

PROJECT

**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
2X500MW LIGNITE FIRED UNITS AT NEYVELI**

**TECHNICAL SPECIFICATION FOR MISC. TANKS-
SITE FABRICATED (CONDENSATE STORAGE
TANKS)**

SPECIFICATION NO.: PE-TS-402-167-A001



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**

	TECHNICAL SPECIFICATION FOR MISC. TANKS – SITE FABRICATED (CONDENSATE STORAGE TANKS)	Specification no.: PE-TS-402-167-A001
		Vol
		Date: 10.12.2014
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TITLE : TECHNICAL SPECIFICATION
FOR
MISC.TANK-SITE FABRICATED(CST)

SPEC. NO. PE-TS-402-167-A001

REV. NO. 00

DATE : 10.12.2014

PREAMBLE

1.0 The Tender document contains three (3) volumes. The bidder shall meet the requirements of all the three volumes.

1.1 Volume –I CONDITIONS OF CONTRACT

This consists of four parts as below:

- Volume - I A : This part contains instructions to bidders for making bids to BHEL.
- Volume - I B : This part contains general commercial conditions of the tender and include provision that vendor shall be responsible for the quality of item supplied by their sub-vendors.
- Volume - I C : This part contains special conditions of contract.
- Volume - I D : This part contains commercial conditions for erection and commissioning of site work, as applicable.

1.2 Volume- II - TECHNICAL SPECIFICATIONS

Technical requirements are stipulated in Volume II which comprises of:

- Volume - II A : General Technical Requirements - NA
- Volume - II B : Technical specification including drawings, if any

1.2.1 Volume - II B:

This volume is sub-divided into following sections:

- Section - A : This section outlines the scope of enquiry.
- Section - B : This section provides "Project Information"
- Section - C : This section indicates technical requirements specific to the contract, not covered in Section-D.
- Section - D : This section comprises of technical specifications of equipments complete with their data sheets, if any.



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1.2.2 **Volume - III TECHNICAL SCHEDULES**

This volume contains technical schedules which are to be duly filled by the bidder and the same shall be furnished with the technical bid, as applicable.

PROJECT

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**SECTION-A
INTENT OF SPECIFICATION**



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
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PPEI, NOIDA-INDIA**



**TECHNICAL SPECIFICATION FOR
MISC.TANK- SITE FABRICATED (CST)**

SPECIFICATION NO. PE-TS-402-167-A001

VOLUME II B

SECTION A

REV 00

DATE - 10.12.2014

1.0 SCOPE OF INQUIRY / INTENT OF SPECIFICATION

- 1.1 The specification is intended to cover design, engineering, manufacture, inspection and testing at vendor's/ sub-vendor's works, proper packing, delivery at site including freight, unloading, storage & handling at site, erection & commissioning, hydro test at site, painting, handing over, tools & tackles, commissioning spares etc. for **Misc. Tanks- site fabricated (Condensate storage tank)** as per details in different sections / volumes of this specification.
- 1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve the contractor of his responsibility of providing such facilities to complete the supply and E&C of the **Misc. tanks (CST)** to customer.
- 1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.
- 1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.
- 1.5 The general term and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification are subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.
- 1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification **within 10 days of receipt of tender documents**. In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.
- 1.7 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.



**TECHNICAL SPECIFICATION FOR
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- 1.8 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.
- 1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder /vendor and Customer/ Purchaser/Employer will mean BHEL and /or BHEL's customer including their consultant as interpreted by BHEL in the relevant context.
- 1.11 The **Datasheet-A** and the technical requirements mentioned in **Section C** shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in Section -D.

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**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
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SECTION – B

(PROJECT INFORMATION)



**BHARAT HEAVY ELECTRICALS LTD
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PPEI, NOIDA-INDIA**



SALIENT FEATURES OF THE SITE & GENERAL PROJECT INFORMATION

1.1 Introduction

The project site at Neyveli has distinct location advantages, being at pit-head distance from the source of lignite supply from Mines, making it convenient for transportation of lignite by belt conveyor. Water source is readily available from the nearby mines lake. Besides, other infrastructure such as access road, railway connection etc, already exist.

1.2 Power Plant Site

The power plant site is located at Neyveli, opposite to the now defunct Fertilizer and Briquetting & Carbonization Plant, near TPS-I Expansion and TPS-II.

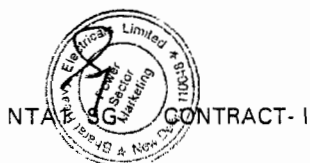
1.3 Project & Site Information

- (i). Owner / Purchaser : Neyveli Lignite Corporation Limited (NLC Ltd), Neyveli, Cuddalore District, Tamil Nadu State, India
- (ii). Consultant : Lahmeyer International (India) Pvt. Ltd (LII), Gurgaon, NCR, India.
- (iii). Project Title : 2x500 MW Neyveli New Thermal Power Project (NNTPP)
- (iv). Location : 200 kms south of Chennai and 50 kms south-west of Cuddalore
- (v). Latitude : 11° 34' 00" N to 11° 35' 00" N
- (vi). Longitude : 79° 26' 00" E to 79° 27' 00" E
- (vii). Elevation above MSL : (+) 67 m
- (viii). Nearest Railway Station : Neyveli,
- (ix). Nearest Sea Port : Chennai, at a distance of 200 km
- (x). Nearest Airport : Chennai, at a distance of 200 km
- (xi). Road Access/Approach to Site : Connected by Chennai-Thanjavur NH 45C road and state highway connecting Cuddalore – Virudhachalam via Neyveli. Both NH and state high way roads are well connected to NLC township roads. The approach road is approximately 15 kms from Chennai–Thanjavur NH – 45C road
- (xii). **Site Meteorological Data**
 - Max ambient temperature : 42.8° C
 - Min Ambient Temperature : 26.9° C





- Wet bulb temp : 29° C
- Max. Relative Humidity : 92 % in the month of September
- Min. Relative Humidity : 23 % in the month of May
- Rainfall : About 1265.7 mm annually (average)
- Wind direction : South West to North East direction
- Wind Speed : 97.2 km/hr (maximum recorded)
4.3 km/hr (average wind speed)
- Seismicity : As per IS: 1893 (part 4) (Zone-II)
Importance factor: 1.75.



PROJECT

**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
2X500MW LIGNITE FIRED UNITS AT NEYVELI**

**SECTION-C
SPECIFIC TECHNICAL REQUIREMENT**



**BHARAT HEAVY ELECTRICALS LTD
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PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**



TITLE TECHNICAL SPECIFICATION FOR MISC. TANKS -SITE FABRICATED (CST)	SPECIFICATION NO. PE-TS-402-167-A001	
	VOLUME II-B	
	SECTION C	
	SHEET 2 of 5 DATE: 10.12.2014	

1.0 SCOPE OF WORK

The specification is intended to cover design, engineering, manufacture, inspection and testing at vendor's/ sub-vendor's works, proper packing, delivery at site including freight, unloading, storage & handling at site, erection & commissioning, hydro test at site, painting, handing over, tools & tackles, commissioning spares etc. for **Misc. Tanks- site fabricated (Condensate storage tanks) .**

1.1 SCOPE OF SUPPLY

Scope of supply shall comprise of but not necessarily be limited to the following:

- 1.1.1 Two (2) nos. condensate storage tanks (cap.1500 cum) complete with all accessories as indicated in **Datasheet –A and sketch of CST** given at last of Section- C of this specification.
- 1.1.2 SS valves, nozzles, piping, fittings, flanges, counter flanges, level gauge, vent, Nuts & bolts wherever required, gaskets, Anchor bolts/foundation bolts and painting for tanks in line with specification requirement.
- 1.1.3 Staircase, platforms, hand railing, knee guard, toe guard, supporting structures, connections & accessories, weir & pad plates, earthing pads as per tanks standard specification and applicable design code.
- 1.1.4 Commissioning spares (Under **Annex-A** attached along with price schedule)
- 1.1.5 Relevant requirement as per GCC, ECC & SCC as applicable.
- 1.1.6 **Any other equipment / material required to make the installation complete in all respects shall be deemed to be included in bidder's scope of work whether mentioned above or not.**

1.2 SCOPE OF SERVICES

Services shall comprise of but not necessarily limited to the followings:

- 1.2.1 Erection and commissioning of two (2) nos. Condensate storage tanks
- 1.2.2 Inspection & testing at vendor's / sub-vendor's workshop
- 1.2.3 Engineering support as and when required till the completion of erection & commissioning of tanks
- 1.2.4 Relevant requirement as per GCC, ECC & SCC as applicable.
- 1.2.5 Review for correctness of civil drawings prepared by BHEL based on civil input drawing furnished by the successful bidder.
- 1.2.7 Any other services as required to make the installation complete in all respects shall be deemed to be included in bidder's scope of work whether mentioned above or not.

2.0 EXCLUSIONS

Tank foundation & associated civil works, LTs and piping beyond terminal point.



