OIL INDIA LIMITED
(A Government of India Enterprises)
PO : Duliajan – 786602
Assam (India)
TELEPHONE NO. (91-374) 2808719
FAX NO: (91-374) 2800533
Email: simanta_hazari@oilindia.in ; erp_mm@oilindia.in

FORWARDING LETTER

Tender No.	**: SDI9746P14/P3 Date 03.05.2013**
Tender Fee	**: Rs 1,000.00**
Bid Security Amount	**: Rs 92,000.00**
Bidding Type	**: SINGLE STAGE TWO BID SYSTEM**
Bid Closing on	**: As mentioned in the e-portal**
Bid Opening on	**: -do-**
Performance Security	**: Applicable**
Integrity Pact	**: Applicable**

OIL invites Bids for **Supply of Fire Water Browser and Chassis for the same** through its e-Procurement site under **SINGLE STAGE TWO BID SYSTEM**. The bidding documents and other terms and conditions are available at Booklet No. MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders. The prescribed Bid Forms for submission of bids are available in the Technical RFx -> External Area - > Tender Documents

The general details of tender can be viewed by opening the RFx [Tender] under RFx and Auctions.. The details of items tendered can be found in the Item Data and details uploaded under Technical RFX.

The tender will be governed by:

a) "General Terms & Conditions" for e-Procurement as per Booklet No. MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders and Amendment No. 1 to General Terms and Conditions for Indigenous E-Tender.

b) Technical specifications and Quantity as per **Annexure – 1A**.

c) The prescribed Bid Forms for submission of bids are available in the Technical RFx -> External Area - > Tender Documents.

d) In the event of receipt of only a single offer against the tender within B.C. date, OIL reserves the right to extend the B.C. date as deemed fit by the Company. During the extended period, the bidders who have already submitted the bids on or before the original B.C. date, shall not be permitted to revise their quotation.

e) Any sum of money due and payable to the contractor (including Security Deposit refundable to them) under this or any other contract may be appropriated by Oil India

Limited and set-off against any claim of Oil India Limited (or such other person or persons contracting through Oil India Limited) for payment of sum of money arising out of this contract or under any other contract made by the contractor with Oil India Limited (or such other person or persons contracting through Oil India Limited).

f) Bidder are advised to fill up the Technical bid check list (**Annexure EEE**) and Response sheet (**Annexure FFF**) given in MS excel format in Technical RFx -> External Area - > Tender Documents. The above filled up document to be uploaded in the Technical RFX Response.

Special Note:

1.0 General Qualification Criteria:

In addition to the general BRC/BEC, following criteria on Bidders' Experience and their financial capabilities shall be considered **(documentary evidence to be provided along with the bid in** Technical RFx -> External Area - > Tender Documents**)** as on the Bid Closing Date:

a) Annual financial turnover of the firm in any of the last 3 financial years or current financial year should not be less than **Rs. 91.75 Lakhs.**

2.0 Application showing full address/email address with Tender Fee (Non-refundable) of Rs. 1,000.00 in favour of M/s Oil India Limited and payable at Duliajan is to be sent to Head-Materials, Oil India Limited, P.O. Duliajan, Assam-786602. Application shall be accepted only upto one week prior to bid closing date (or as amended in e-portal). The envelope containing the application for participation should clearly indicate "REQUEST FOR ISSUE OF USER ID AND PASSWORD FOR E TENDER NO …" for easy identification and timely issue of user ID and password. On receipt of requisite tender fee, USER_ID and initial PASSWORD will be communicated to the bidder (through e-mail) and will be allowed to participate in the tender through OIL's e- Procurement portal. No physical tender documents will be provided. Details of NIT can be viewed using "Guest Login" provided in the e-Procurement portal. The link to e-Procurement portal has been also provided through OIL's web site www.oil-india.com.

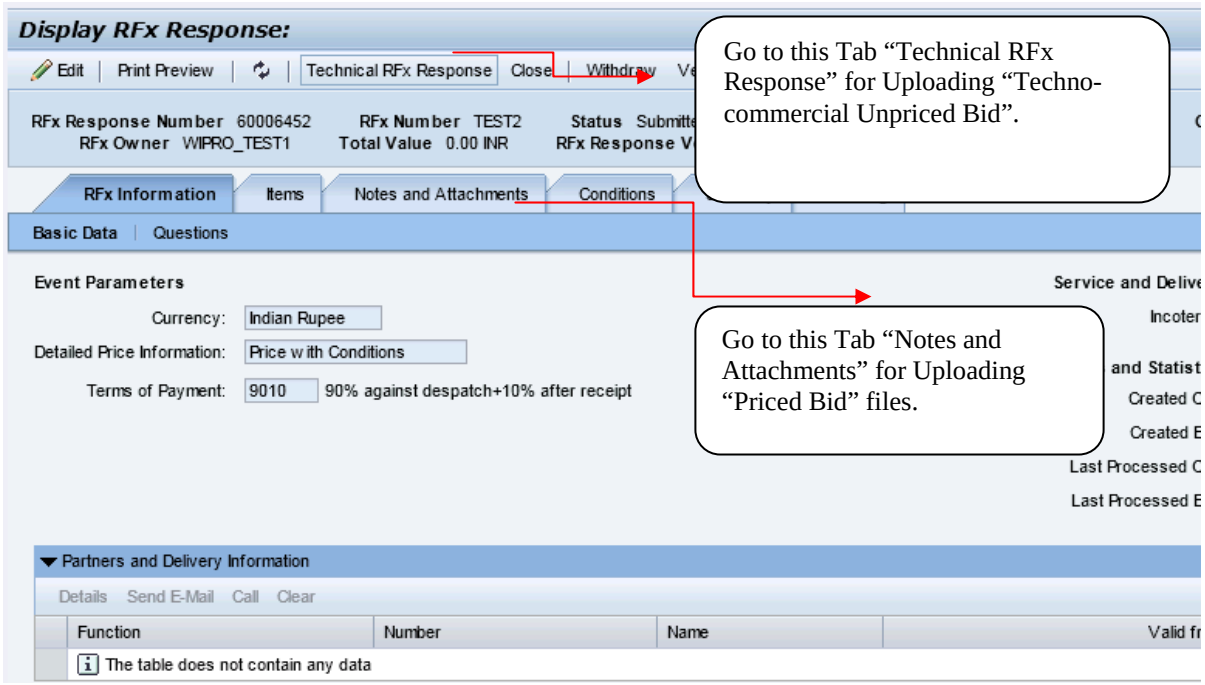
NOTE: PSUs and SSI units are provided tender documents Free of Cost (as per govt guidelines), however they have to apply to OIL's designated office to issue the tender documents before the last date of sale of tender document mentioned in the tender.

3.0 The tender is invited under SINGLE STAGE-TWO BID SYSTEM. The bidders are required to submit both the "TECHNO-COMMERCIAL UNPRICED BID" and "PRICED BID" through electronic format in the OIL's e-Tender portal within the Bid Closing Date and Time stipulated in the e-Tender.

