
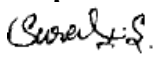



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| <p style="text-align: center;"><u>TECHNICAL SPECIFICATION FOR</u> <u>2 NOS. OF 2000 M 3 FIRE WATER STORAGE TANKS</u></p> <p style="text-align: center;"><u>PROJECT: 2 X 250 M W Unit # 8 & 9, Barauni-TPS, Begusarai</u></p> <p style="text-align: center;"><u>CUSTOM ER: Bihar State Electricity Board (BSEB)</u></p> <p style="text-align: center;"><u>CONSULTANT: M / s Steag Energy Services (India) Pvt. Ltd.</u></p> | | | | |
| Ref. Doc | Revisions :00 Refer to record of revisions : | Prepared :  (S. SURENDRA) | Approved :  (M. SIVA PRASAD) | Date : 22.04.13 |

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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>1.0 INTENT OF SPECIFICATION</p> <p>1.1 The specification is intended to cover design, engineering, supply of material (including commissioning spares), inspection and testing at vendor's / sub-vendor's works, proper packing and forwarding, shipment & delivery at site and also supervision of the following activities</p> <ul style="list-style-type: none"> (i) Tank fabrication, Erection and Commissioning, (ii) Inspection and Testing and (iii) Handing over <p>of 2 nos. of 2000 m3 Fire water Tanks as per the specifications and requirements indicated in different sections of this specification.</p> <p>1.2 Tank fabrication, Erection and Commissioning is not in the scope of bidder. However, bidder to furnish recommended erection and commissioning procedures along with all the drawing / documents required to facilitate Fabrication, Erection and Commissioning of the tanks by others.</p> <p>1.2 The contractor shall be responsible for providing all material, equipment & services required to ensure operability, maintainability, reliability and safety of the tanks as covered under this specification, irrespective of whether they have been specifically indicated in this specification or not.</p> <p>1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment / system 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.</p> <p>1.4 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are hereby made part of the tender specifications. The equipment / material and works covered by their specification are subject to all the attachments referred in the specification. The tenderer shall be responsible for adherence to all requirements stipulated herein.</p> <p>1.5 All text/ numeric in the document / drawings to be generated by the successful bidder will be in English language only.</p> <p>1.6 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 BSEB (Bihar State Electricity Board) as interpreted by BHEL in the relevant context.</p> | | | |
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PROJECT: 2 X 250 M W Unit # 8 & 9, Barauni-TPS, Begusarai


PROJECT INFORMATION


| | | |
|------|--|---|
| | Owner | Bihar Electricity Board (BSEB). |
| 1. | Project | 2 X 250 M W Unit # 8 & 9, Barauni-TPS, Begusarai |
| 2. | Owner's consultant | M / s Steag Energy Services (India) Pvt. Ltd. |
| 3. | Location | Town: Barauni, District: Begusarai, State: Bihar |
| 4. | Nearest Airport | Patna - 115 Kms. |
| 5. | Nearest Railway Station | Simaria Railway Station on North Eastern railways |
| 6. | Access to site | The site is at Barauni-Mokama section of National Highway (NH-31) |
| 7. | Latitude | N 25 ⁰ 23'13.5" to N 25 ⁰ 23'54" |
| 8. | Longitude | E 86 ⁰ 01'05.1" to E 86 ⁰ 01'46.3" |
| 9. | Maximum Ambient Air Temperature | 35.2° C |
| 10. | Minimum Ambient Air Temperature | 11.4°C |
| 11. | Dry Bulb Temperatures | |
| 11.1 | Highest recorded : | 35.3°C |
| 11.2 | Lowest recorded : | 12.1° C |
| 12. | Wet Bulb Temperatures | |
| 12.1 | Design AMB WBT | Minimum - 12.0°C Maximum - 29.0°C |
| 13. | Relative Humidity | |
| 13.1 | Design AMB Humidity | Minimum - 26% Maximum - 98% |
| 14. | Annual Mean | 52 % |
| 15. | Rainfall | |
| 15.1 | Annual Total | 1003.4 mm |
| 16. | Wind data | |
| 16.1 | Wind Speed | 47 m / sec |
| 17. | Prevailing Wind Direction | East (blowing from) |
| 18. | Wind Pressure | Minimum 990 hPa. Maximum 1011.5 hPa. |
| 19. | Seismic coefficient | Zone IV as per IS-1893 Part-I (2002) |