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**TECHNICAL SPECIFICATION FOR
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3.0 TERMINAL POINTS

Terminal points for scope of work shall be as given below:

- 3.1. Counter flanges of all the nozzles and valves (wherever applicable) of tanks
- 3.2. Drain pipe of seal pot and NaOH breather pots.
- 3.3. Stubs for mounting level transmitter

4.0 PERFORMANCE / FUNCTIONAL GUARANTEE

The items to be supplied shall be guaranteed for proper functioning for 18 months from the date of supply or as per commercial terms and conditions whichever is later.

5.0 SERVICES TO BE PROVIDED BY THE CUSTOMER / BHEL

Tank foundation, associated civil works and relevant services as per GCC, ECC & SCC.

6.0 PAINTING / CORROSION PROTECTION REQUIREMENT

Painting of tanks and its accessories shall be done in line with **Annexure-I** to Datasheet-A given at last under Section-C of this specification.

7.0 EQUIPMENT DESIGN CRITERIA & OTHER TECHNICAL DETAILS

The minimum design criteria / technical details to be followed for tanks shall be as per **Datasheet-A, sketches of tank**, other datasheets, design criteria & other details placed under section-D of this specification.

8.0 CODES & STANDARD

API 650 / IS803 and other relevant codes given under section –D.

9.0 QUALITY ASSURANCE, QUALITY PLANS, INSPECTION & TESTING PROCEDURE

- a) Bidder should maintain excellent quality of works, all supply items shall meet the relevant quality standards.
- b) The successful bidder shall furnish Quality Plans/ Inspection Check Lists for various items for the package in line with minimum requirement indicated in specification during detail engineering for Customer's / BHEL's approval.
- c) For other items for which any specific inspection requirement is not indicated in the specification but the same included in scope of work, vendor specific QPs/ CLs shall be furnished by the successful bidder for Customer/Consultant's review and approval. All comments made by customer/ consultant shall be incorporated by the successful bidder without any commercial and delivery implication.



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11.0.0 **SUB-VENDOR ITEMS**

The make of Sub-vendor items shall be as per **Annexure-IV** given under sec-D of this specification. For make of unlisted items, bidder to furnish list of sub-vendors during detail engineering stage for BHEL's review and approval. Any delay on account of processing approval of additional sub-vendor shall not be taken as a reason for delay in completion of project. Bidder shall furnish along with his offer the following supporting documentation within 1 month of placement of LOI. Thereafter no request for additional sub-vendor shall be entertained.

- Documentation to show that the equipment /system has been supplied for a plant of similar or higher capacity.
- Documentation in the form of certificate from end user, stating that the equipment/system has been operating satisfactorily for two years as on the scheduled date of bid opening.

Bidder to assess the capability of their proposed sub-vendors in terms of preparation of drawings, calculations, documents, quality assurance, supply of material etc. as per project schedule before placing the order on them.

12.0 **DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID**

The drawings and documents to be submitted with the bid shall strictly be as per **Annexure-II** given under section-D; any documents other than those indicated in Annexure-III will not be reviewed and will not form part of contract.

13. **DRAWINGS AND DOCUMENTS REQUIRED DURING DETAIL ENGINEERING**

List of drawings / documents required during detail engineering along with submission schedule is given in **Annexure-III** under section-D of this specification. Any other drawings and documents as required by BHEL / Customer / Consultant shall be furnished by the successful bidder during detail engineering stage for which no commercial and time implication shall be entertained by BHEL.

Note: All drawings & documents should contain complete bill of quantities as applicable. Billing break-up after award of contract to successful bidder shall be based on BOQ mentioned in the GA & fabrication drawings.

14.0 **DRAWINGS DISTRIBUTION SCHEDULE**

Vendor needs to submit 10 sets of hard copies of each drawing/document during detail engineering along with editable soft copy of the same. However, exact no. of drawings / documents and submission/distribution procedure for the same shall be intimated to the successful bidder after award of contract and the same shall be complied by the successful bidder without any commercial implication.

15.0 **DRAWINGS ENCLOSED WITH SPECIFICATION**

The following sketch enclosed at last of section-C, will form part of the specification.

- Sketch No.PE-DC-402-167-S001 – CONDENSATE STORAGE TANKS



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**TECHNICAL SPECIFICATION FOR
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SECTION C

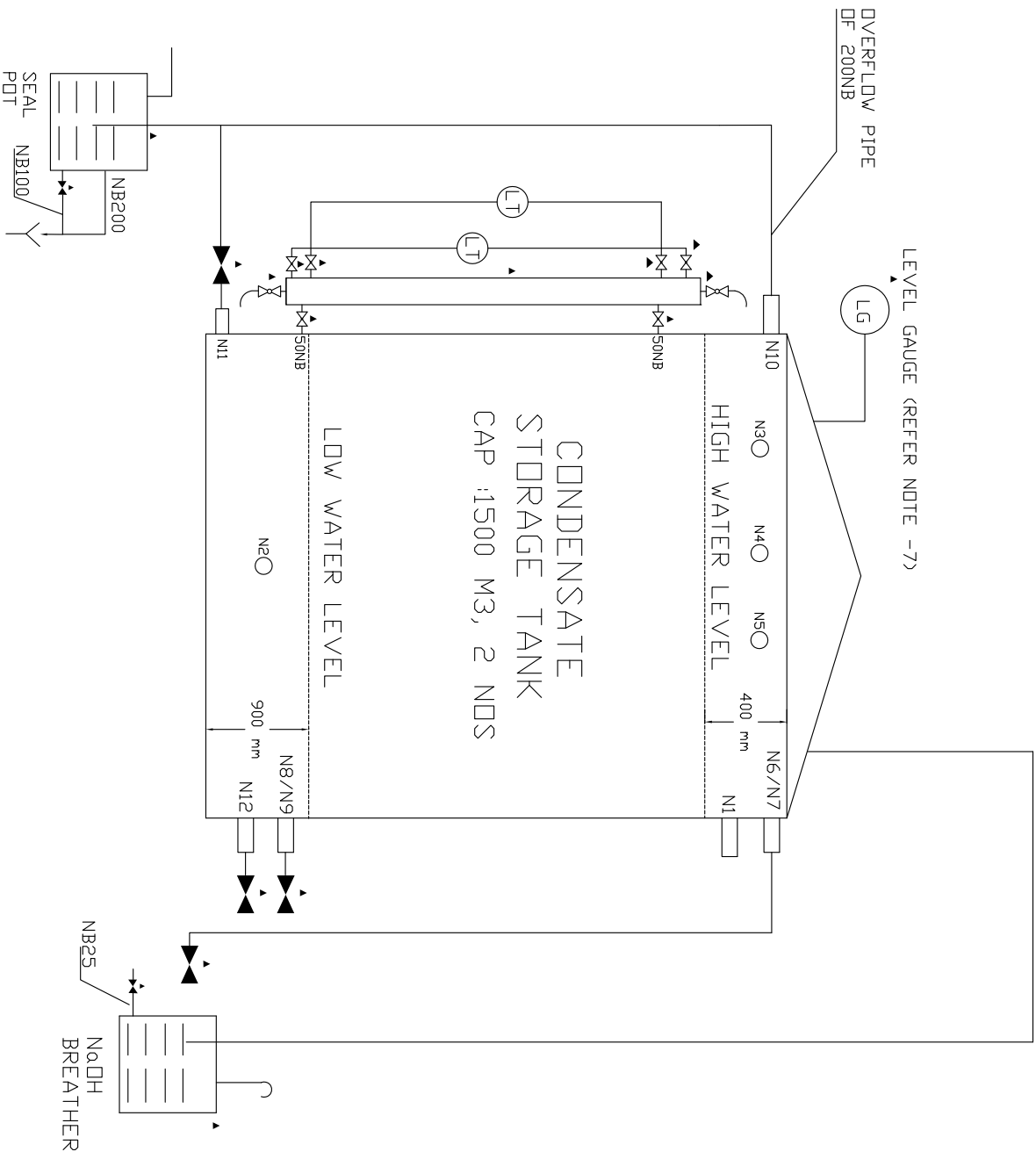
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16.0 OTHER POINTS TO BE TAKEN CARE BY BIDDER

- a. In case bidder needs any information for making their offer suitable for the intended service. They must ask for the same within 10 days of receipt of tender documents. It will be bidder's responsibility to ensure that the product/ system offered meets the intended service.
- b. Document approval by customer under approval or information category shall not absolve the vendor of their contractual obligations of completing the works as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval of BHEL. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to BHEL for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.