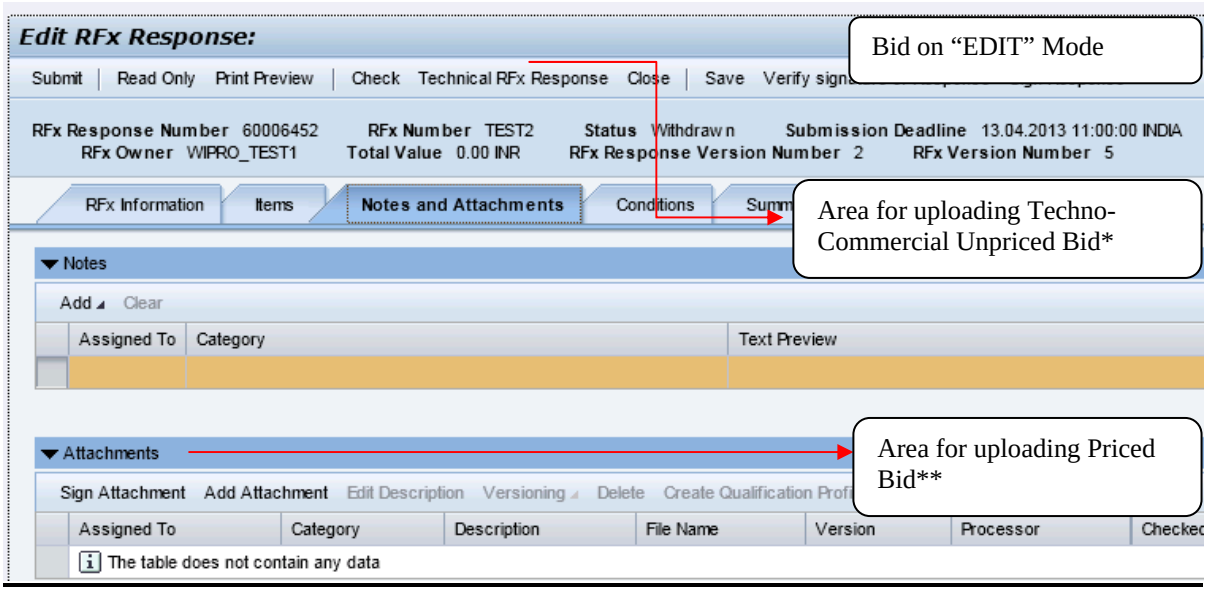
3.1 Please ensure that Technical Bid / all technical related documents related to the tender are uploaded in the Technical RFx Response-> User - > Technical Bid only**.** The "**TECHNO-COMMERCIAL UNPRICED BID**" shall contain all techno-commercial details **except the prices**. **Please note that no price details should be uploaded in** Technical RFx Response**.**

3.2 The "**PRICE BID**" must contain the price schedule and the bidder's commercial terms and conditions.**The prices of the items should be quoted in "Conditions Tab". Details of prices as per Bid format / Commercial bid can be uploaded as Attachment under the attachment option under "Notes & Attachments".**

3.3 A screen shot in this regard is given below. Offer not complying with above submission procedure will be rejected as per Bid Rejection Criteria mentioned in Annexure-CCC.



On "EDIT" Mode- The following screen will appear. Bidders are advised to Upload "Techno-Commercial Unpriced Bid" and "Priced Bid" in the places as indicated above:



Note :

* The "Techno-Commercial Unpriced Bid" shall contain all techno-commercial details **except the prices**.

** The "Price bid" must contain the price schedule and the bidder's commercial terms and conditions. For uploading Price Bid, first click on Sign Attachment, a browser window will open, select the file from the PC and click on Sign to sign the Sign. On Signing a new file with extension .SSIG will be created. Close that window. Next click on Add Atachment, a browser window will open, select the .SSIG signed file from the PC and name the file under Description, Assigned to General Data and clock on OK to save the File.

4.0 Please note that all tender forms and supporting documents are to be submitted through OIL's e-Procurement site only except following documents which are to be submitted manually in sealed envelope super scribed with **Tender no.** and **Due date** to **Head Materials, Materials Department, Oil India Limited, Duliajan - 786602, Assam** on or before the Bid Closing Date and Time mentioned in the Tender.

a) Original Bid Security
b) Detailed Catalogue (if any)
c) Any other document required to be submitted in original as per tender requirement

All documents submitted in physical form should be signed on all pages by the authorised signatory of the bidder and to be submitted in triplicate.

5.0 Bidders are requested to examine all instructions, forms, terms and specifications in the bid. Failure to furnish all information required as per the NIT or submission of offers not substantially responsive to the bid in every respect will be at the bidders risk and may result in rejection of its offer without seeking any clarifications.

6.0 **All the Bids must be Digitally Signed using "Class 3" digital certificate with Organisation's name *(e-commerce application)* as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India. The bid signed using other than "Class 3 with Organisation's Name" digital certificate, will be rejected.**

7.0 Bidders must ensure that their bid is uploaded in the system before the tender closing date and time. Also, they must ensure that above documents which are to be submitted in a sealed envelope are also submitted at the above mentioned address before the bid closing date and time failing which the offer shall be rejected.

8.0 Bid must be submitted electronically only through OIL's e-procurement portal. Bid submitted in any other form will be rejected.

9.0 **SINGLE STAGE TWO BID SYSTEM** shall be followed for this tender and only the PRICED-BIDS of the bidders whose offers are commercially and technically acceptable shall be opened for further evaluation.

10.0 **a) The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure-DDD of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.**

b) The name of the OIL's Independent External Monitors at present are as under:

i) SHRI N. GOPLASWAMI, I.A.S. (Retd.),
Former Chief Election Commissioner of India
E-mail Id : gopalaswamin@gmail.com

ii) **SHRI RAMESH CHANDRA AGARWAL, IPS (Retd.)**
Former Director General of Police
E-mail Id : rcagarwal@rediffmail.com

11.0 The tender shall be governed by the Bid Rejection & Bid Rejection Criteria given in enclosed **Annexure-CCC**. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria (as per **Annexure-CCC**) contradict the Clauses of the tender and / or "General Terms & Conditions" as per Booklet No. MM/LOCAL/E-01/2005 for E-procurement (LCB Tenders) elsewhere, those in the BEC / BRC shall prevail.

12.0 To ascertain the substantial responsiveness of the bid OIL reserves the right to ask the bidder for clarification in respect of clauses covered under BRC also and such clarifications fulfilling the BRC clauses in toto must be received on or before the deadline given by the company, failing which the offer will be summarily rejected.

13.0 Please do refer the User Manual provided on the portal on the procedure How to create Response for submitting offer.

NOTE:

1. Bidders should submit their bids explicitly mentioning compliance / non compliance to all the NIT terms and conditions.

Yours Faithfully

Sd-
(S HAZARI)
DY. MANAGER MATERIALS (ID)
FOR HEAD-MATERIALS

BID REJECTION CRITERIA (BRC) / BID EVALUATION CRITERIA (BEC)

The following BRC/BEC will govern the evaluation of the bids received against this tender. Bids that do not comply with stipulated BRC/BEC in full will be treated as non responsive and such bids shall prima-facie be rejected. Bid evaluation will be done only for those bids that pass through the "Bid Rejection Criteria" as stipulated in this document.

Other terms and conditions of the tender shall be as per General Terms and Conditions vide annexure- MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria (BRC / BEC) contradict the Clauses of the tender or MM/LOCAL/E-01/2005 elsewhere, those in the BRC / BEC shall prevail.

