NUCLEAR POWER CORPORATION OF INDIA LTD

(A Government of India Enterprise)

Project : 700 Mwe FLEET MODE REACTOR HEADER ASSEMBLY
TENDER NO. CMM/FTP/00-33-1-1199

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QAP for Seamless Carbon steel Pipes SA-333 GRADE -6

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	Name & designation	Sign & Date

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1	2	3	4	5	6	7	8	9	10				11
1	Billet	Heat analysis &Chemical Composition	MA	Checking of TC, Heat No, Grade, fine grain, melting practice, fully killed, vacuum degassed	One sample per heat per size	Material specification – SA-333- Gr 6 modified , PC-M-287 R-1	Material specification – SA-333-Gr 6 modified, PC-M-287 R-1	Test Report	3			1,2	
2	Heat Treatment of Pipes	Monitoring of Temperature and Time	MA	Job loading & at the end of soaking witness , Review of H.T Register& chart	100 %	PC-M-287 R-1 & Material specification – SA-333 Gr 6, NPCIL Approved procedure	PC-M-287 R-1 & Material specification – SA-333 Gr 6, NPCIL Approved procedure	HT Charts	3			2,1	Refer Note no-1
3	Product Analysis	Chemical Composition	MA	Chemical Elements	One sample from each pipe size	PC-M-287 R-1 & Material specification – SA-333 Gr 6	PC-M-287 R-1 & Material specification – SA-333 Gr 6	Test Report	3	2,1			

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					per lot per heat								
4	Tensile Test (Longitudinal)	Tensile Strength and % Elongation (UTS,Y.S. and % Elongation)	MA	Strength and % Elongation	On 5 % of the pipes from each lot or min two per heat per lot	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Test Report	3	2,1			
5	Impact Test	Impact test at -45 degree C	MA	Toughness	One set (3 Nos.) / Heat/lot	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Test Report	3	2,1			Refer Note no-2
6	Grain Size	Grain and Microstructure	MA	Grain and Microstructure	One sample from each pipe size per lot per heat	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Test Report	3	1,2			

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7	Flattening Test	Flattening	MA	Flattening Test	Each pipe at both end	PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,SA-530	PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,SA-530	Test Report	3	1,2			
8	Metal Macro structure /Etching Test	Structure& Check for seamless	MA	Structure	One sample from each pipe size per heat per lot	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Test Report	3	1,2			
9	Cold bending, LP test and sectioning	Cold bending test & LPE	MA	Cold bend test	Two sample from each size per heat per lot	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Test report	2			1,2	
10	Ultrasonic Examination	UTE	CR	Surface &Volumetric Examination	100%	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	UE Report	3	2,1			.

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						,ASME section III-NB-2550& NPCIL approved procedure	,ASME section III-NB-2550& NPCIL approved procedure						
11	Hydrostatic Test	Hydrostatic test @ 174 Kg/cm2 g	CR	Pressure Integrity and leak tightness.	100%	PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,ASME section III-NB-2550& NPCIL approved procedure	PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,ASME section III-NB-2550& NPCIL approved procedure	Hydro test report	3	2,1			
12	Pickling & Passivation	Surface prevention	MA	Visual	100 %	PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL approved procedure	PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,NPCIL approved procedure	Test reports	3	2,1			

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13	Visual &Dimension Check	Dimension & Surface quality and cleaning	MA	Length, controlled bore, end wall thickness, straightness, For 2 % pipes thickness checked by UT thickness gauge at 1 mtr interval on 4 location throughout the circumference of the pipe	100%	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	IR	3	2,1			
14	Marking, color coding at both ends location of the Pipe	Visual, Marking	MA	On each pipe at various locations	100 %	Material specification – SA-333 & SA-530	Material specification – SA-333 & SA-530	IR	3	1,2			Refer note-5&6.2 of NPCIL PC-M-287

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15	Document /test certificate verification	documentation	MA	verification	100 %	PC-M-287 R-1 & Material specification – SA-333 –Gr 6,	PC-M-287 R-1 & Material specification – SA-333 –Gr 6,	IR	3		1,2		Refer note-6
16	Preservation and packing	Surface preservation & Packing quality	MA	Verification	100 %	PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL Approved procedure	PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL Approved procedure	IR	3	1,2			Refer note-5
17	Issue Shipping Release	documentation	CR	verification	100 %	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	PC-M-287 R-1 & Material specification – SA-333 –Gr 6	Shipping Release	3			1,2	Refer note-8

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1) The heat treatment furnaces shall be in good condition and shall have temperature recorder and checked for calibration by Vendor-Q.A and NPCIL Q.A or its authorized inspection agency. The related certificates shall be submitted. Validity of calibration shall not more than 6 months and that of thermocouples &controllers for 3 months.
2) For hydro testing DM water is preferable, however potable water is acceptable. Water used for hydrostatic testing shall preferably be free from halogen and Sulphur. In no case halogen and Sulphur more than 25 ppm of shall be permitted.
3) These pipes should be oil dipped in both ID & OD and capped on both ends before Marking as per PCM-287-R1.
4) The manufacturer shall not ship the pipes without obtaining the clearance for shipment by NPCIL-Q.S OR its authorized inspection agency.
5) No repair by welding shall be permitted on the pipes.
6) All NDT shall be witnessed by appropriate qualified personnel of LEVEL-2 qualified as per referencing code.
7) Surface defects like dents, mechanical marks, hit marks; handling marks removal shall be done as per clause 4.3 of PC-M-287.
8) Lot-Lot means quantities of one size having one heat number, HT together in a continuous furnace.

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