BHEL PEM	DATASHEET - A FOR CONDENSATE STORAGE TANKS	
	DOC. NO.: PE-DS-402-167-A001	
	SHEET NO. 01 OF 01	
PROJECT TITLE : 2X500MW NNTPP TG PKG.		REV. NO.: 0
1.0	SERVICE IDENTIFICATION	CONDENSATE STORAGE TANKS
2.0	NUMBER REQUIRED	TWO (02) NOS. FOR STATION (ONE NO. PER UNIT)
3.0	STORAGE MEDIUM	DM WATER(CONDENSATE)
4.0	SIZE OF TANK	13.5 M. DIA X 12.0M. HEIGHT
5.0	NET CAPACITY	1500 M3
6.0	TYPE OF TANK	VERTICAL CYLINDRICAL SHELL & CONICAL ROOF
7.0	MATERIAL OF CONSTRUCTION	MILD STEEL TO IS : 2062 Gr B
8.0	CORROSION ALLOWANCE	1.8 MM
9.0	DESIGN TEMPERATURE & PRESSURE CLASS	60 ^o C, DESIGN FOR FILLED WATER HEAD / ATMOSPHERE
10.0	LOCATION OF INSTALLATION	OUTDOOR
11.0	DRAIN VALVE FOR TANK	100NB
12.0	DRAIN VALVE FOR NaOH / KOH BREATHER	25NB
13.0	DRAIN VALVE FOR SEAL POT	100NB
14.0	PIPE MATERIAL FOR HAND RAILING	CARBON STEEL, GALVANIZED, MEDIUM GRADE
15.0	NOZZLE CONNECTIONS REQD / END CONNECTION	AS PER ENCLOSED SKETCH (PE-DC-402-167-S001) / SOCKET WELDED FOR SIZE ≤ NB50 & FLANGED FOR SIZE > NB50
16.0	PIPE / NOZZLE MATERIAL	AS PER SPECIFICATION
17.0	VALVES END CONNECTION	SOCKET WELDED FOR SIZE ≤ NB50 FLANGED FOR SIZE > NB50
18.0	VALVES MATERIAL	AS PER SPECIFICATION
19.0	APPLICABLE CODES / STATUTORY REGULATIONS	IS-803 / API650
20.0	INSTRUMENTS / ACCESSORIES REQUIRED (REFER ENCLOSED SKETCH)	(a) CONSERVATION VENT VALVE / BREATHER (TO BE PLACED ON GROUND) (b) OVERFLOW & DRAIN PIPING WITH DRAIN VALVE (c) SEAL POT WITH DRAIN VALVE ETC. FOR OVERFLOW (d) STANDPIPE FOR MOUNTING INSTRUMENTS (SIZE NOT LESS THAN NB 100) (e) DRAIN, VENT & ISOLATING VALVES FOR STAND PIPE (f) LEVEL GAUGE - FLOAT & ARROW TYPE (GUIDE WIRE, FLOAT & HOUSING OF SS316) (g) 4 NOS TAPPINGS WITH NB 25 ROOT VALVES ON STANDPIPE (FOR MOUNTING TWO LEVEL TRANSMITTERS) (h) SAMPLING CONNECTION WITH NB 25 VALVE ON TANK. (i) 3 NOS. SPARE INSTRUMENT CONNECTIONS ON TANK ROOF FOR LI (j) 4 NOS SPARE CONNECTIONS WITH VALVES AS INDICATED IN SKETCH.
21.0	INSIDE PROTECTION & EXTERNAL PAINTING	REFER ANNEXURE-I REGARDING PAINTING
22.0	MANHOLE	TWO (2) NOS. ONE ON SHELL & THE OTHER ON ROOF (SIZE MIN. 600 NB)

SKETCH FOR CONDENSATE STORAGE TANK



DIM. OF TANK - 13.5M DIA X 12.0M HT.

NOTES:

- 1.0 - HIGH WATER LEVEL SHALL BE MINISOMM BELOW BOTTOM OF OVERFLOW NOZZLE.
- 2.0 - ALL NOZZLES (ALONG WITH FLANGES & COUNTER FLANGES), OVERFLOW PIPE, NOZZLE FOR MOUNTING LEVEL INDICATOR, STANDPIPE ALONG WITH ISOLATION VALVES AND SPARE VALVES SHALL BE SUPPLIED BY TANK VENDOR.
- 3.0 - TRANSMITTER SHOWN ARE EXCLUDED FROM TANK VENDOR SCOPE. THESE SHALL BE SUPPLIED SEPARATELY UNDER INSTRUMENTATION PACKAGE. HOWEVER, 25NB TAPINGS ALONG WITH ROOT VALVE SHALL BE PROVIDED ON STANDPIPE BY TANK VENDOR FOR MOUNTING OF LTS.
- 4.0 - ▲-ITEMS THUS MARKED ARE TO BE SUPPLIED ALONG WITH TANK.
- 5.0 - LOCATION OF THE TANK IS OUTDOOR.
- 6.0 - THE NET CAPACITY OF TANK I.E 1500 CUM IS CAPACITY BETWEEN LOW AND HIGH LEVEL SHOWN IN THIS SKETCH.
- 7.0 - FLOAT & ARROW TYPE LEVEL INDICATOR SHALL BE PROVIDED.
- 8.0 - A CIRCUMFERENTIAL DRAIN SHALL BE PROVIDED AROUND THE CST FOR TERMINATING THE TANK, SEAL POT & NaOH BREATHER DRAINS. THE CIRCUMFERENTIAL DRAIN SHALL THEN BE CONNECTED TO NEARBY PLANT DRAIN BY CIVIL AGENCY.

NOZZLE NO.	DESCRIPTION	SIZE (NB)
N1	DM WATER INLET	200
N2	COND OUTLET	200
N3	SPARE WITH BLIND FLANGE	100
N4	CT PUMPS RECIR.	50
N5	EXCESS COND. DUMP	200
N6	SPARE WITH VALVE	100
N7	SPARE WITH VALVE	100
N8	SPARE WITH VALVE	200
N9	SPARE WITH VALVE	200
N10	OVERFLOW	200
N11	DRAIN WITH VALVE	100
N12	SAMPLING CONNec. WITH VALVE	25



TITLE

**TECHNICAL SPECIFICATION FOR
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2x500 MW NNTPP, TG PKG**

SPECIFICATION NO. PE-TS-402-167-A001

VOLUME II-B

SECTION C

SHEET 1 of 1 DATE : 10.12.2014

ANNEXURE-I

Painting specification for Condensate Storage Tank (CST)

	Tank Internal	Tank External, Structural steel works, piping, stairways & other accessories	Tank Underneath
Surface Preparation (as per SSPC, Vis 1 or DIN 55928, section-4 or SIS 055900)	SA 2.5	SA 2.5	Electric or pneumatic tool cleaning to ST-3.
Primer	Two (2) coats of epoxy zinc phosphate primer of 30 micron each.	Two (2) coats of epoxy polyamide resin based, zinc phosphate primer of 30 micron each.	2 coats of high build coal tar epoxy suitably pigmented (2 pack), DFT: 80 – 100 microns each coat.
Intermediate coat	N. A.	One (1) coat of HB epoxy MIO coating of 80 micron.	N. A.
Finish	Solvent free epoxy coating (Min. 2 coats) of DFT 50 Microns each.	Two (2) coats of epoxy polyamide enamel paint suitably pigmented of 30 microns per coat.	N. A.
Total DFT	160 microns	200 microns	160 – 200 microns
<u>Color shade</u>		<u>Aluminium</u>	

PROJECT

**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
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**SECTION-D
STANDARD TECHNICAL REQUIREMENT**



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**



TITLE STANDARD TECHNICAL SPECIFICATION FOR MISC TANKS	SPECIFICATION NO. PE-TS-STD-167-A001	
	VOLUME II B	
	SECTION D	
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1.0 **SCOPE**

The specification is intended to cover design, engineering, manufacture, inspection and testing at vendor's/ sub-vendor's works, proper packing, delivery at site including freight, unloading, storage & handling at site, erection & commissioning, hydro test at site, painting, handing over, tools & tackles, commissioning spares etc. for Misc. Tanks- site fabricated as mentioned in different sections of this specification

2.0 **CODES & STANDARDS**

The design, fabrication & assembly, erection & performance of steel tanks shall comply with all latest statutory regulations and safety codes applicable in the locality where the tanks are to be installed. Tanks shall conform to the latest applicable Indian/British/ USA standards. The vendor shall not be construed to be relieved of his responsibility by virtue of this specification. The tank in general shall conform to the latest editions, as is applicable, out of the following standards.

- 1 IS-800 Code of practice for use of steel in general building construction
- 2 IS-803 Code of practice for design, fabrication and erection of vertical mild steel cylindrical welded oil storage tank.
- 3 IS-804 Specification for rectangular pressed steel tanks
- 4 IS-805 Code of practice for use of steel in gravity water tank.
- 5 IS-816 Code of practice for metal arc welding for general construction in MS .
- 6 IS-817 Code of practice for training and testing for metal arc welder
- 7 IS-2825 Code of practice for unfired pressure vessel
- 8 BS-2594 Specification for carbon steel welded horizontal cylindrical storage tank
- 9 BS-2654 Specification for vertical steel welded storage tanks with butt welded shells for the petroleum industry
- 10 Indian explosive act and statutory requirements of chief controller of explosives, Nagger. (For oil storage tanks.)
- 11 Indian Boiler Regulations
- 12 Indian Factories Act
- 13 American code for oil tanks API 650

3.0 **DESIGN REQUIREMENT**

3.1 **General Requirement**

- 3.1.1 All tanks will be mild steel tanks. The tanks will be of welded construction and will be designed to withstand satisfactorily the internal forces due to the liquid these tanks have to hold as specified



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and external forces due to wind and seismic forces without deformation or undue strain. The plates will be cold rolled through plate bending machines by several no. of passes to the curvature.