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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | | <p>2.0 <u>SPECIAL INSTRUCTIONS TO BIDDERS</u></p> <p>2.1 This specification shall be read in conjunction with all its enclosures. In case of any discrepancy arising between this job specification & its enclosures, the most stringent of all (as determined by purchaser) shall be followed. Further, if a requirement in this specification or any of the enclosures, calls for a decision from the Purchaser, it shall be bidder's sole responsibility to clearly bring out/highlight the same distinctively in his pre-bid queries, so as to enable purchaser to furnish their decision/clarification. If such issues/requirements are not duly addressed by bidder during the pre-bid stage and if such issues/requirements are observed later during order execution stage, it shall be binding on the bidder to comply with the final decision made by the purchaser subsequently, without any cost, delivery, or any other commercial implications.</p> <p>2.2 Any additional equipment, material, services etc., which are not specifically mentioned in this specification, but required to make the Tanks complete in all respects, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.</p> <p>2.3 Any specific hardware/software/item/ etc. required as indicated in 2.2. above but not listed elsewhere in this specification or its enclosures, shall be deemed to be included in the basic price quoted by the bidder. Also, all mounting hardware/accessories/fittings/conduits/etc. required for the Erection & Commissioning of the Tanks shall be deemed to be included in the basic price quoted by the bidder. Bidder, at no point of time, shall be eligible to raise any extra claim in this regard.</p> <p>2.4 The Bidder shall accept full responsibility for the completeness and for the reliable operation of Tanks as a whole. These shall be executed on the basis of proven design principle. Standardization of equipment, materials etc. shall be employed in the design. Care shall be taken to ensure safe operation as well as simplicity of Erection & Commissioning of the Tanks. Even though, the requirements are specified in detail to the extent possible, bidder to apply good engineering practices in the design, selection of equipment, manufacturing, procurement, transportation, fabrication, painting, inspection & testing, supervision of erection & commissioning of system etc., wherever same is not clearly spelt out.</p> <p>2.5 By accepting the contract, the bidder shall be deemed to have accepted the obligation of supplying everything that is necessary for the purpose mentioned above, regardless of any omission in the specification or on the drawings for the fulfillment of complete main plant package.</p> | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>2.6 Bidder to note that the Purchase Order for the Fire Water Tanks for the 2 x 250 MW BSEB Barauni thermal power project shall be placed on lump sum fixed prices based as per tender specification requirements.</p> <p>Bidder to further note that they shall not be permitted for any claim for additional commercial implication on any account during the detail engineering stage</p> <p>2.7 Bidder shall quote strictly as per the scope of supply and requirements of this specification. Bidder offer shall be strictly as per these specification requirements. Unsolicited or Alternate offers from the bidders will not be entertained.</p> <p>2.8 In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid. All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of enquiry by bidder and clarifications on the same shall be obtained by the bidder from the purchaser. In case no such clarifications are sought during pre-bid stage, it will be assumed that bidder has no comments or observations on BHEL's specification and no deviations to the specifications will be taken by the bidder.</p> <p>2.9 Bidder to quote strictly as per BHEL's Price Bid format(Annexure-IX). Failure to do shall make their offer liable for rejection. Any tampering/modification/change of the BHEL's price format is not allowed and is liable for rejection of bidders offer.</p> <p>2.10 In case Bidder is unable to offer due to any specific requirement of specification, Bidder shall bring out the same in their regret letter. Otherwise it will be considered that non participation by the bidder is attributable to reasons other than any specification requirements.</p> <p>2.11 Compliance with this specification shall not relieve the bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.</p> <p>2.12 The design information, specifications and drawings indicate the "Minimum" requirements and are intended to enable Bidders to ascertain the extent of the work involved. Bidders are expected to supplement the information included in this specification as required and submit a comprehensive bid.</p> <p>2.13 The intending tenderers shall be deemed to have visited the site and have studied the conditions before submitting the Bids. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.</p> | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>2.14 Civil works will be done by BHEL based on civil inputs furnished by the bidder during detail engineering. In case of any changes in the civil input drawing after civil work is completed, necessary prices on account of modification of the civil work shall be deducted from bidder's account.</p> <p>3.0 SCOPE OF SUPPLY, SCOPE OF SERVICES, EXCLUSIONS AND TERMINAL POINT DETAILS:</p> <p>The Fire water tanks to be engineered and the materials shall be supplied at site under this specification shall be generally as per enclosed DATA SHEET for Fire Water Storage Tank(Annexure-I) and also the Sketch for Fire Water Storage Tank (Annexure-X).</p> <p>3.1 SCOPE OF SUPPLY</p> <p>3.1.1 The Scope of Supply shall include the following major items:</p> <ul style="list-style-type: none"> a) All the plate materials required for Tank Bottom, Shell, and Roof etc. for the Fire Water Tanks. b) All the required connections, nozzles and accessories required for each tank as per enclosed Tank Data Sheet(Annexure-I) and also the Sketch for these Tanks as per (Annexure-X). The size of the nozzle and no.of nozzles for Barauni project shall be as per Data Sheet(Annexure-I). Size and No:of Nozzles indicated in Sketch(Annexure-X) is only for reference. c) All the required piping material inside the tank d) All the required pad plates on the tanks for supporting outside piping e) All flanges and counter flanges/blind flanges for all nozzles of tank connections including the fasteners (bolts, studs, nuts) and gaskets for these connections. f) All the manhole covers/flanges including the fasteners (bolts, studs, nuts) and gaskets. g) All the structural material required for roofs, ladders, wind girders, rails, platforms, stairs, supports, stiffeners, curb angles etc. h) The following instrumentation along with their fittings, accessories, mountings etc. (As per the enclosed Data Sheets provided elsewhere in this specification) : <ul style="list-style-type: none"> 1) 3 nos of Level Switches(Level High, level Low , Level Low Low) for each tank 2) 1 no Level gauge / Indicator for each tank | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | | | <p>i) All anchor bolts, nuts, washers including pad plates (as required for anchoring of tank as per approved design calculations).</p> <p>j) All the required material for draining and goose neck venting arrangements for the tanks including necessary piping, fittings, nozzles, valves, flanges, fasteners etc.</p> <p>k) 1 no. of 300 NB size Drain valve for each tank.</p> <p>l) All the required material for routing the drain and over-flow of the tanks to the nearest storm water drain system located at 20 mtrs away from the tank area. These shall include necessary piping (approximately 75 mtrs of 12" pipe(6.35 mm thick), 10 nos. of 12" elbows, 3 nos. of 12" Tees), fittings, nozzles, valves, flanges, fasteners etc. These material is requirement of two no of water tanks.</p> <p>m) Required material for Earthing of the tanks up to the nearest risers of earthing mats including earthing pads, strips etc.</p> <p>n) Start-up Spares and Commissioning Spares (Details to be provided by vendor).</p> <p>o) O&M Manuals in both soft and hard form (6 sets).</p> <p>p) Any other material required to complete the Tanks as per the intent and requirements of this specification.</p> <p>3.2 SCOPE OF SERVICES</p> <p>The major scope of services shall include:</p> <p>3.2.1 Design, engineering, preparation of detailed fabrication drawings, bill of material, tag and piece numbers, welding procedures etc. Stiffeners and other structural framing for supporting the tank shall be designed by the fabricator and properly shown in the fabrication drawings.</p> <p>3.2.2 Even though, fabrication, erection and commissioning is not in bidder's scope, bidder to furnish recommended fabrication, erection & commissioning, testing and inspection procedure along with drawing / documents to facilitate fabrication, Erection & Commissioning, testing and inspection of Tank.</p> <p>3.2.3 Supervision of (a) Fabrication, Erection & Commissioning, (b) Inspection & testing, (c) handing over of the tank for 80 man days. For the purpose of tender (L1 bidder evaluation) total no of 80 man days to be covered in 5 visits have been considered. However, either or both of the number of man days or no of visits may change on either side based on the actual site requirement.</p> | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>3.2.4 Preparation and submission of all drawings as per the list enclosed in this specification elsewhere.</p> <p>3.2.5 Engineering support as and when required during fabrication erection & commissioning, testing and inspection of the system .</p> <p>3.2.6 Any other service required for making the installation complete in all respect within bidder's scope and for satisfactory erection & commissioning of the system , unless specifically EXCLUDED from scope of services.</p> <p>3.2.7 Painting at sub vendor works.