



Verkhnyaya Saida
Metallurgical Production Association

1, Parkovaya St., Verkhnyaya Saida, Sverdlovsk reg.

624 600, RUSSIA

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Telex 348175, 348177 "SEVER"

INSPECTION CERTIFICATE

EN 10204-3.1.8 ISO 9002 CERT. N° 09 108 98269

CERTIFICATE No 04287Y036

date 26.06.2003

Purchaser: VSMPO TRUS, U.S.A.

Quality/alloy: Ti6Al4V

Condition of delivery: Hot Rolled; Machined; Pickled

Contract: 3405431T Annex 4

Purchaser order: 10804

Terms of delivery: C50TF22-S17 CLC par. 3.1 (C.I.A.)

GE S 470 01/06/2008, GE S 1000 01/02/2008, AMS 2241R



Item No	Units	Weight, (kg/LB)	Object	Dimensions (mm/inch) or Drawing	Heat No	Lot No
	406	1675/3690	BAR	dia 19,05 x 3050 - 3660 / 0,750 x 120-144	8-46-3035	618
				min dia 19,05; max dia 19,11		

Chemical Composition, %				Ti-remainder				min dia 19,05; max dia19,11								Residuals,%				In the Part, %		
Requirement	Al	Mn	Mo	V	Zr	Cu	Sn	C	Fe	Y	B	O ₂	N ₂	H ₂	each	total	H ₂	B				
C50TF22-S17 CLC	5,50-6,75	max	max	3,50-4,50	max	max	max	max	max	max	max	max	max	max	max	max	max	max	max			
TOP	6,36	0,002	0,019	4,01	0,020	0,008	0,007	0,005	0,30	0,005	0,0014	0,20	0,05	0,0125	0,1	0,20	0,0030	0,0003				
BOTTOM	6,48	0,003	0,020	3,93	0,020	0,008	0,007	0,005	0,071	0,0001	<0,0014	0,174	0,008	0,0014	<0,10	0,062	0,0030	<0,0003				
								0,004	0,078	0,0001	<0,0014	0,183	0,007	0,0012	<0,10	0,066	0,0030	<0,0004				
Requirement	0,20%	Tensile	Elonga-	Reduc-	Sample	Beta-	Heat treatment															

Requirement	0,20% proof stress	Tensile strength	Elongation	Reduction	Samples #	Bois-transus	Heat treatment
	MPa	MPa	%	%		T°, F	time
C50TF22-S17 CLC	min	min	min	min		T°, F	
	827	896	10	25			
	Longitudinal						
11	924	1006	17,7	51,0	TOP	1810,4	1274
12	934	1011	16,5	51,3	BOTTOM	1819,4	air
249-10	917	987	15,7	50,0			cooling
249-11	915	986	16,9	51,7			

Ingot: triple VAR, dia 745 mm/
weight 3430 kg/ 7561 pounds.

Prepared by: Levina O.V.
Name: Vasilova O.V.

signature

stamp

Macrostructure testing As per AMS 2380F Level 10, P3TF25 no defects

C50TF22

No segregation detected

Microstructure testing As per C50TF22 Levels 10,20, single area 50

par. 3.3.8 (free from alpha-case);

Photo 320817, 320819

Ultrasonic inspection As per P3TF34, S4, C.I.A. Longitudinal shear wave, immersion method

We certify that, subject to exceptions or reservations stated hereafter, the supplies obtained here were manufactured in accordance with the technical specifications of the contract, order or sub-order and that, as inspection operations and tests, having been completed, the supplies comply in every respect with the relevant parts of specifications, drawings, and relevant standards and regulations in force.

Information particular to the supplies delivered:

Product is manufactured by VSMPO.

Specify the reference of certification system:

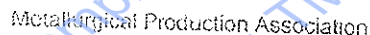
Bar production to the established process.

MP 39.012GE-00 Rev.F

See Annex 1

100% analysis for alloy compliance; no burnt areas.