- 3.1.2 All tanks will be designed for the capacities ,dimensions and working conditions as specified in **DATA SHEET -A** . These tanks will be provided with all necessary connections as specified. The design of tanks will be such as to allow easy inspection, cleaning and repair. Due consideration will be given to wind loading and adequate stiffening will be provided to prevent failure of tank due to buckling when it is empty. A 2.0 mm corrosion allowance until unless specified in **DATASHEET-A** for shells, bottom and roof and beyond the required thickness shall be provided.
- 3.1.3 Vessel seams shall be so positioned that they do not pass through vessel connections.
- 3.1.4 The inside seam should be ground smooth, suitable for application of corrosion resistant primer. Except where otherwise indicated in the specification, if the stiffening of shell and/ or roof is necessary, tanks will be stiffened from outside.
- 3.1.5 Flange faces of all nozzles shall be machined and squared with the vessel center line.
- 3.1.6 All roofs and supporting structures shall be designed to support dead load plus a uniform live load of not less than 150 kg/m² of projected area.
- 3.1.7 The tanks shall be designed to have all courses truly vertical. Adequate distance between vertical joints in adjacent courses shall be taken so that the distortion is reduced to minimum.
- 3.1.8 When removing temporary attachments from shell plates, care should be taken that parent plate is not damaged. Holes in plate work to assist in fabrication / erection should be avoided as far as possible. The location of holes and method of filling shall be indicated in the fabrication drawing. Any projection of metal shall be chipped and ground flush with the plate surface .The plate shall not be gouged or torn in process of removing lugs.
- 3.1.9 In the construction of shell, very care shall be taken to minimize distortion or lack of circularity due to welding or for any other reason.
- 3.1.10 The successful bidder shall furnish design calculations to BHEL during detailed engineering stage for approval along with the Xerox copies of relevant pages of authentic supporting literature e.g. Code, Hand book, National / international Standards etc. Calculation shall be necessarily done in SI UNITS for the followings: -
- The tanks shall be designed as per good engineering practice as applicable and referred code shall be of latest edition.
 - Plate thickness calculation (different courses of shell plate, bottom plate and roof plate thickness), roof curb angle, top wind girder, intermediate wind girder, tank internal pressure vis –a-vis. allowable value.
 - Design of roof and roof structures for vertical storage tanks shall be designed based on guidelines given in the book titled “Process equipment design” by Brownell and Young.
 - Tank stability calculation (wind load / seismic / overturning stability) shall be done as per good



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engineering practice as applicable and referred code shall be of latest edition. However, factors / coefficients as required for the design of tank shall be obtained from BHEL by the bidder after placement of order.

- e) Vent sizing calculation shall be done as per good engineering practice as applicable and referred code shall be of latest edition.
- f) Sizing calculation for vent, NaOH / KOH breather, seal pot and breather valve.
- g) Weight calculation of plates, appurtenances & structures separately shall be included in the design calculation/GA.
- h) Staircase / access ladder and hand railing shall be provided as per the relevant codes and standards.

3.1.11 **Alignment**

3.1.11.1 Plates to be joined by butt welding shall be matched accurately. Misalignment in completed vertical joints shall not exceed 10% of the plate thickness or 1.5 mm for plates of 20 mm thick and under, whichever is larger.

3.1.11.2 In completed horizontal butt joints, the upper plate shall not project beyond the face of the lower plate at any point by more than 20% of the upper plate thickness with a maximum of 3 mm for plate thickness exceeding 8 mm except that for plate thickness 8 mm and under, the maximum shall be 1.5 mm.

3.1.11.3 Each tank shall be properly constructed ensuring perfect vertical alignment within 5 mm and tank circularity within 5 mm on diameter. Local bulging and / or depressions at any location of tank particularly shell shall not be permitted.

3.1.12 **WELDING**

3.1.12.1 Tanks and other attachments shall be welded as per AWS and the qualification of welder should be as specified in ASME.

3.1.12.2 Welding sequence shall be so adopted that distortion due to welding shrinkage shall be minimum. Welding procedure specification shall be submitted for approval of BHEL giving details of material, welding position, sequence, type of electrode used, pre-heat & post weld requirement etc as per the code of construction. Brand name of electrodes to be used with proper classification (e.g. E 6013) shall be as per BHEL's approval.

3.1.12.3 Welding shall not be carried out when the surface is wet and during periods of rain and high winds unless the welder and the work are properly shielded which should meet the approval of the purchaser.

3.1.12.4 Inspection of all welds shall be carried out in accordance with the governing code of construction. All material used by the purchaser such as electrodes, gaskets, bolts, nuts etc shall be conforming to relevant standards of repute and approved by the purchaser prior to use.

3.1.13 Each tank shall be complete with access staircase and fittings like drain connection, overflow connection, tank inlet and outlet covers, level gauge glass, fittings with isolation cocks and



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protection covers , tank vent connection etc all complete with needed accessories for the completeness of the tanks and as specified in data sheet -A .

3.1.14 All openings in tank plate shall be well reinforced in approved manner by adding pad plates of adequate size and / or structural sections.

3.1.15 **STAIRCASE / ACCESS LADDER AND HAND RAILING**

3.1.15.1 All cylindrical vertical tanks shall be provided with spiral staircase and shall conform to the requirements specified in API 650 unless specified otherwise. All stair treads shall be 32 mm steel fabricated gratings. Each tread, if needed, shall be housed in individual steel fabricated frame which shall be adequately supported from the tank outer periphery. The staircase shall have minimum 750 mm clear width.

3.1.15.2 Access ladder, one (1) for each horizontal cylindrical / rectangular tank shall be provided for access to the tank roof. It shall be steel fabricated having minimum 450 mm width. Ladder stringers shall be heavy steel flats or angle section. All rungs shall be minimum 20 mm Dia rods spaced at not more than 30 cm center to center. All ladders shall have steel fabricated safety cage to the approved construction. Safety cage shall be provided about 2.5 m clear height of the ladder. Access ladder's stringers shall be widely spaced at top for free access to the tank roof.

3.1.15.3 All staircase and roofs of vertical cylindrical tanks shall be provided with pipe hand railings of 1070 mm effective height throughout. Handrails shall be constructed out of 32 NB medium class galvanized steel pipe conforming to ASTM A 53 Gr.B. Handrail posts shall be arranged at spacing not greater than 1850 mm. Two (2) sets of pipes horizontal runners all along the length shall be provided. All welds joints in the handrails shall be ground flush to protect any person getting injured. Steel toe plates of 100 mm flats shall be used. Hand railing shall be fabricated installed in an approved manner as directed by purchaser in accordance with approved drawings.

3.1.16 Unless otherwise specified, for all flanged connections vendor shall furnish suitable counter flanges and necessary nuts, bolts and gaskets materials.

3.1.17 Unless otherwise specified bolts and nuts shall be hexagonal head conforming to ISO -898-1:1999.

3.1.18 Gaskets shall be 3 mm thick full face rubber or CAF. On completion of hydraulic test / water fill test, contractor shall replace the gaskets used during testing at his own cost.

3.1.19 Float level indicators of approved make, as specified in data sheet-A shall be provided.

3.1.20 During erection of tank, shell plates shall be suitably supported both for outside and inside to avoid buckling / collapsing of tank due to high speed wind , gust or severe storm ,if any, occurring during erection.

3.1.21 The contractor shall furnish two (2) grounding pads for each vertical tank. Each pad shall be stainless steel plate 100 mm x 100 mm x 6 mm thick, with two 15 mm holes on 45 mm centers. Pads shall be edge welded to tank shell within 450 mm from the tank base. Two grounding lugs shall be provided for each horizontal tank.