</p> <p>3.2.8 Material re-conciliation will be done jointly by Purchaser's erection office (BHEL-PSER) & Sub-vendor. Bidder to note that the payment towards the supply for any item will be made only after the completion of the material reconciliation activity at site. Bidder to further note that no separate payment shall be made by Purchaser for material reconciliation activity & any price of this service will be deemed to be included in the basic price of supply of the package quoted by the bidder.</p> <p>3.3 EXCLUSIONS</p> <p>3.3.1 Tank foundation & associated civil works, tank fabrication, erection and commissioning, inspection and testing at site and handing over of the tank are excluded from bidder's scope of work. However, foundation drawing along with loading data, anchor bolt details etc. shall be furnished by the successful bidder during detailed engineering stage.</p> <p>3.3.2 Even though tank fabrication, erection and commissioning are not in bidder's scope, bidder to furnish all the required recommended erection and commissioning procedure along with drawing / documents to facilitate complete Fabrication, Erection and commissioning. Further, Erection and commissioning spares as required including items like foundation bolts, anchor bolt (if reqd.), etc. shall be provided by bidder during detail engineering.</p> <p>3.3.3 Earthing of tank is not in bidders scope. However, supply of required material for Earthing of the tanks up to the risers of earthing mats including earthing boss, strips are in the scope of bidder.</p> <p>3.3.4 Supply of painting material, surface preparation and painting of tanks are excluded from bidders scope.</p> <p>3.3.5 Storage, preservation of Materials/Equipments at site is excluded from bidders scope (however detailed storage and preservation procedure shall be furnished by bidder).</p> | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>3.4 <u>TERMINAL POINT DETAILS</u></p> <p>3.4.1 For all nozzles(except drain, overflow, vent, level instruments) matching counter flanges/blind flanges shall be the terminal point.</p> <p>3.4.2 For overflow & drains the terminal point shall be the nearest storm water drain system which will be 20 mtrs away.</p> <p>3.4.3 For nozzles for Level Instruments(LG/LS), the terminal point shall be the instruments.</p> <p>3.4.4 For vents, goose neck shall be terminal point.</p> <p>3.4.5 For earthing purpose, terminal point is nearest risers in the mat.</p> <p>4.0 <u>DETAILED DESIGN & TECHNICAL REQUIREMENTS</u></p> <p>4.1 The successful bidder shall furnish design calculations(in native/original format) to BHEL during detailed engineering stage for approval along with the relevant pages of authentic supporting literature e.g. Code, Hand book, National / international Standards etc. All steps including formulas and abbreviations shall be clearly shown in the calculation. All inputs / assumptions shall be indicated in the first sheet of the calculation. Calculation shall be necessarily done in SI UNITS only for the followings: -</p> <p>a) The tanks shall be designed as per IS: 803 latest edition.</p> <p>b) Material of construction of Fire water tanks shall be mild steel conforms to IS – 2062 grade – A.</p> <p>c) 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.</p> <p>(i) Bottom plate of 6 mm , bottom most shell plate (1 st course) of 10 mm , 2nd & 3rd shell course of 8 mm , remaining shell course of 6 mm and roof plate of 6mm be provided as minimum including corrosion allowance. Plate thickness calculation shall be approved from BHEL / Customer during detailed engineering stage. However, if the addition / summation of calculated value of plate thickness (excluding tolerance on plate as per relevant IS) / nominal minimum thickness specified in the relevant design code / standard and corrosion allowance comes out more than the specified value then the nearest available (higher side) plate thickness in the market shall be provided for bottom, shell and roof plates without any commercial implication.</p> | | |
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| <p align="center">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.</p> | <p>(ii) Negative tolerance on plate thickness shall not be considered in the plate thickness calculation and also shall not be provided in the tank. Only positive tolerance shall be considered.</p> <p>d) All inlet piping shall be taken from bottom of the tank. The clearance between the bottom of the tank and the edge of the inlet piping shall be kept as per code and good engineering practices.</p> <p>e) All the manhole covers/flanges shall be of hinged & bolted type with nuts, bolts and gaskets in bidder's scope of supply. The size of the manhole shall be minimum 600 mm .</p> <p>f) Wind and seismic load calculations required for foundation bolt design.</p> <p>g) Weight calculation of plates, appurtenances & structures separately shall be included in the Design calculation.</p> <p>h) Maximum Height of unstiffened shell shall be calculated based on the corroded thickness of shell courses. Section modulus of wind girders shall also based on corroded thickness of shell course.</p> <p>4.2 All appurtenances and mountings shall also be designed as per relevant clauses of IS: 803 as per the design code indicated in DATA SHEET for Fire Water Storage Tank(Annexure-I).</p> <p>4.3 Tank shall be suitably constructed for safe, proper and continuous operation under all conditions that can be expected in a plant life without undue strain, corrosion or other operating difficulties.</p> <p>4.4 In calculating the minimum plate thickness, the specific gravity of the liquid shall not be taken less than 1 .</p> <p>4.5 Tank seams shall be so positioned that they do not pass though tank connections. Longitudinal seams of various shell courses shall be offset.</p> <p>4.6 Wherever possible, the inside seam weld shall be ground smooth, suitable for application of corrosion resistant primer.</p> <p>4.7 Due consideration shall be given by the supplier for wind load and earthquake effect in the design of tanks.</p> <p>4.8 For the tanks being of diameter larger than 3.75 m added structural supports in the form of rafter shall be provided.</p> | | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>4.9 Reinforcement in tanks shall be provided as per design code as indicated in DATA SHEET for Fire Water Storage Tank(Annexure-I). The reinforced connection shall be completely pre - assembled into shell plate.</p> <p>4.10 The joint efficiency factor to be adopted for design calculation shall be in accordance with the specified design code.</p> <p>4.11 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.</p> <p>4.12 Staircase / access ladder and hand railing shall be provided as per the relevant codes and standards.</p> <p>4.13 Water draw off sump shall be provided as per the relevant design code, latest editions.</p> <p>4.14 Code conformance for flanges / counter flanges shall be as per IS2062 Gr A (Dimensional standard- ANSI B16.5 clause 150/IS 1538).</p> <p>4.15 The number & size of nozzles (including flanges, counter flanges and inside piping) indicated in the sketches attached with the data sheets are tentative and bidder guidance purpose only and the same may undergo minor change during detail engineering stage for which no commercial implication shall be entertained by BHEL.</p> <p>4.16 Bidder shall furnish the Standard calculation along with the roof structure calculation during detail engineering for checking the stability of roof.</p> <p>4.17 The tank shall be designed for filled water head / atmospheric pressure and design temperature for the tank shall be as specified in the DATA SHEET for Fire Water Storage Tank(Annexure-I).</p> <p>4.18 Type of roof for vertical cylindrical storage tanks shall be either supported cone roof or self supporting cone roof as per latest edition of relevant design code.</p> <p>5.0 TESTING & INSPECTION</p> <p>5.1 Bidder shall maintain an effective Quality Assurance System, to ensure that all equipment and material supplied as a part of the Fire water tanks meet required Quality standards and specifications.</p> <p>5.2 After award of contract, bidder shall submit Quality Plan for approval. The quality plan shall be submitted in BHEL quality plan format, Bidder to note that all the cost involved in any of the inspection & testing requirements as per the approved quality plan shall be deemed to be included in the price quoted by the bidder. Bidder shall not be eligible to</p> | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>raise any extra claim on account of any inspection & testing as per the approved quality plan.</p> <p>5.3 The particulars of the proposed tests and the procedure for the tests shall be submitted to the Owner / Engineer for approval before conducting the tests. The successful bidder shall submit recommended FQP (field quality plan) and suggestive PG test procedure for BHEL review during detail engineering stage.</p> <p>6.0 PAINTING</p> <p>Field surface preparation, supply of paint material and field painting is excluded from vendor scope. However necessary painting to be carried out by bidder at subvendor works for the material and equipments supplied by the bidder.</p> <p>7.0 DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID</p> <p>The bidder must submit the following drawings and documents along with their bid in 2 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.</p> <ol style="list-style-type: none"> a) List of recommended spares for 3 years normal operation indicating quantities in terms of numbers as per(Annexure-VII). b) Un-priced copy of price format(Annexure-IX) indicating quoted/ not quoted against each row & column. c) Specific confirmation sheet(Annexure-V). d) Checklist(Annexure-VIII). e) Start up & Commissioning Spares(List and quantity as per bidders recommendation) f) Tentative GA for BHEL' reference only. Bidder to furnish the weight of each tank (in empty condition and water filled condition). Bidder to note that the weight in water filled condition shall be considered from bottom of tank up to top of curb angle. <p>In the absence of any 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.</p> | | |
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8.0 DRAWINGS/ DOCUMENTS REQUIRED DURING DETAIL ENGINEERING