Telex 348176, 348177 "SEVER"

ANNEX TO
INSPECTION
CERTIFICATE

EN 10294-3.1.B ISO 9002 CERT. N° 00 100 95261

ANNEX 1 CERTIFICATE 04287Y03B

Requirement: C50TF22-S17 CLO par. 3.1 (CIA)



Quantity of Bars 406

Product Bar

Heat 8-46-3035

Lox 618

Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #	Bar #
11	22	37	49-3	59-4	72	83	99	109-4	119-5	133	148	159-4	172	187	198	209-4	222	238	249-5
12	23	38	49-4	59-5	73	84	99	109-5	119-6	134	149	159-5	173	188	199	209-5	223	239	249-6
13	24	39	49-5	59-6	74	85	99-1	109-6	119-7	135	149-1	159-6	174	189	199-1	209-6	224	239-1	249-7
14	25	39-1	49-6	59-7	75	86	99-2	109-7	121	136	149-2	159-7	175	189-1	199-2	209-7	225	239-2	249-8
15	26	39-2	49-7	51	76	87	99-3	109-8	122	137	149-3	151	176	189-2	199-3	211	226	239-3	249-9
16	27	39-3	49-8	52	77	88	99-4	109-9	123	138	149-4	162	177	189-3	199-4	212	227	239-4	249-10
17	28	39-4	49-9	53	78	89	99-5	109-10	124	139	149-5	163	178	189-4	199-5	213	228	239-5	249-11
18	29	39-5	49-10	54	79	89-1	99-6	109-11	125	139-1	149-6	164	179	189-5	199-6	214	229	239-6	
19	29-1	39-6	49-11	55	79-1	89-2	99-7	111	126	139-2	149-7	165	179-1	189-6	199-7	215	229-1	241	
19-1	29-2	39-7	51	56	79-2	89-3	101	112	127	139-3	151	166	179-2	189-7	201	216	229-2	242	
19-2	29-3	41	52	57	79-3	89-4	102	113	128	139-4	152	167	179-3	189-8	202	217	229-3	243	
19-3	29-4	42	53	58	79-4	89-5	103	114	129	139-5	153	168	179-4	189-9	203	218	229-4	244	
19-4	29-5	43	54	59	79-5	89-6	104	115	129-1	139-6	154	169	179-5	189-10	204	219	229-5	245	
19-5	29-6	44	55	59-1	79-6	89-7	105	116	129-2	139-7	155	169-1	179-6	189-11	205	219-1	229-6	246	
19-6	29-7	45	56	59-2	79-7	91	106	117	129-3	141	156	169-2	179-7	191	206	219-2	231	247	
19-7	31	46	57	59-3	79-8	92	107	118	129-4	142	157	169-3	181	192	207	219-3	232	248	
19-8	32	47	58	59-4	79-9	93	108	119	129-5	143	158	169-4	182	193	208	219-4	233	249	
19-9	33	48	59	59-5	79-10	94	109	119-1	129-6	144	159	169-5	183	194	209	219-5	234	249-1	
19-10	34	49	59-1	59-6	79-11	95	109-1	119-2	129-7	145	159-1	169-6	184	195	209-1	219-6	235	249-2	
19-11	35	49-1	59-2	59-7	81	96	109-2	119-3	131	146	159-2	169-7	185	196	209-2	219-7	236	249-3	
21	36	49-2	59-3	71	82	97	109-3	119-4	132	147	159-3	171	186	197	209-3	221	237	249-4	

Notes:

- Total quantity of bars: 406

Notes:

- | | | |
|----|-----------------------------|-------|
| 1. | Total quantity of bars: | 406 |
| 2. | Bars excluded from the lot: | N/A |
| | Bar #: | |
| | Nonconformances Bar #: | |
| 3. | Bar length min 2440 mm: | 11.25 |

4. Bars excluded from the lot due to US-results: N/A
Weight: _____ kg
Internal Defects: _____
Surface Defects: _____

Prepared by: Levina O.V.
Name: Vasileva O.V.

signature

stano



CERTIFICATE OF REPORT
NF & M INTERNATIONAL, INCORPORATED

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

Page 1 of 1

Customer:

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

Ship To:

VSMPO -TIRUS PA WAREHOUSE
401 RIVERPORT DRIVE
LEETSDALE PA 15056
ATTN: CHRIS CHMURA

NF&M Work Order	Ingot No.	Size	Customer P.O.
09884	8-46-3035	.7500 In RND	29463-NI
NF&M Sales Order	Material	Description	Report Date
0C3686-00	Titanium 6-4	ANNEALED BAR	12/02/2013

SPECIFICATIONS: AMS4928T, ASTM B348-13

PRODUCT CHEMISTRY

Sample	17	63	
Hydrogen (ppm) surface	8	7	Hot extraction method.

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

Sample/Dir	22/L	32/L
Ultimate (KSI)	145	147
Yield (KSI)	135	138
(0.2% offset)		
4D Elongation (%)	18	18
Reduction (%)	50	51

HEAT TREATMENT

Type: VACUUM ANNEALED

1) Temp (F): 1300 Duration (Hrs): 1.25 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: 3695#

QUALITY CONTROL

Jeffrey Kiefer

JEFFREY KEEFER, LAB TECHNICIAN CLASS 2



Nadcap

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.