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3.2 VERTICAL CYLINDRICAL STORAGE TANKS

- 3.2.1 The vertical cylindrical storage (non- pressure) tanks shall be of mild steel welded construction and shall be designed in accordance with API-650 / AWWA D - 100. The vertical cylindrical storage tanks shall have slightly sloping bottom towards an adequately sized sump inside the tank to enable complete draining of the tank. The tank shall be designed for a wind pressure and seismic coefficient as specified. While worst of these two shall be increased as per API.
- 3.2.2 Conical roof shall be self-supported over the tank periphery. The roof shall have a slope of not less than 1 in 16 to ensure drainage of rainwater. Needed roof rafters and purlins adequately designed shall be provided.
- 3.2.3 All plates to be used for fabrication of tank shall be checked and all sides trimmed to make them square.
- 3.2.4 All bottom plates shall have lap weld joints on all sides with overlap not less than five times the plate thickness.
- 3.2.5 All shell course plates shall be taken during bending to prevent plate skewing. For butt weld joints, edges shall be prepared which shall be uniform and smooth throughout. To maintain needed root penetration gap at any butt weld joint, sufficient numbers of erection cleats shall be provided on all sides of outer periphery of each shell plate. Plates for tanks shall be straightened by pressing or by other non-injurious methods.
- 3.2.6 Each shell course shall be of uniform width throughout longitudinal weld in plates. Make up for the course width shall not be permitted. Shell plates in each course width shall be so arranged that all vertical joints are staggered having a minimum of 600 mm stagger. Shell thickness could be reduced in upper courses depending on design requirements but in no case the plate thickness shall be less than 6 mm.
- 3.2.7 The tank height shall be completed by the provision of top curb/ angle which shall be butt welded to the adjacent tank plate courses. The outstanding leg of the curb angle shall be kept outside the tank periphery. All butt weld joints shall be full strength welds but for design of shell plate thickness adequate weld efficiency as recommended by applicable code(s) shall be used.
- 3.2.8 Tank roof shall be supported over steel fabricated central column(s). Adequately sized and spaced rafters and purlins shall be provided. All rafters shall have sliding bolted connections at one end and preferably on the tank periphery side. The roof supporting frame shall have needed tie rods or bracing sets.
- 3.2.9 Roof plates shall have lap joints with lap not less than 25 mm and lap weld over the top surface only. Roof plates shall have continuous fillet welds around the tank curb angle. No joint of roof plate over the supporting frame shall be made.
- 3.2.10 Needed openings for mounting various specified accessories shall be well reinforced in accordance with application codes and as approved. Manhole shall be bolted and shall have hinged covers unless otherwise specified.
- 3.2.11 All inlet pipe nozzles located at the top of tanks shall be provided with internal piping up to 500 mm high above the tank's bottom inside with suitable weir plate at bottom. The inside piping shall be adequately supported and shall be provided with adequately sized vent connection at pipe top.



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- 3.2.12 The manhole shall be of hinged & bolted type with nuts, bolts and gaskets with minimum size of 600 mm.
- 3.2.13 NaOH / KOH breather and seal pot shall be located in the bottom / ground level and necessary connection from tank vent to NaOH / KOH breather shall be provided through min. 100 NB SS pipe. The sizing of NaOH breather and Seal pot shall be decided based on emptying and filling rate of tanks. A tentative rate of 5 cum/hr may be considered for both emptying and filling of tank. However, the complete information shall be provided to vendor during detail engineering.
- 3.2.14 Material of construction of all pipes, fittings, valves, nozzles, flanges and counter flanges shall be as per datasheets given at the end of this section.
- 3.2.15 Material of construction for standpipe (if applicable) shall be stainless steel (SS) and size shall not be less than NB 100 unless otherwise specified in Datasheet-A for tanks given at the end of section.
- 3.2.16 Two (2) nos NaOH / KOH breather shall be provided by the bidder for each tank, out of which one shall be used for in-breathing purpose and the other shall be used for out-breathing purpose.
- 3.2.17 The size of the drain and vent valve of standpipes shall be 25 NB and size of the isolating valves (2 nos) for standpipe shall be 50 NB unless otherwise specified in the specification.
- 3.2.18 The overflow pipe from overflow nozzle shall be connected to seal pot.
- 3.2.19 All stair treads and platforms shall be made from gratings
- 3.3.0 RECTANGULAR TANKS**
- 3.3.1 Rectangular tanks shall be fabricated from steel material and shall be designed to withstand internal hydrostatic pressure. In addition these shall be checked for a wind pressure and seismic coefficient as specified wherever applicable. While worst of these two shall be considered, the permissible stress shall be increased as per IS when their effect considered with tank load.
- 3.3.2 Tank bottom and / or side plates shall be of minimum 6 mm thick plate. Corrosion margin of at least 2 mm shall be provided over the design thickness of bottom and / or side plates.
- 3.3.3 To support tank plates and to maintain required unsupported plate length, adequately sized and spaced steel structural closed frame shall be provided inside the tank. Longitudinal and / or vertical structural members to connect and adequately support these frames shall be provided at corners. Horizontal diagonal members / sway bracings at corner shall also be provided.
- 3.3.4 Tank plates cut to size shall be welded on these frames. Plate butt weld joints at other locations shall be eliminated to avoid warping of the plates at free joints. Adequate openings in the structural frames, particularly at the bottom shall be provided to ensure complete unrestricted drainage of tank at one point.
- 3.3.5 Complete assembled tank shall have at its bottom longitudinal steel fabricated bearer beams welded to it. The tank with bearer will rest over number of concrete blocks to be provided by purchaser. The tank shall be adequately bolted / welded to the concrete blocks. Needed inserts /



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anchor bolts shall be furnished by the bidders. Grouting of tank over concrete blocks in approved manner shall be included in bidder's scope of work, if erection is also awarded to the bidder.

3.3.6 Where rectangular tanks are flushed in dual compartments the inside partition plate shall be well reinforced to withstand hydrostatic test pressure completely on one side throughout the full height.

3.4 **HORIZONTAL CYLINDRICAL TANK**

3.4.1 The horizontal cylindrical tank with dished ends shall be of mild steel welded construction and shall be designed in accordance with BS- 2594. The tank shall be designed for a wind pressure and seismic coefficient as specified. While worst of these two shall be considered, the permissible stress shall be increased as per IS.

3.4.2 The shell and dished end plate thickness shall be chosen as per design requirement but in no case the dished end and shell plate thickness shall be less than 8 mm.

3.4.3 All seams, longitudinal as well as circumferential, shall be butt welded. Longitudinal seams should not be situated in the lower third of a tank or on the top centre line.

3.4.4 All tank shall be supplied with integral saddle support and shall be designed in accordance with BS- 2594.

4.0 **TESTING AND INSPECTION AT MANUFACTURERER'S WORKS**

4.1 **General**

4.1.1 The supplier shall provide inspection to establish and maintain quality of workmanship in his works and that of his subcontractors to ensure the mechanical accuracy of components, compliance with drawings identity and acceptability of all materials, parts and equipment. He shall conduct all tests required to ensure that the equipment and material furnished shall conform to requirements of the acceptable codes. All tests and test procedure proposed by manufacturer shall be submitted to the purchaser for their prior approval.

4.1.2 All materials used for manufacture of the equipment under this specification shall be of tested quality. Relevant test certificates shall be made available to the purchaser before the final shop inspection. In case the relevant correlating test certificates are not available, the supplier shall arrange to carry out the necessary tests required by codes at his own cost.

4.1.3 Alloy cast iron and cast steel components shall be tested for both physical and chemical properties in absence of purchaser's representatives. Test bears shall be either integral or taken from the same ladle of material as the casting they represent.

4.2 **TESTING AND INSPECTION FOR TANKS**

4.2.1 The scope of testing and inspection for pressure vessel / tanks covered in this specification shall generally comprise of the following:

i) Examination and approval of fabrication drawings to ensure that design, materials and fabrication details meet requirement of code and specifications. Purchaser will review these drawings for interface problems and conformity with the general arrangement drawings and accord their approval.



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- ii) Examination of materials of construction and identification with material test certificates.
- iii) All the plates of thickness 50 mm or more shall be ultrasonically tested to ensure freedom from laminations.
- iv) Ensuring the relevant weld procedure and welder qualification tests are in accordance with stipulated code requirements.
- v) Inspection of dished end flanges and alloy steel bolting where required.
- vi) Inspection during fabrication at appropriate stages including fit ups .
- vii) For all butt welds, the root run and final run shall be subjected to dye penetrant or magnetic particle inspection. For all fillet welds the final run shall be subjected to dye penetrant / magnetic particle examination.
- viii) Examination of radiographs including radiographic techniques, supervision of other non - destructive tests and heat treatment procedure as required by codes and specifications.
- ix) Examination of internal cleanliness before final closure.
- x) Dimensional examination of completed vessel including axis marking, proof marking , match marking etc.
- xi) Witnessing of hydrostatic, pneumatic or vacuum tests or special tests as required by the code and specification. In case of hydrostatic tests, the test pressure must be kept for a minimum of two hours.
- xii) Witnessing cleanliness, preservation, packing and marking.
- xiii) Stamping of vessel and issue of certificates.

4.2.2 NON - PRESSURE TANKS

FIELD TESTING

Scope of testing and inspection for non-pressure tanks covered in this specification will comprise of the following:

- 4.2.2.1 Identification of materials to manufacturer's test certificates.
- 4.2.2.2 Inspection of plates, edges after edge preparation and checking curvature against template if shell plates sent after rolling.
- 4.2.2.3 Checking of dimension and match marking.
- 4.2.2.4 DPT / MPI on all welds (100%).
- 4.2.2.5 All cross / Tee joints and butt welds to be 10% Radio graphed.