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

| S.no. | Document no. | Category | Title |
|------------------------------|--------------|-------------|--|
| A. DESIGN CALCULATION | | | |
| 1 | | Approval | Design Calculation for Fire Water Storage Tank, seismic design calculation along with roof structure |
| 2 | | | Vent sizing calculation. |
| B. DRAWINGS | | | |
| 1 | | Approval | GA - Storage Tank including nozzle details, bill of material, weld details etc. |
| 2 | | Information | GA of stairway indicating platforms, landings and handrails with bill of materials |
| 3 | | Information | Roof structural detail of Storage Tank including nozzle details, bill of material, weld details etc. |
| 4 | | Information | Plate cutting layout of storage tank (shell, roof and bottom plate) |
| 5 | | Information | Fabrication Drawing for Storage Tank |
| 6 | | Approval | Nozzle orientation drawing of Storage Tank |
| 7 | | Approval | Load Data of Tank Foundations and Details of Anchor Chair for Tank Foundations |
| 8 | | Approval | GA / cross-sectional drawing of CS valve. |
| 9 | | Approval | GAD of Level Indicator |
| 10 | | Approval | GAD of Level Switch |
| B. DATA SHEETS | | | |
| 1 | | Approval | Data sheet for Plates & Structure |
| 2 | | Approval | Data sheet for Pipe, Fittings, and Flanges & Accessories. |
| 3 | | Approval | Datasheet for Paint for Fire Water Storage tank. |

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| 4 | | Approval | Datasheet for Valves. |
| C. | | QUALITY PLANS | |
| 1 | | Approval | Recommended Field Quality Plan |
| 2 | | Approval | Inspection Check List of MS Plates & Structural Steel |
| 3 | | Approval | QAP of Valves. |
| 4 | | Approval | QAP for MS Plates & Structural Steel |
| 5 | | Approval | QAP for Pipe, Fittings, Flanges & Accessories. |
| 6 | | Approval | QAP for Level indicator |
| 7 | | Approval | QAP for Level Switch |
| D | | GENERAL / OTHER DOCUMENTS | |
| 1 | | Information | Bar Chart |
| 2 | | Approval | Billing Break-Up for Supply |
| 3 | | Approval | Makes of Bought-out Items |
| 4 | | Approval | As Built |
| | | Approval | O&M Manual |
| 5 | | Approval | Packing procedure before FOB delivery |
| 6 | | Approval | Packing list |
| 7 | | Approval | Suggestive PG test procedure |
| 8 | | Approval | Erection procedure |
| 9 | | Approval | Commissioning procedure |
| 10 | | Approval | Painting Procedure |
| 11 | | Approval | Valve schedule |

8.2 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.

8.3 Data sheets of various items shall be prepared by the bidder for storage tanks and shall be submitted to BHEL / customer / consultant for approval after placement of order and any changes required by BHEL / customer / consultant for the same shall be incorporated and adhered by the bidder without any commercial implications.

8.4 GA drawing, nozzle schedule, design data, material of construction etc. shall be prepared by the bidder during detail engineering stage based on specification / contractual requirement and there should be no commercial implication on account of finalization of the drawings and documents.

8.5 O & M manual shall be furnished to BHEL for approval during detailed engineering stage.

- 8.6 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.
- 8.7 Revision made by the bidder in any drawings and documents shall be highlighted by indicating the no. of revisions in a triangle without fail so that the minimum time is required by BHEL to review the drawings and documents.
- 8.8 Any other drawings and documents in addition to the list of drawings and documents indicated in the NIT specification as required by BHEL for the execution of the project shall be furnished by them during detailed engineering stage and no commercial implication shall be entertained by BHEL for the same.
- 8.9 Bidder to confirm that all the drawings shall be prepared in Auto Cad - 2010 version and required number of hardcopies and soft copies shall be furnished to BHEL during detailed engineering stage.
- Following may be noted wrt the drawing submission schedule.

| SL NO. | DESCRIPTION | NUMBER OF COPIES TO BE SUBMITTED | WHEN TO SUBMIT |
|--------|---|----------------------------------|--|
| 1. | Initial drawings/documents under approval and information category. | 4 | As per approved Master document list |
| 2. | Revised drawings/documents incorporating BHEL's comments. | 4 | Within 1 week of receipt of commented Drawings from BHEL |
| 3. | Final Drawings/documents | 17 | Within 2 months of placement of order. |
| 4. | Erection Documentation | 8 | 1 Month before dispatch of equipment, The list of documents identified under master document list for erection to be furnished in 5 nos. of folders. |
| 5. | Draft O & M Manuals with out test certificates | 2 | 2 months before the delivery date of equipment |

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| SL NO. | DESCRIPTION | NUMBER OF COPIES TO BE SUBMITTED | WHEN TO SUBMIT |
|--------|--|----------------------------------|--|
| 6. | Revised O & M Manuals with Test Certificates to be submitted to BHEL (Hyderabad) | 17 | Within one month after dispatch of equipment |
| 7. | Final O&M Manuals in a CD | 3 | Within one month after dispatch of equipment |

8.10 15 days time is required by BHEL to offer their comments on the drawings and documents being submitted by the bidder (during detailed engineering stage in the event of L.O.I being placed) from the date of receipt.

8.11 The engineering drawings submitted by successful bidder for approval during detailed engineering stage showing / indicating the followings:-


- Scope of work by BHEL and bidder shall be indicated with different legend or in the form of note.
- Recommended locations of earthing bosses.
- Civil loads and the detailed calculation showing weights of roof, bottom, and shell plates, all accessories and nozzles etc.
- Details of pockets as required for anchor bolts.


8.12 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. However, minimum 7 days notice shall be served for the same.


8.13 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.