Criteria	**Complied / Not Complied. (Remarks if any)**
1.0 BID REJECTION CRITERIA (BRC): **(A) Technical :** The bid shall conform generally to the specifications and terms and conditions given in this bid document. Bids shall be rejected in case the offered product does not conform to required parameters stipulated in the technical specifications. Notwithstanding the general conformity of the bids to the stipulated specifications, the following requirements will have to be particularly met by the Bidders without which the same will be considered as non-responsive and rejected. 1.0 The offer should be for Fire Water Bowser meeting the scope of work specifications mentioned in the tender. 2.0 Bidder's Qualification The bidder shall be an Original Equipment Manufacturer (OEM) / Fabricator / Assembler of Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender. Notary attested copy of "certificate of incorporation" of the firm shall be furnished along with the bid. OR The bidder shall be an authorized dealer/distributor in India for the Original Equipment Manufacturer (OEM) / Fabricator / Assembler of Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender. Notary attested copy of "certificate of incorporation" of "Original Equipment Manufacturer (OEM) / Fabricator / Assembler" shall be furnished along with the bid. **3.0 Bidder's Experience** 3.1 In case, the bidder is an Original Equipment Manufacturer (OEM) / Fabricator / Assembler of the offered Fire Water Bowser, the following criteria shall be met by the Bidder:	

3.1.1 The bidder should have been in the business of fabricating / assembling Including commissioning of Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender at least 3 (Three) years as on the Bid Closing date. Necessary Notary attested document {i.e. Copy of Audited Balance sheet for last 3 (Three) years} should be enclosed along with techno-commercial bid to ascertain the same.

3.1.2 The bidder should have the experience of successful execution of supply of at least 2 (two) nos. Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender or in combination of Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender on minimum 16 Tons chassis capacity or above in the last 10 (Ten) years as on the Bid Closing date. Necessary notary attested proof of Purchase Order and Commissioning report /Performance report should be enclosed along with bid to ascertain the same.

The bidder shall submit the details of the previous supply of such Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender in a tabular format as shown below -

(a) Sl. No.
(b) Client/ Customer's Name and address,phone and fax number & contact e-mail id
(c) Order No/ Contract No
(d) Date of Order
(e) Fire Tender (Bowser/Nurser/ Foam/water/DCP) Specification, Make, Model & Quantity supplied
(f) Order Completion Date
(g) Proof of Execution of supply / P. O. and commissioning report /Performance report

However, the parties who had already successfully supplied at least one Fire Water Bowser/Foam Nurser / Water Tender/ Foam Tender/ DCP Tender to Oil India Limited in the past during last 10 (ten) years as on bid closing date are exempted from submitting the proof.

3.2 In case the Bidder is an authorized dealer/distributor of OEM / Fabricator / Assembler of Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender, the following criteria shall be met by the Bidder:

3.2.1 The Bidder shall confirm supply of Fire Water Bowser from Original equipment manufacturer (OEM) / Fabricator /Assembler who meets the qualification criteria stipulated under clauses 3.1.1 & 3.1.2 above. Necessary notary attested documents as mentioned under clauses 3.1.1 & 3.1.2 above along with the bid failing which offer will be rejected.

3.2.2 In addition, the bidder shall have the experience of successful execution of supply & commissioning of at least 1(one) number Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender as described under clause 3.1.2 in the last 10 (ten) years preceding the bid closing date of this tender.

The bidder shall submit the details of the previous supply of such Fire Water Bowser/ Foam Nurser / Water Tender/ Foam Tender/ DCP Tender in a tabular

format as shown below -

(a) Sl. No.
(b) Client/ Customer's Name and address,phone and fax number & contact e-mail id
(c) Order No/ Contract No
(d) Date of Order
(e) Fire Tender (Bowser/Nurser/ Foam/water/DCP) Specification, Make, Model & Quantity supplied
(f) Order Completion Date
(g) Proof of Execution of supply / P. O. and commissioning report /Performance report

3.2.3 Bidder shall enclose a Certificate in original in support of authorization of dealership/distributorship with back up Warranty & Guarantee from the "Original Equipment Manufacturer (OEM) / Fabricator / Assembler" to quote for this tender. The bid shall be rejected in case of any change of the proposed "Original Equipment Manufacturer (OEM) / Fabricator / Assembler" after submission of the bid (except merger, takeover of the "OEM/Fabricator/ Assembler" Company etc) by authorized dealer/distributor of the "Original Equipment Manufacturer (OEM) / Fabricator / Assembler".

4.0 The Fire Water Bowser should be of "Right Hand Drive unit" (Steering on right hand side of unit). Left Hand Drive unit will not be acceptable.

5.0 The bidder shall quote the Engine power with emission norms of minimum BS-III/Euro III.

6.0 The bidder shall have single point responsibility for complete package.

7.0 Offer should be complete with stage-wise inspections, supply, commissioning and training.

(B) <u>Commercial</u> :

i). Bids are invited under “Single Stage Two Bid System”. Bidders have to submit both the “Unpriced Bids” and “Priced Bids through electronic form in the OIL’s e-Tender portal within the bid Closing date and time stipulated in the e-tender. The Unpriced bid is to be submitted as per scope of works and Technical specification of the tender and the priced bid as per the online Commercial bid format. For details of submission procedure, please refer relevant para of General Terms and Conditions vide MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders. Any offer not complying with the above shall be rejected straightway.

ii). <u>BID SECURITY:</u>

Bid security of Rs 92,000.00 shall be submitted manually in sealed envelope superscribed with Tender no. and Bid Closing date to Head Materials, Materials Department, Oil India Limited, Duliajan- 786602, Assam on or before the Bid Closing Date and Time mentioned in the Tender. <u>If bid security in ORIGINAL of above mentioned amount is not received within bid closing date and time , the bid submitted through electronic form will be rejected without any further consideration.</u> For

exemption for submission of Bid Security, please refer Clause No. 8.8 of General Terms and Conditions vide MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders. **The Bid Security shall be valid upto 30.06.2014.**

iii). **PERFORMANCE BANK GUARANTEE:**

Successful bidder will be required to furnish a Performance Bank Guarantee @10% of the order value.

For exemption for submission of Performance Bank Guarantee, please refer Clause No. 9.12 of General Terms and Conditions vide MM/LOCAL/E-01/2005 for E-Procurement LCB Tenders. The Performance Bank Guarantee for capital nature items like plant and machinery etc. shall be valid for 12 months from the date of commissioning or 18 months from the date of despatch whichever concludes earlier. However, for consumables like chemicals, cement, tubular etc. the Performance Bank Guarantee shall be valid for 12 months from the date of despatch.

iv). *The Bank Guarantee should be allowed to be encashed at all branches within India*.

v). Validity of the bid shall be minimum 120 days from the Bid Closing Date.

vi). The prices offered will have to be firm through delivery and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and rejected.

vii). Bids received after the bid closing date and time will be rejected. Similarly, modifications to bids received after the bid closing date & time will not be considered.

viii). All the Bids must be Digitally Signed using "Class 3" digital certificate *(e-commerce application)* as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India. The bid signed using other than "Class 3" digital certificate, will be rejected.

ix). **Price should be maintained in the "online price schedule" only. The price submitted other than the "online price schedule" shall not be considered.**

x). **INTEGRITY PACT:**

OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure DDD of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be

rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.	
2.0 BID EVALUATION CRITERIA (BEC): The bids conforming to the technical specifications, terms and conditions stipulated in the tender and considered to be responsive after subjecting to the Bid Rejection Criteria as well as verification of original of any or all documents/ documentary evidences pertaining to BRC, will be considered for further evaluation as per the Bid Evaluation Criteria given below: **(A) TECHNICAL :** (1) The manufactured product should be strictly as per OIL's tender specification. **(B) COMMERCIAL :** i). To evaluate the inter-se-ranking of the offers, Assam Entry Tax on purchase value will be loaded as per prevailing Govt. of Assam guidelines as applicable on bid closing date. Bidders may check this with the appropriate authority while submitting their offer. ii). To ascertain the substantial responsiveness of the bid OIL reserves the right to ask the bidder for clarification in respect of clauses covered under BRC also and such clarifications fulfilling the BRC clauses in to must be received on or before the deadline given by the company, failing which the offer will be summarily rejected. iii) Priced bids of only those bidders will be opened whose offers are found technically acceptable. The technical acceptable bidders will be informed before opening of the (priced Bid)	

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NOTE:

Bidders should submit their bids explicitly mentioning compliance / non compliance to all the NIT terms and conditions.

