



"VSMPO-AVISMA Corporation"

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EN 10204-3.1 AS 9100/EN ISO 9001 CERT. No 01 117 048312

INSPECTION CERTIFICATE

CERTIFICATE № 13853Y11A
Purchaser: Tinus International SA, Switzerland
Quality/alloy: GRADE2 Condition of delivery: Hot Rolled, Machined, Annealed.

Date: 31.08.2011

Contract: 84054105TDD Annex 13

Purchaser order: 26483-RM
Terms of delivery: ASTM F 67-06



| Item No | Units | Weight, (kg) | Object | Dimensions (mm) or Drawing No | Heat No | Lot No |
|---------|-------|--------------|----------------|--|------------|--------|
| | 170 | 857 | Pickled BAR | dia 19,05 ^{+0,20} x 3658-4267 | 8-33-07052 | 988 |

| Requirement | Chemical Composition, % | | | | Residuals, max, % | In the Part, Samples as-pickled | H (%) |
|--------------------|-------------------------|----------|----------|-----------|-------------------|---------------------------------------|------------|
| | O | Fe | C | N | | | |
| ASTM B 348-13 Gr.2 | max 0,25 | max 0,30 | max 0,08 | max 0,03 | | | |
| ASTM F 67-06 | | | | max 0,010 | | | |
| TOP | 0,141 | 0,032 | 0,005 | 0,002 | | | |
| BOTTOM | 0,160 | 0,033 | 0,005 | 0,002 | | | 91-2 0,003 |

| Requirement | 0,20% proof stress | | Tensile strength | | Elongation | | Reduction | | Beta-transus | | Heat treatment | |
|--------------------|--------------------|-----|------------------|-----|------------|------|-----------|-----|--------------|-------------|----------------|--|
| | MPa | min | MPa | min | % | min | % | min | T°, C | T°, C | time | |
| ASTM B 348-13 Gr.2 | | | | | | | | | | | | |
| ASTM F 67-06 | | 275 | | 345 | | 20 | | 30 | | | | |
| | 42-1 | 342 | 469 | 473 | 27,6 | 66,8 | | | | 650 | 1 h | |
| | 91-2 | 332 | | | 30,8 | 66,5 | | | | air cooling | | |

Macrostructure testing N/A
Microstructure testing As per ASTM F 67-06 par.9.1:
(free from alpha-case).
Ultrasonic inspection N/A

We certify that, subject to exceptions or concessions listed hereafter, the supplies detailed here were manufactured in accordance with the technical specifications of the contract, order or sub-order and that, all inspections operations and tests, having been completed, the supplies comply in every respect with the relevant particular specifications, drawings, and relevant standards and regulations in force. Information particular to the supplies delivered, specify the reference of concessions granted.

Bar Heat Treatment 650° C, 1 h, air cooling.
Mercury Free.
Production start-up date: 06.08.2011
Diameter tolerance ASTM B 348-10(±0,20 mm)

Prepared by Dushina A.A.
Name Dushina A.A.

signature

stamp