8.14 All drawings and documents including general arrangement drawing, data sheet, calculation etc. shall be furnished to BHEL during detailed engineering stage and shall include / indicate the following details for clarity w.r.t. inspection, construction, erection and maintenance etc.:-


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Doc


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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>a) All drawings and documents shall bear BHEL's title block and drawing / document number. However, BHEL's drawing / document numbering scheme shall be furnished to the successful bidder after the placement of L.O.I.</p> <p>b) All drawings and documents shall indicate the list of all reference drawings including general arrangement.</p> <p>c) All drawings shall include / show plan, elevation, side view, cross - section, skin section, blow - up view, all major self-manufactured and bought out items shall be labelled and included in BOQ / BOM in tabular form.</p> <p>8.15 ENGINEERING COMPLETION :</p> <p>8.15.1 The Engineering shall be considered as completed after the following activities are finished:</p> <ul style="list-style-type: none"> ● Final approval of all the Drawings / Documents which are in 'Approval' Category as per Document List in clause 8.1 above. ● After successful review of drawings/documents which are in 'Information' Category as per Document List in clause 8.1 above. ● Final approval of detailed Bill of Quantity (BOQ). <p>8.16 ERECTION & COMMISSIONING DOCUMENTATION :</p> <p>8.16.1 ERECTION DOCUMENTATION :</p> <p>8.16.1.1 Erection document List shall be prepared during Engineering review meeting (after award of contract) identifying all the DOCUMENTS / DRAWINGS required for completion of Erection activities of the complete system, to be submitted by the bidder as part of documentation.</p> <p>8.16.1.2 The Bidder shall submit for Purchaser's approval draft manual for Equipment Delivery and Erection (EDE Manual) covering detailed instructions, write up, technical data, drawings, check-lists, documentation formats for all activities after equipment manufacture upto installation of equipment. This manual shall cover general instructions for all equipment and specific instructions for individual equipment wherever required and shall include at least the following :</p> <ul style="list-style-type: none"> ● Instructions for packing, shipping, receiving, handling, ware-housing and storage. ● Part number/Dispatch link-up of all the equipments/items supplied and also their co-relation with system /drawing/ approved BOQ. | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | | | <ul style="list-style-type: none"> • Instructions for location and installation of equipment furnished by this specification. • Installation drawings for field mounted equipment and other equipment covered under this specification. • Instruction relating installation of piping, support and routing drawings of drain and overflow nozzles. • Check lists and quality assurance hold points. • Formats for all related documentation. • The EDE Manual shall conform to the requirements of this specification, all applicable codes and standards, recommendations of equipment manufacturers and accepted good engineering practices and shall be subject to Employer approval during detailed engineering. • The Bidder shall ensure that all work under this part shall be performed as per the requirements of this specification, Employer approved EDE Manual and drawing/documents approved by the Employer during detailed engg. <p>8.16.1.3 Erection Manuals</p> <p>The erection manuals shall be submitted at least three (3) months prior to the commencement of erection activities of particular equipment/system. The erection manual should contain the following as a minimum .</p> <ul style="list-style-type: none"> • Erection strategy. • Sequence of erection. • Erection instructions. • Critical checks and permissible deviation/tolerances. • List of tool, tackles, heavy equipments like cranes, dozers, etc. • Bill of Materials • Procedure for erection. • General safety procedures to be followed during erection/installation. • Procedure for initial checking after erection. • Procedure for testing and acceptance norms. • Procedure / Check list for pre-commissioning activities. • Safety precautions to be followed in erection all equipments and electrical supply distribution during erection <p>8.16.2 COMMISSIONING DOCUMENTATION:</p> <p>8.16.2.1 The contractor shall submit the commissioning documentation, comprising of Standard checklists, pre-commissioning procedures, testing schedules, commissioning schedules and commissioning networks for various Equipment / systems covered under the contract, for the approval of employer.</p> | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | | | <p>8.16.2.2 Standard checklist, as the name suggests, shall be a fairly general documents, containing the list of all checks required to be carried out for similar and repetitive type of equipment to ensure consistent and thorough checking.</p> <p>8.16.2.3 The testing schedule is a document, designed for safe and systematic commissioning of individual equipment/sub-system. Commissioning schedule is a document envisaged for commissioning of a system. The testing/Commissioning schedule shall have a standard format in order to maintain consistency of presentation, content and reporting. A brief write up on the contents of the Testing Schedule/ Commissioning Schedule is as per the following:</p> <p>Testing Schedules should be designed to ensure that the plant area, equipment or apparatus are tested and commissioned and will operate as per the employer's specifications and good engineering practices.</p> <p>Testing Schedule/ Commissioning Schedule is required to be of a standard format in order to maintain consistency of presentation, content and reporting.</p> <p>Testing Schedule/ Commissioning Schedule should contain the following sections to make the document a self contained one:</p> <ul style="list-style-type: none"> a) Plant Details/Design data b) Testing Objective/Proposals c) State of the Plant required prior to commissioning <ul style="list-style-type: none"> ○ Erection Status with respect to Mech. Elect and C&I ○ Services required ○ Safety requirements d) Test method including completion/acceptance criteria e) Results f) Testing Programme g) Mech/ Elect/ C&I –Plant item completing list h) List of Drawing/documents required for carrying out the testing. <p>8.16.2.4 The contractor shall submit the list of commissioning documentation to be submitted by him, alongwith their submission schedule for various equipment/systems covered under the contract, with in 6(six) month from the date of award of contract, for the acceptance of employer.</p> <p>8.16.2.5 The Contractor shall submit the commissioning documentation, for various equipment/covered under the contract, for the approval of employer, at least 12 months before the scheduled date of commissioning of the equipment/systems.</p> | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>9.0 PRE-BID CLARIFICATIONS AND DEVIATIONS</p> <p>9.1 Bidders are advised to quote strictly as per BHEL's specification requirements. In case bidder excludes some components of scope of supply or some features of specification requirements, the bidder will be required to include the same in the scope during offer evaluation stage /contract execution stage without any additional commercial and price implications on account of the same. Bidder to note that they won't be entitled for any price impact on account of withdrawal of deviation taken from BHEL spec during technical scrutiny/evaluation of the bidder's offer . Price impact will be allowed by BHEL only to the extent of change of specification during tender evaluation stage, if any, from BHEL end.</p> <p>9.2 In case bidder feels that it is necessary to exclude some components of scope of supply & some features of specification requirements, due to genuine constraints if any, bidder has to clearly bring out the same to the notice of BHEL and take their prior approval <u>before submission of bid</u>. Bidders are requested to bring out only those issues and deviations which are impractical to meet (or) not technically advisable as per the experience of bidder, for BHEL's review <u>before the submission of bid</u>. All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of the Enquiry/NIT/RFQ in the enclosed format (Annexure -VI). All such applicable deviations /clarification shall have cross reference to page number /section / clause /para etc. of this specification or its annexure with proper reasons for the deviations for purchaser's consideration. Any such applicable deviations /clarification not listed under the above section, even if reflected in any other portion of the bidder's proposal shall not be considered applicable. Purchaser shall review the above pre-bid queries & deviations submitted by the bidder and furnish the necessary clarifications /instructions to the bidder immediately. Bidder shall submit their offer taking cognizance of these clarifications/instructions provided by Purchaser.</p> <p>9.3 In absence of any such pre-bid clarifications sought by the bidder and in case of contradictory requirements of the specification (if any), the more stringent requirement as interpreted 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.</p> <p>9.4 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.</p> | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>9.5 Bidders are advised to quote strictly as per BHEL's specification requirements. In case bidder excludes some components of scope of supply or some features of specification requirements, the bidder will be required to include the same in the scope during offer evaluation stage /contract execution stage without any additional commercial and price implications on account of the same. Bidder to note that they won't be entitled for any price impact on account of withdrawal of deviation taken from BHEL spec during technical scrutiny stage. Price impact will be allowed by BHEL only to the extent of change of specification during tender evaluation stage, if any, from BHEL end.</p> <p>9.6 Information like Bill of materials (BOM), Instrument list, datasheets, and typical specifications enclosed by the bidder as a part of their bid, shall be retained for information only and shall not be referred by contractor in future as contractual agreement during contract execution stage. No implication shall be admissible on the basis of these documents during any stage of contract execution and the requirements of as specified/indicated this specification will be binding and final. System wise BOQ shall be finalized based on approved drawings during detail engineering stage.</p> <p>10.0 <u>BID EVALUATION CRITERIA</u></p> <p>The bid shall be evaluated based on the price quoted for the tank and its accessories & commissioning spares, Supervision charges for E&C and any technical loading due to non-adherence to the technical specification.</p> <p>However, the price for recommended spares shall not be considered for evaluation purpose.</p> <p>11.0 <u>OTHER REQUIREMENTS</u></p> <p>11.1 Bidder to assess the capability of their 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. No deviations shall be entertained.</p> <p>11.2 Items shall be procured from the subvendor list as per Annexure-III</p> <p>11.3 Dealers are not acceptable for any item of the package. Bidder shall procure all items including plates, structurals, flanges, counter flanges etc. from BHEL approved sub vendor only. No argument on this account shall be entertained.</p> <p>11.4 While supplying the material bidder shall consider suitable margin (at least 5%) for the materials i.e. pipes, plates, flanges and fittings, traps, insulation and cladding etc. over and above the requirement as per approved drawing / documents so as to take care of material shortage at site during erection.</p> | | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p>11.5 Commissioning spares are deemed to be included in bidder's scope and same shall be supplied during erection and commissioning stage. In case of any shortfall of these spares, same shall be procured by BHEL and the prices of the same shall be deducted from bidder's account.</p> <p>12.0 Billing Breakup Methodology:</p> <p>12.1. Billing break-up (BBU) shall be submitted to BHEL in following methodology:</p> <p>12.1.1 The BBU shall be prepared only for the pro-rata billing purpose.</p> <p>12.1.2 BBU will contain complete list of items required for the completion of the project as per specification and shall be dispatched by bidder irrespective of the items/quantities are indicated in the document or not.</p> <p>12.1.3 Any additional requirement of the item already indicated in the document will be updated in the subsequent revision of this document. All such item will be dispatched as "free item" term to BHEL.</p> <p>12.1.4 Inspection & Testing of all items shall be as per approved quality plan. The entire item shall be dispatched to site only after the completion of Inspection and testing requirement as per approved quality plan. Non-inclusion of any item does not absolve the vendor from meeting the requirement.</p> <p>12.1.5 Vendor shall obtain prior permission from BHEL after submitting all the documents before ensuring dispatch of all main items applicable for project.</p> <p>12.1.6 Inspection & quality: All the items applicable for this project shall be inspected as per approved quality plan. It may be noted that any item shall be dispatched to site only after complying with the Inspection requirements as per approved quality plan.</p> <p>12.1.7 As separate document indicating the details of all the items having SHELF LIFE shall be furnished. Prior permission from BHEL shall be taken before dispatch of any of the item having shelf life.</p> <p>12.1.8 Applicable taxes & duties shall be extra.</p> <p>12.2. BBU shall be a comprehensive document having details of all the items applicable for this project .There should not be any Non-Billable item to be supplied at site .</p> <p>12.3. BBU shall be submitted as per "Payment Terms of Annexure-BB"</p> <p>12.4. Wherever Lot items are indicated, same shall be quantified in details in a separate annexure. Similarly all Accessories/ Instruments/ items are to be defined with comprehensive details</p> <p style="padding-left: 40px;">It is to be ensured that all fittings, accessories (including Bolts, fittings etc.), Instrument and other items, if any, shall be listed in separate line items or in a separate annexure.</p> | | |
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| <p><u>13.0 ANNEXURES</u></p> | | |
| | | <p>PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD-32</p> |
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ANNEXURE-I**DATASHEET FOR FIRE WATER STORAGE TANK**

