	0.004	<0.005	<0.0014	0.184	0.007	0.007	0.0014	<0.10	0.059	11	
BOTTOM	6.40	0.004	0.025	3.81	0.020	0.008	0.007	0.003	0.003	<0.005	<0.0014	0.180	0.007	0.007	0.0013	<0.10	0.050	239-3	

Requirement

0.20% proof stress	Tensile strength	Elongation	Reduction	Sample	Brinell	Heat treatment
MPa	MPa	%	%	№№	T ₀ , F	T ₀ , F time
ASTM F 1472-08e1	min	min	min			
C50TF22 S15 Cl.F	827	896	10	25		
M000196 M	827	896	10	25		
Longitudinal						
11	887	976	16.9	50.2	TOP	1299
12	894	979	16.5	50.9	BOTTOM	2h
239-2	869	956	19.3	50.4	1846/4	air cooling
239-3	874	956	20.1	52.9		

Macrostructure testing As per AMS 2380E Level 10. No defects found (P3TF25). No segregation detected (C50TF22), S470G.

Microstructure testing As per C50TF22 Levels 10, 20, per 3.3.8 (free from alpha-case). Photo 320817, S470G.

ASTM F 1472 -08e1 par 9.1, 9.3; M000196M par 6.1

Ultrasonic inspection As per P3TF34, S3, Cl.A Longitudinal wave AMS 2631D Cl. A1. Longitudinal wave.

Immersion method Focused transducer.

Ingot, triple VAR, dia 755 mm/ 29.72 inch, weight 3090 kg/ 6812 pounds.

Prepared by Dushina A.A

signature



Whoever has accepted descriptions or corrections listed here was manufactured in accordance with the technical specifications of the standard under its sub-order and has inspected, measured, compared, and supplied the material in accordance with the specifications, drawings, and relevant standards and regulations in force.

Product is manufactured by VSMPO.

Forging stocks are produced and inspected in acc. with GENAVSMPO SAL-1 Agreement, MP 39.004GE-00 Rev.F, MP 39.005GE-00 Rev.B, MP 39.012GE-00 Rev.C.

100% analysis for alloy compliance; no burnt areas

See Annex 1

53752

Original Cert #: 03378Y04A **CERTIFICATE OF REPORT**
NF & M INTERNATIONAL, INCORPORATED

1729 PENNSYLVANIA AVENUE, MONACA, PENNSYLVANIA 15061 Ph. 724-774-9200/FAX 724-728-2544

Customer:

Ship To:

Page 1 of 1

VSMPO - TIRUS, US - LEETSDALE 401 RIVERPORT DRIVE LEETSDALE PA 15056 ATTN: ACCOUNTS PAYABLE	VSMPO - TIRUS PA WAREHOUSE 401 RIVERPORT DRIVE LEETSDALE PA 15056 ATTN: CHRIS CHMURA
--	---

NF&M Work Order	Ingot No.	Size	Customer P.O.
09887	8-42-2336	.8750 In RND	29463-NI
NF&M Sales Order	Material	Description	Report Date
0C3686-00	Titanium 6-4	ANNEALED BAR	10/29/2013

SPECIFICATIONS: AMS4928T, ASTM B348-13

PRODUCT CHEMISTRY

Sample	155	235	
Hydrogen (ppm) surface	9	9	Hot extraction method

TENSILE PROPERTIES (HEAT TREAT ID 1) (FULL SECTION PROPERTIES)

Sample/Dir	159-2/L	199-2/L
Ultimate (KSI)	143	142
Yield (KSI) (0.2% offset)	132	130
4D Elongation (%)	19	20
Reduction (%)	50	52

HEAT TREATMENT

Type: VACUUM ANNEALED
1) Temp (F): 1300 Duration (Hrs): 1.0 Argon Quenched.
Performed at Solar Atmospheres Inc., 30 Industrial Road, Hermitage, PA 16148

MACRO

Acceptable to AMS2380 REV. F, LEVEL 10

MICRO

Acceptable to AMS4928T Para 3.5.1.2.1 (L)


REMARKS

Material conforms to the requirements of this purchase order.
 ALLOY TYPE TESTING - OK
 No Alpha Case present
 All properties performed at room temperature unless specified otherwise.
 All testing performed at NF&M INTERNATIONAL unless specified otherwise.
 Material supplied or processed on this purchase order has not come in direct contact with mercury or it's compounds nor with any mercury containing device employing a single boundary of containment

SHIPPING DATA

Weight: 2646#

QUALITY CONTROL


 ALAN YARZEBINSKI, LAB TECHNICIAN CLASS 2



THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THE CERTIFICATE MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL LAW.

THE TEST REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF NF&M QUALITY.