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ITEM DESCRIPTION

SPECIFICATION FOR "FIRE WATER BOWSER" WITH CHASSIS & ACCESSORIES
Part - B Fabrication of "FIRE WATER BOWSER & ACCESSORIES"

1.0 SCOPE:

1.1 This specification covers the requirements regarding design, procurement, fabrication, testing and supply of "Fire Water Bowser" to be used for fire fighting. The scope of supply shall be inclusive of, but not limited to the following.

1.1.1 Chassis
1.1.2 A centrifugal type fire water pump of 3200 LPM discharge capacity at 7 Kg/cm2.
1.1.3 Power take-off units for driving the water pump.
1.1.4 Water tank of capacity 12,000 Litres capacity.
1.1.5 Water cum Foam monitor & suitable Jet Ratio Controller Pump (JRCP) along with all fittings (750 to 500 US GPM with variable nozzle with Jet, Spray & Fog Pattern)
1.1.6 Body Fabrication/ Works
1.1.7 Control Panel
1.1.8 Accessories and spares
1.1.9 Piping, necessary controls etc. Complete

1.2 The chassis for the "Fire Water Bowser" shall be procured & supplied by the vendor. The vendor shall be responsible for supplying all equipment / accessories and properly fixing them on the chassis as described in this specification. Other details and requirements which are not covered under this specification, but may be necessary to complete the "Fire Water Bowser" and/or to fulfil the operation/performance requirement shall be provided by the vendor, who will be responsible for the design and construction of the complete appliance to the full satisfaction of the owner.

2.0 General Requirements

2.1 The "Fire Water Bowser" including all accessories shall be designed, manufactured, tested etc. as per relevant Indian, International Standards, wherever applicable and as per sound engineering practice.
2.2 All the equipment and accessories shall be fixed on the appliance in a compact and neat manner and shall be so placed that each part is easily and readily accessible for use and maintenance. The centre of gravity shall be kept as low as possible.
2.3 The controls on control panel shall be so arranged that one man can operate all the controls.
2.4 The vendor shall provide a detailed description of the "Fire Water Bowser", a list of equipment to be furnished, and other construction and performance details to which the "Fire Water Bowser" shall conform.
2.5 The detailed description of the "Fire Water Bowser" shall include, but shall not be limited to, estimated weight, wheelbase, turning clearance radius, principal dimensions, transmission, and axle ratios.
2.6 Responsibility for the "Fire Water Bowser" and equipment shall remain with the vendor until they are accepted by the OIL.
2.7 On initial delivery of the "Fire Water Bowser", the vendor shall supply a qualified representative to demonstrate the "Fire Water Bowser" and provide initial instructions to

representatives of the OIL regarding the operation, care, and maintenance of the "Fire Water Bowser" and equipment supplied.

2.8 INSPECTION & TESTING:

2.8.1 Third-Party Certification of Test Results:-The results of tests to be certified by an independent third-party certification organization.
2.8.2 Prior to dispatch of vehicle from vendor's shop Second & Final Stage inspection & testing shall be carried out by the vendor to the complete satisfaction of third party inspection agency as mentioned below :-

First stage
(Chassis Inspection) The supplier (successful bidder) shall facilitate inspection for all the trucks in one lot by OIL's Engineer (Without involvement of Third Party Inspection Agency) for inspection of the Chassis & other materials to be used for fabrication of the Fire Water Bowser.
Second stage Construction of under- structure, Water tank. Documents related to Quality of material of tanks and thickness of tank's plates, radiography inspected and stamped by recognised third party inspector shall be produced at the time of Second stage inspection.
Placement of tank, fittings, lockers, pump, quality of fabrication.
(Placement of tank etc shall be done after First Stage inspection)
Final stage Performance test of all the systems, pump, primer, PTO, load & stability test of Fire Water Bowser, testing of equipments / tools & appliances, checking of anti-corrosion treatment / painting, electrical fittings, checking of all relevant documents etc.
(Before final painting)

2.8.3 Stability: Stability of appliance will be such that when fully equipped & laden, if the surface on which the appliance stands is titled to either side at an angle of 27º from horizontal it will not overturn.
2.8.4 Gradient: The vehicle will be tested on a gradient test ramp at an angle of 1:4. as per BIS.
2.8.5 Endurance Test: The pump will be tested for a continuous period of four hours & water will not be replenished during this test, engine will not show signs of overheating. During this test, the temperature of engine should not exceed the rated temperature and that of lubricating oil 79oC.
2.8.6 Priming Test: The priming will be tested as per the latest standards & the system will be subjected to a test at a suction of vertical lift of 7 Mtrs measured from water level to the centre of suction eye of the pump at a rate of not less than 30 seconds.
2.8.7 Articulation Test: The vehicles shall be tested for articulation & will not show any signs of stress during this test. The clearance in the wheel wells will be checked for tolerances.
2.8.8 Hydraulic Testing: All the piping will be subjected to hydraulic test pressure of 18 Kg/cm2 for a period of 2 hrs. The pump casing will be subjected to a hydraulic test pressure of a minimum 21 Kg/cm2.
2.8.9 Shower Test: After completion of the fabrication, the vehicle will be subjected to shower test as per the norms laid down under BIS. The appliance will not show any signs of leakages during this test.
2.8.10 Road Test: Vehicle will be tested for braking, acceleration & top speed by the inspecting officers.
2.8.11 All consumable (e.g. diesel fuel, engine lube oil, water etc.) shall be arranged by vendor at his own cost. Vendor shall arrange all facilities to carry out inspection & testing.
2.8.12 OIL representatives shall have access at all reasonable times to vendor's works where the appliance or its accessories are being fabricated and tested.
2.8.13 Drawings (i.e. Skelton Structure, Water Tank drawing, General layout drawing, Load distribution chart, Electric circuit diagram etc.) & Quality assurance Plan (QAP) shall be approved by the Oil India Ltd. No supply shall be accepted unless drawings & Quality assurance Plan (QAP) are finally approved by the Oil India Ltd.

2.8.14 Third party Inspection agency shall carryout the Inspection based on approved drawings & approved QAP.
2.8.15 The inspection release note of Third part Inspection agency shall clearly stipulate that Material /equipment have been inspected as per approved drawings & approved QAP.
2.8.16 All the tests/inspection for vehicle shall be witnessed by Oil India Ltd. representatives along with third party inspection agency.

2.8.17 FOR WATER TANK:

2.8.17.1 Review of mill test certificates and Co-relation of raw materials before start of fabrication.
2.8.17.2 DP test of all welds of water tank.
2.8.17.3 DP test of all nozzles to shell (reinforcement pads) for water tank.
2.8.17.4 Visual and dimensional check of water tank before mounting on chassis.
2.8.17.5 Hydraulic test of completed water tank. Hydraulic test shall be carried out at 0.5 KG/CM2 (G) at top of tanks. Pressure shall be held for the duration to permit complete inspection.