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4.2.2.6 For the offered tanks, fill test shall be carried out for at least 24 hours. Atmospheric storage tanks on inside surface shall be leak tested before painting.

4.2.2.7 All quality plans / checklists for various items shall be furnished during detail engineering stage for BHEL / customer's approval and any changes required by BHEL / customer shall be incorporated in the documents and adhered without any price implication. However, minimum requirement of MQP as indicated in the technical specification shall be followed. All necessary items as required for inspection and testing of the tank including instruments shall be arranged by the bidder

4.2.3 REPAIR OF LEAKS

4.2.3.1 All leaks detected during testing shall be repaired to the satisfaction of the purchaser and on completion retested for leakages as per approved procedure.

4.2.3.2 In the joints between roof plates only, pin hole leaks may be repaired by mechanical method. However, where there is any indication of considerable porosity, the leaks shall be sealed by laying down an additional layer of weld over the porous sections.

4.2.3.3 In the other joints, whether between shell plates or bottom plates or both, leak shall be repaired by only welding and if necessary, after first cutting out the defective part.

5.0 PAINTING REQUIREMENT

Surface preparation, being a pre-requisite for any paint application, shall be such as to clean the surface thoroughly of any materials which will be conducive to premature failure of the paint substrata. Blast clean type (Grit blasting by copper/ MS/other) shall be decided during detailed engineering for which no commercial implication shall be entertained by BHEL.

All surfaces shall be cleaned of loose substances and foreign materials, such as dirt, rust, scale, oil, grease, welding flux etc. in order that the prime coat is rigidly anchored to virgin metal surface.

Paint shall be applied in accordance with paint manufacturer's recommendation and shall meet the requirement of the exposure condition and specific system of painting thereof.

The above is the minimum requirement to be followed by the successful bidder. Any additional requirement to ensure prevention of atmospheric corrosion shall be provided by the successful bidder without any commercial implication.

6.0 OTHER TECHNICAL REQUIREMENTS

1. All drawings shall be prepared as per BHEL's title block and bear BHEL's drawing No. and customer / consultant's drawing no; which will be forwarded to the successful bidder during detail engineering stage.
2. All possible efforts shall be made by the bidder to get the approval of drawings and documents from BHEL / customer / consultant at the earliest and the documents prepared / generated by them or their sub-vendors shall be checked by their competent authority before submission to BHEL.
3. Bidder to depute competent designer (s) at BHEL's office during detailed engineering stage to discuss drawings and other technical documents as and when required by BHEL.



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4. All the drawings which are required to be furnished to BHEL during detailed engineering stage shall include technical parameters, details of paints, BOQ / BOM etc in tabular form indicating all components including bought out items and their quantity, material of construction indicating its applicable code / standard, weight, make etc.
5. All testing of tanks shall be done in line with testing requirement of this specification and as finalized during detailed engineering and customer approvals.



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ANNEXURE-II

DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID

The bidder must submit the following drawings and documents along with their bid in **4 sets** so as to enable BHEL to evaluate their offer. In absence of any of these documents, BHEL reserves right not to evaluate the offer of the concerned bidder.

- a. All the relevant documents and certificates required to establish/meet PQR criteria, If applicable as given in tender documents
- b. Deviation schedule, strictly as per enclosed format under Vol-III.
- c. Un-priced copy of price format indicating quoted/ not quoted against each row & column.
- d. Recommended Foundation drawing of tank along with loading data, anchor bolt details etc.
- e. Compliance cum Confirmation certificate duly stamped and signed, attached under VOL-III of this Specification.

In the absence of any one of the documents mentioned above, bidder's offer is liable to be rejected. Further any documents submitted by bidder other than above shall not be taken cognizance of and these shall not form part of contract.



TITLE:

TECHNICAL SPECIFICATION
MISC. TANKS- SITE FABRICATED

SPEC. NO.: PE-TS-STD-167-A002

VOLUME: IIB

SECTION:

REV. NO. DATE : 10.12.2014

SHEET OF

ANNEXURE-III**DRAWINGS/ DOCUMENTS REQUIRED DURING DETAIL ENGINEERING**

The successful bidder shall submit the following drawings / documents during detail engineering for approval / information / reference (as the case may be):-

S.N	DOCUMENT NO.	DESCRIPTION	Submission schedule from LOI Date	Resubmission After incorporating comments	Comments approval by BHEL & Customer
1	PE-V0-402-167-A101	Design Calculation of tank	3 Weeks	Within 1 week	4 Weeks
2	PE-V0-402-167-A201	General arrangement drawing of tank including nozzle orientation & civil input drawing	3 Weeks	Within 1 week	4 Weeks
3	PE-V0-402-167-A202	Fab. drawing :Tank roof structural, staircase details, nozzle connections details, NAOH Breather & Seal pot details	5 Weeks	Within 1 week	4 Weeks
4	PE-V0-402-167-A301	Datasheet & GA for Pipe fittings , plates & structure, Level indicator & Valves	6 Weeks	Within 1 week	4 Weeks
5	PE-V0-402-167-A401	QAP for Plates, structures, Pipes & fittings, Level indicator, valves	6 Weeks	Within 1 week	4 Weeks
6		FQR,WPS,PQR	As per site requirement	Within 1 week	4 Weeks
		Total engineering completed in time		5 months	

Note:

1. Finally approved documents to be provided in Auto CAD format for onward submission to end customer.
2. Drwg/ Document shall be uploaded by the successful bidder on WRENCH / DMS. Procedure for the same will be informed after award of contract.



TITLE:

TECHNICAL SPECIFICATION
MISC. TANKS- SITE FABRICATED

SPEC. NO.: PE-TS-STD-167-A002

VOLUME: **IIB**

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SHEET OF

COMPANY SEAL

SIGNATURE: _____

NAME : _____

DESIGNATION: _____

COMPANY: _____

DATE: _____

ANNEXURE-IV

SUB-VENDORS - MISCELLANEOUS TANKS - 2 X 500MW NNTPS (TG PKG)

S.NO	CAT. OF INSPECTION	ITEM	SUB-VENDORS	PLACE	REMARKS
1	III	CS PIPES ERW	TISCO	JAMSHEDPUR	UP TO 350 NB
	III		SAIL	ROURKELA	
	III		SURYA ROSHNI	BAHADURGARH	UP TO 400 NB
	III		JINDAL	GHAZIABAD	UP TO 350 NB
	III		RATNAMANI	KUTCH	UP TO 400 NB
	III		WELSPUN	ANJAR	UP TO 400 NB (IS 3589)
2	III	CS PIPES SEAMLESS	MAHARASHTRA SEAMLESS	RAIGARH	UP TO 350 NB
	III		ISMT	AHMEDNAGAR	UP TO 150 NB
	III		JINDAL SAW		
	III		ISMT	BARAMATI	UP TO 200 NB
3	III	SS PIPES*	REMI		
	III		RATNAMANI	KUTCH	
	III		APEX TUBES		
4	III	STRUCTURAL STEEL	TISCO		
	III		IISCO		
	III		JINDAL STEEL AND POWER LIMITED		
	III		ESSAR STEEL		
	III		RINL		
5	III	M.S. PLATES*	TISCO		
	III		IISCO		
	III		JINDAL STEEL AND POWER LIMITED		
	III		ESSAR STEEL		
6	II	GATE & GLOBE (CAST STEEL /FORGED STEEL)	A.V. VALVES LTD	AGRA	
	II		BABCOCK VALVES	SONDIKA SPAIN	
	II		FLUIDLINE VALVES COMPANY PVT.LTD.	MUMBAI	
	II		LEADER VALVES LTD.	JALANDHAR	
	II		NITON VALVE INDUSTRIES PVT LTD	MUMBAI	
	II		NSSL LIMITED.	NAGPUR	
	II		M/S GM ENGINEERING	RAJKOT	
	II		STEEL STRONG VALVES (I) PVT.LTD.	MUMBAI	
	II		VENUS PUMPS AND ENGG. WORKS	KOLKATA	
	II		V.K. VALVES PVT. LTD.,	JALANDHAR	
	II		WEIR BDK VALVES- A UNIT OF WEIR INDIA PVT. LTD.	NEW DELHI	
	II		SAKHI ENGINEERS PVT.LTD.	MUMBAI	
	II		AUDCO		
	II		OSWAL INDUSTRIES		
7	III	LEVEL INDIATOR FLOAT AND BOARD TYPE	SBEM	PUNE	
	III		LEVCON	KOLKATA	
	III		SIGMA	MUMBAI	
	III		CHEMTROL		
	III		DK INSTRUMENT	KOLKATA	
	III		V AUTOMAT	DELHI	
8	III	PAINT	ASIAN PAINT		
	III		BERGER		
	III		GOODLASS DEROLAC		
	III		JOTUN		
	III		SHALIMAR		
9	III	PIPE FITTINGS	PIPE FIT	VADODARA	
	III		GUJRAT INFRA PIPES	VADODARA	
	III		MS FITTINGS	KOLKATA	
	III		TUBE PRODUCT	VADODARA	
	III		SIDDARTH & GAUTAM	FARIDABAD	
	III		EBY	MUMBAI	
	III		NL HAZRA	KOLKATA	
	III		NITIN PROFILE	MUMBAI	
III	BHARAT FORGE	PUNE			
	NOTES :				
		INSPECTION CATEGORIZATION			
1		CAT I :INSPECTION BY OWNER, BHEL/BHEL NOMINATED TPJA & VENDOR .MDCC WILL BE ISSUED BASED ON INSPECTION REPORT IN LINE ITH APPROVED QAP.			

