

## Supply of Titanium Ti-6Al-4V (Grade 5) Solid Rod

Sl. No.	Description	BHEL Specification
1	Chemical composition (%)	As per AMS4928 P / MIL-T-9047 G Carbon - 0.08 (max) Iron - 0.25 (max) Nitrogen - 0.05 (max) Oxygen - 0.2 (max) Aluminium - 5.5 to 6.75 Vanadium - 3.5 to 4.5 Hydrogen - 0.015 (max) Yttrium - 0.005 (max) Total other elements - 0.4 (max) Titanium - Balance
2	Dimensions	100 mm (+5%) Diameter with 1000 mm (+2%) length Weight: 36 Kg (+10%)
3	Condition	Bar manufactured through forging or extrusion process
4	Heat treatment	Annealed
5	Mechanical properties	As per AMS4928 P / MIL-T-9047 G a. Yield Strength (0.2% YS): 827 MPa (min) b. Tensile Strength (UTS): 896 MPa (min) c. Elongation % (in 4D): 8 % (min) d. Reduction of Area %: 15 (min) e. Hardness (HRC): 30 (min)
6	Certificates	Manufacturer's / NABL approved Lab Test Certificate consisting of Chemical Composition as per relevant standards (specified above), Mechanical properties (as specified above) shall be provided by the manufacturer/vendor. Tensile test should be done as per ASTM E8. Test report should include: a) UTS, b) 0.2% Proof test, c) % Elongation. Hardness test should be done as per ASTM E18. Tests for properties mentioned in Sl. No. 1 and 5 should be done in NABL accredited laboratory.

7	Inspection	NDT inspection to be carried out using Die Penetration (DP) and Ultrasonic testing (UT) technique. DP test should be done as per ASTM E165. UT test should be done by Level-2 certified personnel (ASNT / ISNT). Any defect indication should be reported and submitted for review and acceptance by BHEL.
8	Identification of test certificates	The test certificates should clearly indicate following details regarding material: a) Heat No. / Cast No. b) Lot No. / Batch No.
9	Workmanship	Material shall be uniform in quality and condition, free from foreign material and from internal imperfections which is detrimental to fabrication or performance of parts.
10	Traceability	Manufacturer/Vendor shall submit all records related to traceability of material supplied.
11	Marking	The consignment shall be marked with specification, condition, size, gross, tare & Net weight, consignor and consignee names and addresses, purchase order Number etc.
12	Packing	The materials shall be suitably packed for transit and to avoid damage in any form during transit. A release note shall be furnished with the supplies on the following lines: "Certified that goods supplied against the reference Purchase Order are free from defects, inspected, tested and conform to respective AMS/ASTM specifications".
13	Offer requirement	Payment will be made on per kg basis of the actual material received as per the specifications and similarly quote must contain quantity offered and price per kg of the material being supplied.
14	Dispatch clearance	All the required test certificates (mentioned above) must be submitted to BHEL at least 3 days before the delivery of material for review and dispatch clearance.