2.8.18 FOR PIPING :

2.8.18.1 Review of mill test certificates and co-relation of raw materials (for pipes, fittings, valves etc) before start of fabrication.
2.8.18.2 DP test of butt welds and final run.
2.8.18.3 DP test of all flanges to pipe welds.
2.8.18.4 Radiographic examination of 10% butt welds (selected at random).
2.8.18.5 Hydraulic test of piping installation on chassis.
2.8.18.6 Visual and dimensional check.

2.8.19 FOR WATER PUMP :

2.8.19.1 Review of mill test certificates for material of casing, impeller and shaft.
2.8.19.2 Hydraulic testing of casing.
2.8.19.3 Performance testing of pump to establish the performance curve at rated speed and power absorbed at rated conditions. Parameters at maximum & minimum allowable speeds shall be evaluated to establish performance curves at these speeds.

2.8.20 POWER INPUT AT RATED CONDITIONS :

2.8.20.1 Four-hour mechanical run test shall also be carried out.
2.8.20.2 Performance test shall be done on test bench with shop driver.
2.8.20.3 Four hour run test at rated conditions for verifying performance.
2.8.20.4 NPSH test.
2.8.20.5 Visual and dimensional check.
2.8.20.6 Performance test of auto water ring primer at rated conditions.

NOTE: The above inspections & tests shall be carried out at pump manufacturer's shop prior to dispatch. Third party inspection agency shall review the documents for the tests carried out by the manufacturer.

2.8.21 FOR PTO UNITS :

2.8.21.1 All standard tests as specified by the PTO supplier.

2.8.22 FOR FOAM CUM WATER MONITOR :

2.8.22.1 Availability of the specified flow and pressure of water and Foam solution at the base flange for the monitor.
2.8.22.2 Review of mill certificates for material.
2.8.22.3 Hydro-testing of monitor at 25 KG/CM2 pressure
2.8.22.4 Horizontal & vertical movements of monitor.
2.8.22.5 Spray/jet pattern of the monitor.
2.8.22.6 Foam expansion ratio of monitor.
2.8.22.7 Water & Foam throws.
2.8.22.8 Workmanship & painting.

2.8.23 FOR "Fire Water Bowser" (DURING FABRICATION & ASSEMBLY) :

2.8.23.1 Review of mill test certificates and co-relation of raw materials used for structure & body fabrication before start of fabrication.
2.8.23.2 Inspection of framework for soundness of welding and fitment of chassis and dimensional check.
2.8.23.3 Inspection for proper installation of pumps, tanks, piping with supports and their dimensional checks.
2.8.23.4 Visual inspection of raw materials for framework, cladding, flooring etc.

2.8.24 FOR COMPLETED VEHICLE :

2.8.24.1 Determination of actual payload on the chassis so as to confirm payload given by vendor in the bid. For determining actual payload all tanks shall be full, all removable accessories will be on vehicle with a crew of six.
2.8.24.2 Static stability of the fully laden vehicle shall be checked to ensure that no overturning occurs till vehicle attains tilting of 35 ± 1 degrees from horizontal.
2.8.24.3 Road test of the fully laden vehicle shall be carried out to ensure the maximum speed, acceleration, turning radius, breaking ability as specified by chassis manufacture.
2.8.24.4 Dimensional check of completed vehicle. The overall height shall be measured both when vehicle is laden with full payload and un-laden.

2.8.24.5 Test to confirm functional capability of the "Fire Water Bowser" shall be carried out:
2.8.24.5.1 Running of water pump at rated conditions while discharging water through various outlets individually and in combination.
2.8.24.5.2 The pump shall be run for minimum 4 hours continuously at rated conditions.
2.8.24.5.3 Functional testing of each water outlet (hose point / hose reel) individually and in combination.
2.8.24.5.4 Performance tests of Foam-cum water monitor.
2.8.24.5.5 Performance tests of Foam-cum-water monitor with water through hydrant inlets.
2.8.24.5.6 Functional testing of each hose outlet individually and in combination.
2.8.24.5.7 Vibrations at rotary parts

2.9 Personnel Protection :

2.9.1 Electrical insulation or isolation shall be provided where necessary in order to prevent electrical shock from onboard electrical systems.
2.9.2 Vehicular workmanship shall ensure an operating environment free of accessible sharp projections and edges.
2.9.3 Safety-related (caution, warning, danger) signs shall meet the requirements of job.

2.10 Controls and Instructions :

2.10.1 Illumination shall be provided for controls, switches, instruction plates, gauges, and instruments necessary for the operation of the "Fire Water Bowser" and the equipment provided on it.
2.10.2 All required signs, plates, and labels shall be permanent in nature and securely attached
2.10.3 No gauge or visual display shall be more than 84 in. (2.1 m) above the level where the operator stands to read the instrument.

2.11 Vehicle Stability :

2.11.1 When the "Fire Water Bowser" is loaded to its maximum in-service weight, the height of the vehicle's center of gravity shall not exceed the chassis manufacturer's maximum limit.

2.12 Weight Distribution :

2.12.1 When the "Fire Water Bowser" is loaded to its maximum in-service weight, the front-to-rear weight distribution of the "Fire Water Bowser" as defined shall be within the limits set by the chassis manufacturer.
2.12.2 The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer under full load and all other loading conditions.

2.13 Load Distribution :

2.13.1 Using the information supplied by the OIL, the "Fire Water Bowser" manufacturer shall calculate the load distribution for the "Fire Water Bowser".
2.13.2 The manufacturer shall engineer the "Fire Water Bowser" to comply with the gross axle weight ratings (GAWR), the overall gross vehicle weight rating (GVWR), and the chassis manufacturer's load balance guidelines.

2.14 Fire Water Bowser Performance :

2.14.1 The Fire Water Bowser shall meet all the requirements while stationary on a grade of 6 percent in any direction.

2.15 Roadability :

2.15.1 The Fire Water Bowser, when fully equipped and loaded, shall be capable of the following performance while on dry, paved roads that are in good condition.

2.16 Serviceability :
2.16.1 Where special tools are required for routine service on any component of the Fire Water Bowser, such tools shall be provided with the Fire Water Bowser.

2.17 Road Tests :
2.17.1 Road tests shall be conducted in accordance with this section to verify that the completed Fire Water Bowser is capable of compliance roadability.

2.18 INFORMATION / DOCUMENTS REQUIRED FROM VENDOR :

2.18.1 Any documentation provided with the Fire Water Bowser shall be permitted to be in printed format, electronic format, audiovisual format or a combination thereof.
2.18.2 All drawings & literature shall be kept in Proper folders.
2.18.3 All literature shall be on A-4 size paper and shall be properly laminated.

2.18.4 Each drawing shall be kept in separate pockets in folder. Contents in each pocket shall be labelled properly.

2.18.4.1 AFTER PLACEMENT OF ORDER :

The following documents are required to be submitted in 2 sets and to be approved prior to start of fabrication:

2.18.4.1.1 Flow diagram showing all piping tanks, pumps, valves etc.
2.18.4.1.2 GA & cross sectional drawings, characteristic curves and other details for water pump.
2.18.4.1.3 Internal Drawings for PTO Unit and other technical details.
2.18.4.1.4 Drawings for PTO system to drive pumps from engine.
2.18.4.1.5 Detailed Drawing for Foam-cum water monitor.
2.18.4.1.6 Fabrication drawings & data for water tanks.
2.18.4.1.7 Line diagram for electrical circuits.
2.18.4.1.8 Drawings showing layout of all equipment, lockers, cabin etc.
2.18.4.1.9 QAP incorporating the stipulated inspection and testing requirements.