	2	CAT II:INSPECTION BY BHEL/BHEL NOMINATED TPIA & VENDOR. MDCC WILL BE ISSUED BASED ON INSPECTION REPORT IN LINE ITH APPROVED QAP.
	3	CAT III: MDCC WILL BE ISSUED BASED COC & MTC ISSUSD BY VENDOR AND VERIFICATION BY BHEL/OWNER IN LINE WITH APPROVED QAP/CHECK LIST
	4	* In case material is dispatched directly from Approved sub-vendor plant/stockyard or from dealer stocking material from approved make with correlated test certificate, then inspection category will be III & incase material is proccured from dealer stocking material from approved makes without corelated test certifiante, then inspection category will be II and BHEL witness shall be applicable.

PROJECT

**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
2X500MW LIGNITE FIRED UNITS AT NEYVELI**

**DATASHEET FOR PIPES, FITTINGS, VALVES,
PLATES & LEVEL INDICATOR**



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**



TITLE
STANDARD TECHNICAL SPECIFICATION FOR
MISC TANKS

SPECIFICATION NO. PE-TS-STD-167-A001

VOLUME II B

SECTION D

REV 00

DATE 10.12.2014

SHEET OF

LEVEL INDICATOR

S.NO.	COMPONENT	DESCRIPTION
1	Type	Float and Arrow Type Level Indicator
2	Float Material	SS 316
3	Guide Cable	SS-316
4	Float Cable	SS-316
5	Spring	SS-304
6	Cover	SS-316
7	Roller / Pulley and Pulley Housing	SS
8	Scale Board	Aluminum, P.U. Painted
9	Pointer and Graduations	Aluminum and S.S.
10	Accuracy	± 5 mm
11	Range	To suit tank size
12	Quantity	one(1) number per tank

PLATES & STRUCTURAL STEEL

A.0	MS Plate		
1.0	Material		IS:2062, Gr. B
B.0	Angle, Channel, Beam, Bar and Flat		
1.0	Material		IS:2062, Gr. A/B
C.0	Handrail		
1.0	Size of pipe		32 NB
2.0	Material		ERW pipe as per IS:1239,Part-I
3.0	Dimension standard		ANSI 36.10, plain ends



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SHEET OF

PIPES, FITTINGS, FLANGES & ACCESSORIES

1.0	SS Pipes	Material Standard	Dimensional Standard
1.1	50 NB and below	Stainless steel pipe as per ASTM A-312, Gr. 304 , Seamless, Sch. 40S	As per ANSI B-36.19, socket welded
1.2	65 NB and above	Stainless steel pipe as per ASTM A-312, Gr. TP-304, Seamless, Sch.10S	As per ANSI B-36.19, BW ends as per ANSI B16.25
2.0	SS Fittings(Elbow, Tees & Reducers)		
2.1	50 NB and below	Forged Stainless steel as per ASTM A-182, F-304	ANSI B 16.11, S/W ends
2.2	65 NB and above	Stainless Steel as per ASTM A-403, WP-304	ANSI B 16.9, B/W ends
3.0	SS Flanges		
3.1	For SS Pipes up to 50 NB	ASTM A182 F304	ANSI B16.5, RF
3.2	For SS Pipes above 50 NB	ASTM A403 Gr. 304	ANSI B16.5, FF
4.0	Gasket for SS fittings		
4.1	Up to 50NB	SS jacketed CAF with superior oil/resistance	ANSI B 16.21
4.2	Above 50NB	PTFE (TEFLON)	ANSI B 16.21
9.0	Bolts & Nuts		
9.1	Wherever applicable in all the tanks.	ASTM A-193, Gr. B7 for Bolts ASTM A-194, Gr. 2H for Nuts	ASTM A-193 / A-194



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SHEET OF

VALVES

S.N	COMPONENT	DESCRIPTION
1.	Body & Bonnet	ASTM A182 Gr.F304 (50NB & below) ASTM A351 Gr.CF8M (50NB above)
2.	Wedge & Seat ring	ASTM A182 Gr.F304 (50NB & below) ASTM A351 Gr.CF8M (50NB above)
3.	Trim	ASTM A182 Gr F304
4.	Rating	Class 800 (50NB & below) Class 150 (50NB above)
5.	Ends	SW to B16.11 (50NB &below) Flanged to B16.5 (50NB above)
6.	Design Standards	B16.34 / API600 for Gate valve B16.34 / BS1873 for Globe valve
7.	Testing standards	API 598 for all valve (All sizes)
8.	Bolts & Nuts	A193 Grb7 & A194 Gr.2H


**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
2X500MW LIGNITE FIRED UNITS AT NEYVELI**

**QAP FOR PIPES, FITTINGS, VALVES
AND LEVEL INDICATOR**




**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI,NOIDA-INDIA**

QAP OF LEVEL INDICATOR

Manufacturer's Name:			QUALITY ASSURANCE PLAN				PROJECT: PACKAGE: Misc. Tanks (Site Fabricated) LOI No. : Customer : BHEL		BHEL Doc. No.:			SHEET 1 OF 1
			QAP OF LEVEL INDICATOR						Rev. No. : 0			
Sl. No.	Components and Operation	Characteristic/ Item	Class	Type of Check	Extent of Check	Reference Document	Acceptance Norm	Format of Record (D*)	Agency			Remarks
									M	B	C	
1	2	3	4	5	6	7	8	9	10			11
1	Level Indicator	Check for Type, Model No., Tag No.	MA	Visual	100%	Approved Data Sheet	Approved Data Sheet	Mfgr. TC	P	V	V	
2		Float Leakage Test	CR	Mechanical	100%	Approved Data Sheet	Approved Data Sheet	Mfgr. TC	P	V	V	
3		Review of TC for Material	CR	Visual	For Lot	MTC	MTC	Mfgr. TC	P	V	V	
		C: BHEL B : Vendor M. : Manufacturer					P - Perform W - Witness V - Verification					
Manufacturer / Contractor / Sub contractor		CR-Critical Characteristics MA - Major Characteristics MI- Minor Characteristics			FOR BHEL			FOR CUSTOMER		APRD. BY		
Signature												

Manufacturer's Name:			MANUFACTURING QUALITY PLAN FOR VALVES				PROJECT: PACKAGE: Misc. Tanks (Site Fabricated) LOI No. : Customer : BHEL			BHEL Doc. No.: Rev. No. : 0 Date: SHEET 1 OF 1			
Sl. No.	Components and Operation	Characteristic/ Item	Class	Type of Check	Quantum	Reference Document	Acceptance Norm	Format of Record (D*)	D	Agency			Remarks
										M	B	C	
1.0	Material :												
1.1	Body,Bonnet,forgings/casting	1.Chemical compositon	CR	Chem.test	One lheat	Approved Data Sheet/DRG	Relevant standard.	TC	√	P	V	V	
		2.Mech properties	CR	Tensile test	One lheat HT Batch	Approved Data Sheet/DRG	Relevant standard.	TC	√	P	V	V	
1.2	Disc & spindle	1. Mech Properties	MR	Tensile test	1 Test bar /Heat	Approved Datasheet	Relevant standard.	TC	√	P	V	V	
		Chemical properties	MR	Chemical analysis									
2.0	In Process Inspection :-												
2.1	Body,Bonnet,Disc,spindle after Machining	Visual	MR	Visual	100%		No visual surface defect	IR	√	P		-	
		Dimension	MR	Measurements	100%	Component drg	Component drg	compliance report					
2.2	Body,Seat ring ,Disc,spindle after Machining	Surface defects	MR	DPT	100%	ASTM A 165	No significant defects	mfr.TC	√	P			
3.0	TESTING & FINAL INSPECTION												
3.1	Complete valve	hydrotesting(pressure & duration as per approved datasheet/std.)	MR	Body/seat	100%	Approved datsheet	No leakage through Body/seat	TC	√	P	W	W	
3.2		Functional test	MR	Full open & full close	100%	Approved Drg/datasheet	Smooth operation	IR	√	P	W	W	
		LEGEND : * RECORDS INDENTIFIED WITH "TICK" SHALL BE INCLUDED											
		C: BHEL B. : VENDOR M:Manufacturer DPT=Dye penetrant test MR-MAJOR.CR-Critical ,CHP-customer Hod, R=review,NDT-non Destructive test,TC-test certificate, IR-inspection Report ,D-Data folder DPT=Dye penetrant Test					P - Perform W - Witness V - Verification						
Manufacturer / Contractor / Sub contractor		CR-Critical Characteristics MA - Major Characteristics MI-Minor Characteristics				FOR BHEL		FOR CUSTOMER		APRD. BY			