| S. No. | DESCRIPTION | SPECIFICATION REQUIREMENT |
|--------|-------------------------------------|--|
| 1. | Service Identification | Fire Water Storage Tank |
| 2. | Tanks Sketch | PE&SD-BSEB-ST-DWG-001 |
| 3. | System | Fire Protection System |
| 4. | Capacity (Effective) | 2000 m ³ |
| 5. | Number Required | 2 Nos. |
| 6. | Storage Medium | Fire Water |
| 7. | Type | Vertical, Cylindrical |
| 8. | Tentative Size | 16.5m (dia) x 10.825m (height) (min) |
| 9. | Pressure Class | Design for filled water head/atmospheric |
| 10. | Material of Construction | Mild Steel to IS:2062, Gr. A |
| 11. | Maximum Metal Design Temperature | 80 °C |
| 12. | Location of Installation | Outdoor |
| 13. | Nozzle Connections Required | 1 x 300 NB (N1 Emergency Makeup) 1 x 150 NB (N2 Normal Makeup) 1 x 600 NB (N3 Roof Manhole) 1 x 200 NB (N4 Tank interconnection) 1 x 65 NB (N5 Water low low level switch for pump stop & alarm) 2 x 65 NB (N6 water high & low level switch for motorised valve & alarm) 1 x 40 NB (N7 Level gauge) 1 x 100 NB (N8 Spare) 1 x 200 NB (N9 Pump return) 1 x 300 NB (N10 Over flow) 1 x 600 NB (N11 Pump suction) 1 x 600 NB (N12 Shell Manhole) 1 x 300 NB (N13 Drain) 1 x 100 NB(N14 Spare) |
| 14. | End Connection | For size <= 50 NB – Socket Welded For size > 50 NB – Butt Welded |
| 15. | Pipe/Nozzle Material | IS 1239 Part II |
| 16. | Valves Material | Cast Iron as per IS210 FG260 Body with 13% Cr SS stem and Seating surfaces of gate valve as per guidelines or requirements specified in TAC |
| 17. | Valves End Connection | For size < 50 NB – Socket Welded For size >= 50 NB – Flanged |