2.18.4.2 AFTER COMPLETION OF ORDER (4 SETS) :

The manufacturer's record of Fire Water Bowser construction details, including the following Information :

2.18.4.2.1 Owner's name and address (Oil India Ltd., Duliajan, Dibrugarh , Assam.)
2.18.4.2.2 Fire Water Bowser manufacturer, model, and serial number
2.18.4.2.3 Chassis make, model, and serial number.
2.18.4.2.4 GAWR (Gross Axle Weight Rating) of front and rear axles.
2.18.4.2.5 Front tire size and total rated capacity in pounds (kilograms)
2.18.4.2.6 Rear tire size and total rated capacity in pounds (kilograms)
2.18.4.2.7 Chassis weight distribution in pounds (kilograms) with water & manufacturer mounted equipment (front and rear)
2.18.4.2.8 Engine make, model, serial number, rated horsepower and related speed, and governed speed
2.18.4.2.9 Fuel tank capacity
2.18.4.2.10 Battery make, model, and capacity in cold cranking amps (CCA)
2.18.4.2.11 Chassis transmission make, model, and serial number
2.18.4.2.12 Chassis transmission PTO(s) make, model, and gear ratio
2.18.4.2.13 Pump make, model, rated capacity in liters per minute and serial number
2.18.4.2.14 Water tank certified capacity in liters.
2.18.4.2.15 Paint manufacturer and paint number(s)
2.18.4.2.16 As built drawings of Fire Water Bowser
2.18.4.2.17 As built drawings for tanks.
2.18.4.2.18 Flow diagram.
2.18.4.2.19 GA & cross sectional drawings, characteristic curves and other details for water pump
2.18.4.2.20 As built Drawings for Installation of PTO Units.
2.18.4.2.21 As built Drawing for Foam-cum water monitor.
2.18.4.2.22 As built Line diagram for electrical circuits.
2.18.4.2.23 All inspection and testing records for tank, pump, PTO's, piping, valves, monitor etc.
2.18.4.2.24 Operating and instruction manual for the Fire Water Bowser. This should also contain adequate information for all bought out items also.
2.18.4.2.25 Fire pump manufacturer's certification of suction capability
2.18.4.2.26 Fire pump, the pump manufacturer's certification of the hydrostatic test

2.18.4.2.27 Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall "Fire Water Bowser" (with the water full but without personnel, equipment, and hose).

2.18.4.2.28 Operations and Service Documentation :

2.18.4.2.28.1 The vendor shall supply operation and service documentation covering the completed Fire Water Bowser as delivered and accepted.
2.18.4.2.28.2 The documentation shall address at least the inspection, service, and operations of the "Fire Water Bowser" and all major components thereof.

3.0 Water Bowser Equipment :

3.1 Equipment Storage :

3.1.1 A minimum of 20 ft3 (0.6 m3) of enclosed weather-resistant compartmentation meeting the requirements for the storage of equipment.

3.2 Hose Storage :

3.2.1 A minimum hose storage area of 6 ft3 (0.2 m3) for 2½ in. (63 mm) or larger fire hose that meets the requirements.

3.3 Minor Equipment :
3.3.1 Brackets or compartments shall be furnished so as to organize and mount the specified equipment.

3.3.2 Following equipments shall be supplied :

3.3.2.1 One first aid kit
3.3.2.2 One Nos. HDPE Long Spine Boards Stretcher.
3.3.2.3 Two combination spanner wrenches
3.3.2.4 Two hydrant wrench
3.3.2.5 Double female adapter, sized to fit 2½ in. (65 mm) conforming to IS-901/1993- 1 Nos. (In locker)
3.3.2.6 Double male adapter, sized to fit 2½ in. (65 mm) conforming to IS-901/1993- 1 Nos. (In locker)
3.3.2.7 Four Nos. wheel chocks with chain link, mounted in readily accessible locations, each designed to hold the Fire Water Bowser.
3.3.2.8 A 24 volts DC operated GRAND make blinker light bar (minimum three blinkers on each side) with PA system and siren shall be provided on top of the vehicle with firm support and assembly shall be covered with SS grill. Assembly shall be operable from cabin- 1 No. (fitted on roof, operable from cabin)
3.3.2.9 Fog lamps powered by the battery of the appliance- 2 Nos. (Fitted on front of Fire Water Bowser. Switch in cabin).
3.3.2.10 Reversing lights-2 Nos. (At rear of chassis)
3.3.2.11 Strong Reversing siren connected with reverse gear of the vehicle-1 set (Mounted on roof)
3.3.2.12 Search light with 100M length of cable with tripod etc. completes powered from main batteries - 1 set (mounted on roof)
3.3.2.13 All tools required for normal / routine maintenance of the appliance, which are not included with the kit of chassis -1 Set (In tool box under rear seat in cabin).

Description of Ordinary Hand Tools in each tool box

Sr No Description of Material
Quantity of Tools

1. Set of pipe wrench of sizes: - 8", 10", 12", 14", 18", 24", 36" - 01 each
2. Double open end spanner (set of 6 mm to 32 mm) : 6x7,8x9, 10x11, 12x13, 14x15, 16x17, 18x19, 20x22, 21x23, 22x24, 24x26, 24x27, 25x28, 30x32 - 01 Set
3. Ring spanner set (06 mm to 32 mm) : 6x7, 8x9, 10x11, 12x13, 14x15, 16x17, 18x19, 20x22, 21x23, 24x26, 24x27, 25x28, 30x32 (Total 13 Nos.) - 01 Set
4. Adjustable slide wrench (04 Nos.) (150 mm, 200, 250 mm & 300 mm) - 01 each
5. Allen keys (in L' shape) & (size in MM) 1.5, 2, 2.5, 3, 04, 05, 06, 07, 08, 09, 10 & 12 (12 Nos.) - 01 each
6. Combination pliers (02 nos.) 150 mm & 200 mm - 01 each
7. Flat file (02 Nos.) 150 mm & 200 mm - 01 each
8. Half round file (200 mm) - 01 No.
9. Hack saw frame with handle (for 12" long blade) along with 10 Nos. of blades - 01 Set
10. Screw drivers (in mm) - 04 Nos. [50x3, 100x4, 125x6, 150x8 - 01 each]
11. Oil can 1/2 pint capacity - 01 No.
12. Steel measuring tape (05 meter long) - 01 No.
13. Nose Plier 150 mm - 01 No.
14. Bolt Cutter-12 Inch & 24 Inch with Spare Blades Set for Bolt Cutters (Taparia Make) - 02 No. Each
15. Tin Cutter of good quality- 02 Nos.
16. Tool box, to contain all above mentioned tools in proper condition. It should be drawer type with 03 pull out drawers and a tote tray with locking system - 01 No.
17. Centre Punch - 01 No.
18 Threading Tools, 20 Pcs Taps And Die Set - 01 Set

3.3.2.14 PESO/CCE approved removable spark arrestor (If chassis manufacturer not provided) fitted to the exhaust of the engine - 1 No.

3.3.2.15 Stainless Steel dividing breeching each having two 63MM female instantaneous type outlets, conforming to IS-905/1980- 1 Nos. (In Locker)

3.3.2.16 Stainless Steel collecting breeching each having two 63MM male instantaneous type outlets, conforming to IS-905/1980- 1 Nos. (In Locker)

3.3.2.17 Stainless Steel 3 way suction collecting head (With one 140MM outlet with round female threads and two female instantaneous type inlets), conforming to IS-904/1983-1 Nos. (In Locker).