QAP OF MS PLATES

Manufacturer's Name: Approved sub vendor			MANUFACTURING QUALITY PLAN				PROJECT: PACKAGE: Misc.Tanks (Site Fabricated) LOI No. : Customer : BHEL		BHEL Doc. No.:				
									ITEM: MS PLATES Sub-system- Misc.tanks				Rev. No. : 0 Date: SHEET 1 OF 1
Sl. No.	Components and Operation	Characteristic/ Item	Class	Type of Check	Extent of Check	Reference Document	Acceptance Norm	Format of Record (D*)		Agency			Remarks
								D		M	B	C	
1	2	3	4	5	6	7	8	9		11			12
RAW MATERIAL													
1	STEEL PLATES	Chemical composition and Mechanical test	MA	Review of corelated MTC	one/heat	IS:2062	IS:2062	Mfgr. TC	√	P	V	V	Refer Note below
2		Visual and dimensionl check	MA	Visual and measurement	100%	Mfg.TC	Mfg.TC IS1852	Mfgr. TC	√	P	**W	**W	
3		Identification/markings	MA	Corelation establish	100%	As per manufacturing practice	As per manufacturing practice IS 2062	Mfgr. TC	√	P	V	**W	
		LEGEND : * RECORDS IDENTIFIED WITH "TICK" SHALL BE INCLUDED								DOC. NO. : Rev No.0			
		C: BHEL B : VENDOR M.Manufacturer				P - Perform W - Witness V - Verification							
Manufacturer / Contractor / Sub contractor		CR-Critical Characteristics MA - Major Characteristics MI- Minor Characteristics				FOR BHEL		FOR CUSTOMER		APRD. BY			
Signature													

Notes ** In case material is despatched directly from Approved sub-vendor plant/stockyard or procured from dealer against co related TC's witnessing by BHEL is waived off and material will be accepted based on MTC of approved sub vendor. In case material is procured from dealer and co related TC's are not available,check on 100% quantity of plates will be performed on sample drawn from them at NABL certified/approved laboratory for chemical & physical properties,however dimensional check shall be witnessed by BHEL

QAP OF PIPE FITTINGS ,FLANGES & ACCESSORIES

Manufacturer's Name:		QUALITY ASSURANCE PLAN			PROJECT: PACKAGE: Misc.Tanks (Site Fabricated)		BHEL Doc. No.:	
		INSPECTION CHECK LIST FOR PIPE FITTINGS ,FLANGES & ACCESSORIES			LOI No. : Customer : BHEL		Rev. No. : 0 Date: SHEET 1 OF 1	
Sl. No.	Components and Operation	Class	Type of Check	Reference Document/Acceptance Norm	Agency			Remarks
					M	B	C	
1	2	3	4	5	6			7
1	Pipes Fittings,Flanges & Accessories	MI	Visual	As per Approved Data Sheet/Tech spec.	P	V	V	
2		MI	Dimensional	As per Approved Data Sheet/Tech spec.	P	V	V	
3		MI	Review of TC	As per MTC	P	V	V	
		MA	Hydro Test	As per MTC	P	V	V	
LEGEND : * RECORDS IDENTIFIED WITH "TICK" SHALL BE INCLUDED						DOC. NO. :		
C : CUSTOMER /BHEL B. : VENDOR M. : Manufacturer				P - Perform W - Witness V - Verification				
Manufacturer / Contractor / Sub contractor	CR-Critical Characteristics MA - Major Characteristics MI- Minor Characteristics IR-Inspection Report ,MTC- Material/Manufacturer's Test. Certificate			FOR BHEL	FOR CUSTOMER	APRD. BY	APPROVAL SEAL	
Signature								



TITLE

**STANDARD TECHNICAL SPECIFICATION FOR
MISC. TANKS**

SPECIFICATION NO. PE-TS-STD -167-A001

VOLUME III

SECTION

REV 00

DATE

SHEET OF

PROJECT

**NEYVELI NEW THERMAL POWER PROJECTS (NNTPP)
2X500MW LIGNITE FIRED UNITS AT NEYVELI**

VOLUME-III

TECHNICAL SCHEDULES



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**

DEVIATION SHEET (COST OF WITHDRAWAL)



PROJECT:- 1x500MW VINDHYACHAL STAGE-V

PACKAGE:- MISC. TANKS-SITE FABRIATED (CST)

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWAL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWAL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWAL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
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TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

NOTES:

- For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
- For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
- All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
- Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
- Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
- Bidder shall furnish price copy of above format along with price bid.
- The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
- Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
- For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
- Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
- All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
- Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
- In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
- In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.



TITLE: TECHNICAL SPECIFICATION COMPLIANCE CUM CONFIRMATION CERTIFICATE	SPEC. NO.: PE-TS-STD-167-A001
	VOLUME: III
	SECTION:
	REV. NO. DATE
	SHEET 1 OF 2

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificates (every sheet) and furnish the same with offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions other than those mentioned under “exclusion” in section C and those resolved as per ‘Schedule of Deviations’, if applicable, with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the ‘Schedule of Deviations’. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the ‘Schedule of Deviations’.
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/ CUSTOMER approval & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This shall be within the contracted price with no extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets/ calculations etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ CUSTOMER approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified/ intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre - bid discussions, otherwise BHEL/ Customer’s decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.

- f) The commissioning spares shall be supplied on ‘As Required Basis’ & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL/ CUSTOMER approval in the event of order.
- h) The tank functional guarantees shall stand valid till at least eighteen (18) months from Hydro test of tank as per technical specification or commercial terms and conditions, whichever is later.
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities. This clause will apply in case during site commissioning additional requirements emerges due to customer and/ or consultant’s comments. No extra claims shall be put on this account.
- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL’s/ Customer’s/ Consultant’s office for across the table resolution of issues and to get documents approved in the stipulated time.



TITLE: **TECHNICAL SPECIFICATION**
COMPLIANCE CUM CONFIRMATION CERTIFICATE

SPEC. NO.: PE-TS-STD-167-A001

VOLUME: III

SECTION:

REV. NO. _____ DATE _____

SHEET 2 OF 2

- k) As built drawings shall be submitted as and when required during the project execution.
- l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.

SIGNATURE: _____

NAME : _____

DESIGNATION: _____

COMPANY: _____

DATE: _____

COMPANY SEAL

SUGGESTIVE PRICE SCHEDULE - MISC. TANKS (CST)							Rev 00
<u>2 X 500 MW NNTPP, TG PKG</u>							
SI.No	DESCRIPTION OF EQUIPMENT / ITEM	Ex-works price	ED	CST	FREIGHT	E&C Charges	Total
1	2	3	4	5	6	7	3 to 7
1.0.0	Total lump sum firm price on FOR site basis for design & engineering, manufacturing, inspection / testing at works as well as at site, duly packed, supply / delivery to site including freight, unloading, storage and handling at site, erection and commissioning, hydro test at site, painting, handing over, tools and tackles, commissioning spares etc. inclusive of all prevailing taxes, duties and other levies, complete with all accessories including instruments required for the total scope defined as per specification (PE-402-167-A001) for 2 Nos. Condensate Storage tanks of Size as 13.5M dia X 12.0 M Ht.						
2.0.0	NOTES						
2.1.0	Bidder to note that total price indicated above at 1.0.0 shall be considered for evaluation and hence should be complete in all respect for the full scope defined and considering all terms and conditions agreed.						
2.2.0	Any item not included in the price quoted above and shown separately will not be taken cognizance of and the offer shall be liable for rejection.						
2.3.0	Bidder shall furnish the price of all the items as indicated in the price schedule. Bidder's offer shall be liable to be rejected incase bidder does not furnish the same.						
2.4.0	In case, price indicated above does not match with the total of item wise break-up given at 3.0.0 , the highest price so calculated shall be considered for evaluation but in case of order, the same shall be placed at the lowest price.						
3.0.0	<u>Break - up of Prices</u>						
3.1.0	Lump sum price of total CS plates for the tank						
3.2.0	Lump sum price of all structures including hand-railings, staircase etc. for the tank						
3.3.0	Lump sum price of total number of valves required for the tank						
3.4.0	Lump sum price of total length of the piping for the tank						
3.5.0	Lump sum price of total no. of level gauges required for the tank						

3.6.0	Lump sum price of NaOH breathers for the tank						
3.7.0	Lump sum price of seal pots for the tank						
3.8.0	Total amount for commissioning spares as per Annexure -A						
3.9.0	Lump sum price of painting for the tank						
3.10.0	Price for hydro test and handing over etc., of the storage tanks included as per the specification.						
	Total						
	Note: Total from 3.1.0 to 3.10.0 should match with 1.0.0 above.						
	Date: _____						
	Bidder's / bidder's representative signature				Company seal		