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| <p align="center">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.</p> | <table border="1"> <thead> <tr> <th>S. No.</th> <th>DESCRIPTION</th> <th>SPECIFICATION REQUIREMENT</th> </tr> </thead> <tbody> <tr> <td>18.</td> <td>Flanges</td> <td>Slip on Flange / Blind flange confirming to IS2062 Gr A(Dimensional standard- ANSI B16.5 clause 150/IS 1538).</td> </tr> <tr> <td>19.</td> <td>Instruments/Accessories Required</td> <td> <ul style="list-style-type: none"> a) Tank Overflow and drain piping of 300NB with drain valve. b) Level Gauge (along with fittings) of Mechanical Float & Board Type to cover Entire Range c) Steel stairs and platforms for external approach. d) Two spare connection of 100NB (N8) and 100NB (N14) with blind flanges. </td> </tr> <tr> <td>20.</td> <td>Surface Preparation, Inside protection and external protection for tank and other accessories</td> <td>Refer painting schedule (Annexure – II)</td> </tr> <tr> <td>21.</td> <td>Man Hole</td> <td>2 Nos. (One on shell and other on roof)</td> </tr> <tr> <td>22.</td> <td>Applicable Codes/Standards</td> <td>IS: 803</td> </tr> </tbody> </table> | | | S. No. | DESCRIPTION | SPECIFICATION REQUIREMENT | 18. | Flanges | Slip on Flange / Blind flange confirming to IS2062 Gr A(Dimensional standard- ANSI B16.5 clause 150/IS 1538). | 19. | Instruments/Accessories Required | <ul style="list-style-type: none"> a) Tank Overflow and drain piping of 300NB with drain valve. b) Level Gauge (along with fittings) of Mechanical Float & Board Type to cover Entire Range c) Steel stairs and platforms for external approach. d) Two spare connection of 100NB (N8) and 100NB (N14) with blind flanges. | 20. | Surface Preparation, Inside protection and external protection for tank and other accessories | Refer painting schedule (Annexure – II) | 21. | Man Hole | 2 Nos. (One on shell and other on roof) | 22. | Applicable Codes/Standards | IS: 803 |
| | S. No. | DESCRIPTION | SPECIFICATION REQUIREMENT | | | | | | | | | | | | | | | | | | |
| | 18. | Flanges | Slip on Flange / Blind flange confirming to IS2062 Gr A(Dimensional standard- ANSI B16.5 clause 150/IS 1538). | | | | | | | | | | | | | | | | | | |
| | 19. | Instruments/Accessories Required | <ul style="list-style-type: none"> a) Tank Overflow and drain piping of 300NB with drain valve. b) Level Gauge (along with fittings) of Mechanical Float & Board Type to cover Entire Range c) Steel stairs and platforms for external approach. d) Two spare connection of 100NB (N8) and 100NB (N14) with blind flanges. | | | | | | | | | | | | | | | | | | |
| | 20. | Surface Preparation, Inside protection and external protection for tank and other accessories | Refer painting schedule (Annexure – II) | | | | | | | | | | | | | | | | | | |
| | 21. | Man Hole | 2 Nos. (One on shell and other on roof) | | | | | | | | | | | | | | | | | | |
| | 22. | Applicable Codes/Standards | IS: 803 | | | | | | | | | | | | | | | | | | |
| NOTE: | | | | | | | | | | | | | | | | | | | | | |
| 1. All other standard accessories as applicable shall be considered. | | | | | | | | | | | | | | | | | | | | | |
| Ref. Doc | | | | | | | | | | | | | | | | | | | | | |

| | | | |
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| COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. | <p><u>ANNEXURE – II</u></p> <p><u>PAINTING SPECIFICATION FOR FIRE WATER STORAGE TANKS</u></p> <p>a) Surface preparation by manual wire brush</p> <p>b) <u>Internal painting</u></p> <p style="padding-left: 40px;">Primer : 3 coats of epoxy painting over one coat of primer (DFT : 40 micron per coat)</p> <p style="padding-left: 40px;">Colour shade : white</p> <p>c) <u>External painting</u></p> <p style="padding-left: 40px;">Primer : 1 coat of primer (DFT : 30 to 40 micron per coat)</p> <p style="padding-left: 40px;">Finish : 3 coats of chlorinated rubber paint (DFT : 30 to 40 micron per coat)</p> <p style="padding-left: 40px;">Colour shade : fire red</p> <p>d) <u>Bottom plate under side painting</u></p> <p style="padding-left: 40px;">Primer : 1 coat of primer (DFT : 30 to 40 micron per coat)</p> <p style="padding-left: 40px;">Finish : 3 coats of coaltar epoxy (DFT : 60 to 80 micron per coat)</p> | | |
| Ref. Doc | | | |

ANNEXURE – III**SUB-VENDOR LIST**

| Sl. no | Item | Sub vendor |
|----------------|------------------|-----------------------------------|
| 1 | M S Plate | STEEL AUTHORITY OF INDIA LTD |
| | | KIRTANLAL INTERNATIONAL DM CC |
| | | INDU STEEL BELGIUM |
| | | DILLINGER-GTS VENTES |
| | | ESSAR STEELS LIMITED |
| | | UNION STAHL GMBH |
| | | SALZGITTER MANNESMANN INTL GMB |
| | | HANGZHOU COGENERATION |
| | | JSW STEEL LIMITED |
| | | DAEWOO INTERNATIONAL CORP. LTD |
| | | WELSPUN CORP LIMITED |
| | | DUFERCO S.A., |
| | | JINDAL STEEL & POWER LIMITED |
| CORUS UK LTD., | | |
| | | |
| 2 | Structural Steel | STEEL AUTHORITY OF INDIA LTD |
| | | BEEKAY STRUCTURAL STEELS |
| | | NANDAN STEELS & POWER LTD. |
| | | MAHAMAYA STEEL INDUSTRIES LIMITED |
| | | RELIABLE SPONGE PVT. LTD. |
| | | JINDAL STEEL & POWER LIMITED |
| | | |
| 3 | Pipe | WUXI SPECIAL STEEL MATERIAL CO |
| | | YANGZHOU LONTRIN STEEL TUBE |
| | | YANGZHOU CHENGDE STEEL PIPE |
| | | PATELS AIRFLOW LIMITED |
| | | HEAVY METAL & TUBES LIMITED, |
| | | ISMT LIMITED., |
| | | |
| | | |
| 4 | Flanges | METAL FORGINGS P. LTD. |

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| | | |
|---|----------------|--------------------------------|
| | | ECHJAY INDUSTRIES PVT LTD |
| | | CHW FORGE PRIVATE LIMITED |
| | | GHAZIABAD ISPAT UDYOG LTD., |
| | | KISAAN STEELS (PVT) LTD., |
| | | THE PUNJAB STEEL WORKS, |
| | | |
| 5 | Gate valve | FOURESS ENGINEERING (I)PVT.LTD |
| | | FLOSTEER ENGINEERS PVT. LTD., |
| | | WEIR BDK VALVES |
| | | NSSL LIMITED |
| | | MICON VALVES (I) PVT. LTD. |
| | | NITON VALVE INDUSTRIES LTD |
| | | SKILT FABRICATORS PVT.LTD, |
| | | LEADER VALVES LIMITED |
| | | K.S.B PUMPS LTD. |
| | | BHARAT HEAVY ELECTRICALS LTD |
| | | |
| 6 | Level Switches | CHEMTROLS INDUSTRIES LTD., |
| | | MAGNETROL INTERNATIONAL, INC. |
| | | LEVCON INSTRUMENTS(P) LTD |
| | | V AUTOMAT AND INSTRUMENTS PVT |
| | | |

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ANNEXURE -IV**(A) DATA SHEET FOR LEVEL INDICATOR**

| S.NO. | COM PONENT | DESCRIPTION |
|-------|------------------------------------|---------------------------------|
| 1 | Type | Float and Dial Type Level Gauge |
| 2 | Float Material | CS |
| 3 | Guide Cable | CS |
| 4 | Float Cable | CS |
| 5 | Spring | CS |
| 6 | Cover | CS |
| 7 | Roller / Pulley and Pulley Housing | CS |
| 8 | Scale Board | Aluminium, P.U. Painted |
| 9 | Pointer and Graduations | Aluminium and S.S. |
| 10 | Accuracy | ± 5 mm |
| 11 | Range | To suit tank size |
| 12 | Quantity | One (1) number per tank |

NOTE: For other components, the material shall be intimated to successful bidder by BHEL during detail engineering for which no commercial implication shall be entertained by BHEL. Suitable mechanism shall be provided by the bidder to minimize air ingress into the tank.