3.3.2.18 Lightweight PVC rubber suction hose fitted with round thread male-female gun metal couplings. Length - 2 meter, Diameter: as per pump suction - 4 Nos. (In compartment on top deck, Compartment shall be open able from top with latching system)

3.3.2.19 Suction strainer with foot valve size to suit suction hose as per IS: 907-1984 - 1 Nos. (In locker)

3.3.2.20 Stainless steel foot strainer-1 Nos. (In locker)

3.3.2.21 Suction Wrench to tighten suction hose as per IS:4643- 04 Nos. (In locker)

3.3.2.22 Hose clamps as per IS:5612 (Part-1-1977) - 2 Nos. (In locker)

3.3.2.23 TFT make hand controlled non-aspirating aqua fog / Foam type nozzles having spray/jet pattern with variable flow & low pressure features (suitable for both Foam & water)- 2 Nos. (in locker)

3.3.2.24 Low pressure diffuser branch, conforming to IS-903/1993- 1 Nos. (In locker)

3.3.2.25 Fireman's axe with belt and pouches conforming to IS: 3650-1981- 4 Nos. (In locker)

3.3.2.26 Crow bar (IS: 704-2005 or latest)- 1 No. (In locker)

3.3.2.27 Sledge hammer - 1 No. (In locker)

3.3.2.28 Jumbo Water Curtains made of stainless steel-4 Nos. (In locker)

3.3.2.29 Female Adopter (140 mm X 100 mm) - 02 Nos.

3.3.2.30 Female Adopter (100 mm X 80 mm) - 02 Nos.
3.3.2.31 Spade - 02 No.
3.3.2.32 Wolflite Handlamp (H-251Mk1) along with same Make charger Usable in Inflammable gases and Vap.), Approved by PESO wolf make, U.K. High Intensity Intrinsically Safe Search Lights For Hazardous Area - Rechargeable Type : 2 Nos.
3.3.2.33 Hose bandage rubberized as per IS: 5612(Part-2:1977) -2007 (or Latest) -10 Nos. (In locker)
3.3.2.34 Ceiling Fire hook as per IS:927:1981-2007 or latest - 01 No.
3.3.2.35 Drag Hook-01 Nos.
3.3.2.36 One 6 lb (2.7 kg) flathead or pick head axe mounted in a bracket fastened to the Tender
3.3.2.37 Door Breaker-01 No.
3.3.2.38 Carpenter Saw 60 CM -01 No.
3.3.2.39 Inline Inductor 225 LPm-01 No.
3.3.2.40 Inline Inductor 450 LPM- 01 No.
3.3.2.41 Nylon Web Sling (2" X 6')-02 Nos.
3.3.2.42 Nylon Web Sling (2" X 8')-02 Nos.
3.3.2.43 Nylon Web Sling (3" X 10')-02 Nos.
3.3.2.44 Wire Rope Sling (½" X 10')-02 Nos.
3.3.2.45 Water Rescue Rope11mm- 200 feet
3.3.2.46 ISI marked 63MM SS male instantaneous couplings (threaded) with caps - 2 Sets.
3.3.2.47 ISI marked 63MM SS female instantaneous couplings (threaded) with caps - 2 Sets.
3.3.2.48 Hydrant key for 4" Gate valve : 05 nos.
3.3.2.49 Hydrant Key for 2 ½" hydrant valve : 05 Nos.

4.0 Chassis and Vehicle Components :

4.1 Welding and drilling on frame work of chassis are not allowed.
4.2 An engine hour-meter shall be provided.
4.3 An angle of approach and an angle of departure of at least 8 degrees shall be maintained at the front and the rear of the vehicle when it is loaded

4.4 POWER TAKE OFF UNITS :

4.4.1 Power take-off (PTO) unit for the pump shall be independent type.
4.4.2 The power takes off unit for water pump shall be of suitable model. The PTO shall be able to meet performance requirement of pump.
4.4.3 Vendor shall submit a sketch showing the arrangement of PTO Unit for taking power from main engine on chassis to water pump.
4.4.4 The drive assembly components (shaft, coupling etc) shall be dynamically balanced and the vibration at any of the rotary parts shall be minimum and in no case shall be more than 10mm/sec. Necessary modifications, to the standard drive system as available on the chassis, shall have to be done by the vendor so as to adopt the PTO Unit in the system.

4.5 FOR OTHER WORK ON CHASSIS :

4.5.1 No part of the bodywork shall reduce ground clearance of vehicle to less than 36cm. & not increase the overall width to more than 2.50M. The highest part of the appliance with the monitor mounted on it shall not exceed 3.60M from the ground level. The construction of super-structure shall not reduce the angles of approach below 30 degree.
4.5.2 Dunlop/3M make anti-vibration rubber mats shall be provided while mounting the tanks etc. on the chassis.

4.5.3 A reflective stripe(s) shall be affixed to the perimeter of the apparatus. The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width and shall conform to the minimum requirements of ASTM D 4956, Standard Specification for Retro reflective Sheeting for Traffic Control, Type I, Class 1 or Class 3. At least 50 percent of the cab and body length on each side, at least 50 percent of the width of the rear, and at least 25 percent of the width of the front of the apparatus shall have the reflective material affixed to it.
4.5.4 Arrangement shall be made on Dashboard opposite to the fire officers' seat to fix a Motorola mobile wireless set of 25W capacity. Power supply shall be provided from vehicle battery. The owner shall fit wireless set later.

4.6 Optical Warning Devices:

4.6.1 Fire Water Bowser shall have a system of optical warning devices
4.6.2 The optical warning system shall consist of an upper and a lower warning level.
4.6.3 The four zones shall be designated A, B, C, and D in a clockwise direction with zone A to the front of the Fire Water Bowser in accordance with Figure 4.8.3.2.

FIGURE: Warning Zones for Optical Warning Devices

4.6.4 Each optical warning device shall be installed on the Fire Water Bowser and connected to the Fire Water Bowser's electrical system in accordance with the requirements
4.6.5 A master optical warning device switch that energizes all of the optical warning devices shall be provided in driver's cabin.
4.6.6 The optical warning system on the "Fire Water Bowser" shall be capable of two separate signaling modes during emergency operations.
4.6.7 One mode shall signal to drivers and pedestrians that the Fire Water Bowser is responding to an emergency and is calling for the right-of-way.
4.6.8 One mode shall signal that the Fire Water Bowser is stopped and is blocking the right-of-way.
4.6.9 A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission.
4.6.10 When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized.
4.6.11 When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized.
4.6.12 The system shall be permitted to have a method of modifying the two signaling modes.
4.6.13 The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s).
4.6.14 The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.
4.6.15 The optical sources on each level shall be of sufficient number and arranged so that failure of a single optical source does not create a measurement point, in any zone on the same level as the failed optical source, without a warning signal at a distance of 100 ft (30 m) from the geometric center of the Fire Water Bowser.
4.6.16 Flash Rate.
4.6.16.1 The minimum flash rate of any optical source shall be 75 flashes per minute, and the minimum number of flashes at any measurement point shall be 150 flashes per minute.
4.6.17 Color of Warning Lights.
4.6.17.1 Permissible colors or combinations of colors in each zone, within the constraints imposed by applicable laws and regulations, shall be as shown in Table.

