







		BHEL HYDERABAD-32	STANDARD QUALITY PLAN						QP No. : HY/HE/10001/TITANIUM TUBES				
			ITEM: WELDED TITANIUM TUBES						Rev. No.: 01 DATE : 17.08.2012 Page 1 of 5				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										S	M	C	
1	2	3	4	5	6	7	8	9		10			11
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Inspection of strip chemical composition	Chemical composition	Major	Chemical composition comparison with material certificate	Each heat	AA13002 Rev.02	AA13002 Rev.02	Inspection certificate	✓	P	V	V	
2.0	IN PROCESS INSPECTION												
2.1	Inspection of tube chemical composition	Chemical composition welded tube	Major	Chemical Analysis	Each lot of welded tubes	AA 13002 rev.02	AA13002 Rev.02	Inspection certificate	✓		P	V	
2.2	Heat treatment (online furnace)	Heat treatment condition	Major	Thermo scope 800-IC	100%	Approved HT Chart	Approved HT Chart	Inspection certificate	✓		P	V	
3.0	FINAL INSPECTION & TESTING												
3.1	Eddy current inspection	Inspection of internal defects	Major	Eddy-current method	100%	ASME SB 338	AA 13002 Rev.02	Inspection certificate	✓		P	W	Hold point
3.2	Pneumatic testing under water	Inspection of tube soundness (leak tightness)	Major	By air under water.	100%	ASME SB 338	Any evidence of air leakage is not allowed	Inspection certificate	✓		P	W	Hold point
3.3	Hydrostatic Test	Inspection of tube soundness (leak tightness)	Major	Hydro	100%	ASME SB 338	No leakage	Inspection certificate			P	W	


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Legend: *D- Documents marked (✓) to be included by Supplier in Documentation Package. S - Sub Vendor M - Vendor / Manufacturer C - Customer (BHEL) / Inspection Agency		 AMIT KARAMCHANDANI ENGINEER/QA	 Y C VENKATESWARA RAO SR. DGM / QA

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3.4	Ultrasonic inspection	Inspection of internal defects	Major	Ultrasonic inspection	100%	ASME SB 338	AA 13002 Rev.02	Inspection certificate	✓		P	W	Hold point At random 10% by BHEL, 100% by vendor
3.5	Inspection of tube outer diameter and ovality	Inspection of tube outer diameter and ovality	Major	Ring gauges PR, NOT by 1000mm from both ends of tube. Micrometer	100% 5%	Drawing	AA 13002 Rev.02	Inspection Report	✓		P	W	----do----
3.6	Wall thickness inspection	Wall thickness inspection	Major	Micrometer	10%	Drawing	AA 13002 rev.02	Inspection certificate	✓		P	W	----do----
3.7	Tube length inspection	Tube length inspection	Major	Stand for length measurement	100%	Drawing	AA 13002 Rev.02	Inspection Report	✓		P	W	----do----
3.8	Straightness inspection	Straightness inspection	Major	Line gage set of feeler gauges	100%	Drawing	AA 13002 rev.02	Inspection certificate	✓		P	W	----do----
3.9	Inspection of internal and external weld reinforcement	Inspection of internal and external weld reinforcement	Major	Using micrometer in machine line projection optical device	10% 2 specimens per tube lot	Drawing	AA 13002 rev.02	Inspection certificate	✓		P	W	----do----



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3.10	Inspection of cut perpendicularity	Inspection of cut perpendicularity	Major	Precision squares set of feeler gauges	5%		AA 13002 Rev.02	Inspection Report Test certificate	✓		P	W	----do----
3.11	Tensile test	Determination of tensile strength , yield strength elongation	Major	Confirmation of welded tube mechanical properties	1 specimen per each HT batch or 125 tubes whichever is less	ASTM A 370	AA 13002 rev.02	Inspection certificate	✓		P	W	
3.12	Flattening test	Flattening test	Major	Confirmation of welded tube mechanical properties	----do----	AA 13002	Cracking is not allowed	Inspection certificate	✓		P	W	
3.13	Reverse flattening test	Reverse flattening test	Major	Confirmation of welded tube mechanical properties	----do----	ASTM A 370	Cracking is not allowed	Inspection certificate	✓		P	W	
3.14	Flare test	Flare test	Major	Confirmation of welded tube mechanical properties	----do----	AA 13002 Rev 02	Cracking is not allowed	Inspection certificate	✓		P	W	
3.15	Surface roughness inspection	Determination of inner surface roughness expect for weld	Major	Determination of inner surface roughness value except for weld	----do----	AA13002 Rev 02	AA13002 Rev 02	Inspection certificate	✓		P	W	

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3.16	Ends processing freedom from burrs	Inspection for ends processing, freedom from burrs	Major	Confirmation of ends processing good quality freedom from burrs	100%	AA13002 Rev 02	AA13002 Rev 02	Inspection certificate	✓		P	W	At random
3.17	Welded tube identification	Identification accuracy control	Major	Confirmation of identification accuracy	100%	AA13002 Rev 02	AA13002 Rev 02	Inspection certificate	✓		P	V	At random
3.18	Acceptance inspection	Inspection to para’s 3.4-3.9, control of test and measurement reports to para’s 3.1, 3.3, 3.10, 14: control of welded tube identification accuracy	Major	Confirmation of measurements and testing compliance with the paragraphs specified	Quantum of check and testing is in accordance with the paragraphs specified	AA13002 Rev 02	AA13002 Rev 02	Inspection certificate	✓		P	V	Hold point
4.0	STORAGE, PACKING AND MARKING												
4.1	Packing & Marking	Control of tubes quantity in a box. Control of test certificates availability. Correctness of tubes packing accuracy of box identification	Each box	Conformation of tubes quantity in a box. Control of test certificates availability, correctness of tubes packing accuracy of box identification	Each Box	AA04900 02	AA0490002	Inspection certificate	✓		P	V	

Note:

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- 1-In case of any discrepancies between BHEL approved specification/drawing and quality plan, the former will prevail.
 2- Project specific requirements, if any, as per PO shall also be complied with.
 3-All the requirements as per BHEL specification are to be complied with.

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