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(B) DATA SHEET FOR PLATES & STRUCTURAL STEEL

| | | | |
|---|------------------------------|---|---|
| 1.0 | Make | : | As indicated in the vendor list |
| 2.0 | Quantity of Structural Steel | : | As per approved BOQ |
| A.0 M S Plate | | | |
| 1.0 | Material | : | IS:2062, Gr. A |
| 2.0 | Width | : | To be informed to successful bidder during detail engineering stage |
| 3.0 | Length | : | To be informed to successful bidder during detail engineering stage |
| 4.0 | Thickness (minimum) | : | 6 mm in case of shell and roof plate, 6mm in case of bottom plate and 10 mm bottom most shell course. |
| 5.0 | Chemical Composition | : | As per IS:2062 |
| 6.0 | Mechanical Composition | : | As per IS:2062 |
| 7.0 | Inspection & Testing | : | As per approved ICL/QAP |
| B.0 Angle, Channel, Beam, Bar and Flat | | | |
| 1.0 | Material | : | As per IS:2062, Grade-A |
| 2.0 | Size | : | As per IS Structural Hand Book |

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ANNEXURE – V**SPECIFIC CONFIRMATIONS FROM BIDDERS**

| S. No. | DESCRIPTION | REPLY / COMMENTS BY BIDDER |
|---------------|--|-----------------------------------|
| 1 | Tank fabrication, erection and commissioning are not in bidders scope. However, bidder to furnish recommended erection and commissioning procedure along with drawing / documents to facilitate Erection and Commissioning of Tank. Bidder to confirm. | CONFIRMED / NOT CONFIRMED |
| 2 | Bidder to note that loading data & anchor bolt details shall be provided by bidder within two weeks' time from the LOI. Bidder to confirm. | CONFIRMED / NOT CONFIRMED |
| 3 | Bidders to note that minimum inspection check requirement are indicated in the Technical Specification for the following items. 1) Plates 2) Valves 3) Pre-fabricated plates, Pipes and Fittings and Structural Steel 4) Level Switches and Level Gauges / Indicators. Any changes made by customer on the same during detail engineering will not have any commercial implication. Further, QAP/CL required for balance items (if any) shall be submitted by bidder during detail engineering for customer approval. Bidder to confirm. | CONFIRMED / NOT CONFIRMED |
| 5 | Bidder to note that erection and commissioning spares for the package are deemed to included in bidder' scope. Bidder to confirm. | CONFIRMED / NOT CONFIRMED |

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ANNEXURE – VII

RECOMMENDED SPARES FOR 3 YEARS OF NORMAL OPERATION

| S.No. | Item Description | Quantity |
|-------|------------------|----------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

SIGNATURE : _____
NAME : _____
DESIGNATION : _____
COMPANY : _____
DATE : _____

COMPANY SEAL

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ANNEXURE – VIII

CHECK LIST TO BE SUBMITTED BY THE BIDDER

| S.No. | ITEM DESCRIPTION | YES/NO |
|-------|--|--------|
| 01 | Documents submitted duly filled up with bidder's signature & stamp. a) Signed and stamped copy of Datasheet(Annexure-I) and Sketch. b) Tentative GA drawing c) Startup & Commissioning Spares | |
| 02 | Specific confirmation sheet. | |
| 03 | Un-priced bid clearly indicating "Quoted" or "Not Quoted" against each row & column. | |
| 04 | The list of recommended Spares considered is also enclosed with the un-priced bid. | |

Pls. note that all documents shall be submitted even though they may not be applicable. Under such circumstance, it shall be clearly mentioned across such schedules that these are not applicable.

SIGNATURE: _____

NAME : _____

DESIGNATION: _____

COM PANY: _____

DATE: _____

COM PANY SEAL

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ANNEXURE – IX

PRICE BID FORM AT FOR
SUPPLY OF 2 NOS. OF 2000M³ FIRE WATER STORAGE TANKS
PROJECT- 2 x 250 M W UNIT # 8 & 9, BARAUNI-TPS, BEGUSARAI

| Sl. No. | Description | Qty. | Unit | PRICE (Refer notes) | |
|----------|--|------|--------|-------------------------|----------------------|
| | | | | Unit Price (Rs.) | Total Price (Rs.) |
| A | MAIN BID | | | | |
| 1 | Price for supply of material required for 2 nos. of 2000 m ³ Fire water storage tanks as per clause no. 3.0 of this specification | 1 | Lot | | |
| 2 | Per diem rate for the supervision of Fabrication, erection & commissioning, inspection & testing and handing over of the tanks. | 80 | Days | | |
| 3 | Travel expenses (inclusive of all other charges like visa fee (if applicable), insurance etc) from / to vendor works to site for Engineer per visit for supervision of Fabrication, erection & commissioning, inspection & testing and handing over of the tanks | 5 | Visits | | |
| B | OPTIONAL BID | | | | |
| 4 | 3 Years operational spares(Detailed list with individual prices to be furnished) | 1 | set | | |

NOTES:

- Bidder to quote strictly as per BHEL's specification requirements
- Bidder to note that the complete supply of the package (Refer Sl. No. 1) is a LUMP SUM Turn-Key Order. Any additional claim on any account, after placement of order will not be entertained under any circumstances.
- Offer will be evaluated based on total price for Sl. No. A.1, A.2 & A.3 of price format.
- Bidder to quote the base rates only. Applicable taxes and duties to be indicated separately. (As per Split Value format Vol IIIB of price formats). Indian bidders to quote in Indian Rupees & Foreign bidders to quote in US\$.
- For the purpose of tender, total no of 80man days to be covered in 5 visits have been considered. However, either or both of the number of man days or number of visits may change on either side based on the actual site requirement. Bidder to note that payment against Sl. No.2 & 3 above shall be made as per the actual number of visits and man days required for the supervision of the complete E&C activities as per these diem rates.

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BIDDER'S SIGNATURE
 NAME:
 DATE
 COMPANY SEAL

| Prepared by | Checked By | Approved by | Date |
|-------------|--------------------|-----------------|----------|
| S Surendra | M Siva Prasad Babu | P. Sudheer Babu | 23.04.13 |

Ref.
Doc