Table Zone Colors

Color	Calling for Right-of-Way	Blocking Right-of-Way
Red	Any zone	Any zone
Blue	Any zone	Any zone
Yellow	Any zone except A	Any zone
White	Any zone except C	Not permitted

4.6.18 Audible Warning Devices:

4.6.18.1 Audible warning equipment in the form of at least one automotive traffic horn and one electric or electronic siren shall be provided.
4.6.18.2 A means shall be provided to allow the activation of the siren within convenient reach of the driver.

4.7 Work Lighting:

4.7.1 Ground Lighting:

4.7.1.1 The work area immediately behind the vehicle shall be illuminated
4.7.1.2 The "Fire Water Bowser" shall be equipped with lighting that is capable of providing illumination on ground areas within 30 in. (800 mm) of the edge of the Fire Water Bowser in areas designed for personnel to climb onto the Fire Water Bowser or descend from the Fire Water Bowser to the ground level.
4.7.1.3 Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.
4.7.1.4 All other ground area lighting shall be switchable.
4.7.1.5 Surface Lighting. The Fire Water Bowser shall have sufficient lighting on all work surfaces, steps, and walkways.
4.7.1.6 Interior Lighting The Fire Water Bowser shall have sufficient lighting to provide in the driving and crew compartments.
4.7.1.7 Compartment Lighting Each engine compartment and pump compartment shall have a light.
4.7.1.8 Each enclosed tool and equipment compartment greater than 4 ft3 (0.1 m3) in volume and having an opening greater than 144 in.2 (0.9 m2) shall have an average minimum level of lighting.
4.7.1.9 Switches for all work lighting shall be readily accessible.
4.7.1.10 The lights shall be arranged or protected to minimize accidental breakage.

4.7.2 Backup Alarm (Reverse Horn) :

4.7.2.1 An electric or electronic backup alarm (Reverse Horn) with light indication shall be provided that meets the Type D (87 dBA) requirements.
4.7.3 Stop, Tail, and Directional Lights.
4.7.4 The Fire Water Bowser shall be equipped with all legally required stop, tail, and directional lights.
4.7.5 Directional lights shall be visible from the front, sides, and rear of the Fire Water Bowser.
4.7.6 Equipment shall not be mounted in a manner that obscures the stop, tail, or directional lights.

5.0 Driving and Crew Areas:

5.1 General:

5.1.1 Each crew riding position shall be within a fully enclosed personnel area.
5.1.2 All interior crew and driving compartment door handles shall be designed and installed to protect against accidental or inadvertent opening.

5.1.3 Means of Escape:

5.1.3.1 Any interior area to be occupied by personnel shall have a minimum of two means of escape.
5.1.3.2 Each opening shall be large enough for a person to escape through the opening.

5.1.4 Instrumentation and Controls:

5.1.4.1 The following instrumentation and controls shall be mounted in the driving compartment and shall be identified and visible to the driver while seated:
a) Speedometer
b) Tachometer
c) Odometer
d) Oil pressure indicator or gauge
e) Coolant temperature indicator or gauge
f) Voltmeter
g) Air pressure gauge(s), if applicable
h) Turn signal control and indicator lights
i) Headlight/DOT light switch
j) High-beam headlight switch and indicator
k) Fuel level gauge(s)
l) Master ignition switch (if a key is provided, it shall be unable to be removed from the driving compartment interior)
m) Warning lights and siren switches
n) Master electrical load switch
o) "Battery on" indicator light
p) Windshield wipers and windshield washer control

5.1.5 Controls and switches that are expected to be operated by the driver while the Fire Water Bowser is in motion shall be within convenient reach for the driver.

5.1.6 Seating arrangement for 6 persons shall be provided in cabin. There shall be two doors in the cabin, sized generously with proper arrangement for embarking and disembarking of crewmembers. The doors shall open outwards and hung forward and shall have levers for unlatching from outside and inside. The doors shall be provided with shatterproof safety glasses which can be raised / lowered by winding type mechanism.
5.1.7 First aid box made of fiber glass/ aluminum suitable for 10 persons shall be provided in the cabin. First aid box shall be suitably mounted in the cabin at easily accessible location.
5.1.8 Non slip type steps & grab rails shall be provided in the cabin to assist the crew members to get in & out. Front side of the cabin shall have glass paneling so that the crew can have an all round view.
5.1.9 The cabin structure shall be so designed so as to avoid any vibration / rattling / deformation in the intended usage of the vehicle. Cabin shall have one roof light & two side lights (one on each side) for proper illumination of cabin. The entire floor of the cabin shall be provided with 3M make vinyl matting of minimum 6MM thickness with anti-skid features.
5.1.10 Battery shall be placed in totally enclosed box with spark proof gland for cable entry with battery cut-Off switch. Installed battery shall have a charging faculty from external source at its location itself.

6.0 Body, Compartments, and Equipment Mounting:

6.1 STRUCTURE / FRAME WORK:

6.1.1 The structure/frame work on chassis & crew cabin shall be of welded construction and made from 30 mm X 30 mm X1.6 mm hollow square section of SS-316 and distance between each horizontal and vertical square shall be maximum 400 mm. Cross supporting members of the panelling shall be made of SS-316 channels of 75 mm X 5 mm thickness

6.1.2 The entire roof of the vehicle including the crew cabin top, entire rear, crew cabin floor, locker floor and sides shall be made from 2 MM of SS:316 sheets suitably treated for slippage and these shall be bolted to the frame for ease in removal of the tank for repairs. The roof of the cabins should be rigid enough to take the weight of two persons without deforming the roof sheeting.

6.1.3 Area around the monitors operation shall be provided with 16 SWG anodized aluminum-checkered plate (in addition to the 2 mm Alluminum sheets) and shall be bolted to the frame.

6.1.4 Proper access ladder with Grab rails and non-skid steps shall be provided to give access to the roof for approaching to the manholes for tank and monitor etc.

6.1.5 Access handrails shall be provided at each entrance to a driving or crew compartment and at each position where steps or ladders for climbing are located. Access handrails shall be constructed of, or covered with, a slip-resistant, non-corrosive material. Handrails shall be between 1 in. and 1-5/8 in. (25 mm and 41 mm) in diameter and have a minimum clearance between the handrails and any surface of at least 2 in. (51 mm).

6.1.6 All handrails shall be designed and mounted to reduce the possibility of hand slippage and to avoid snagging of hose, equipment, or clothing.

6.1.7 Dual sun- visors and long arm rear view mirrors shall be fitted to drivers' cabin.

6.1.8 Proper draining arrangements shall be provided on the entire roof, crew cabin and inside the lockers.

6.2 LOCKERS:

6.2.1 Size and number of locker shall be decided such that on either side 15 nos. 22.5 m length fire hose can be easily accommodated in single layer and equipments may be accommodated in maximum two layers. Sufficient numbers of lockers shall be provided to accommodate all the equipment/accessories in an easily accessible manner.

6.2.2 All lockers shall be provided with Roller type shutter doors of Fireco /MCD, France make only. Roller shutters shall be of hollow rectangular shaped & made from aluminium inter-changeable links connected by means of plastic profiles. Sealing of roller shutter shall be watertight when closed. Roller shutters shall be inward rolling type and shall be provided with guide rails over entire length on both sides to make them torsion free. When shutters are rolled, unobstructed access should be available to the equipment & hoses. Shutters should open in all positions of the vehicle even in rough terrains. Roller shutters shall have locking arrangement to prevent accidental opening during movement of the vehicle.

6.2.3 All the lockers shall be fitted with internal lighting, which shall be capable of being automatically switched, 'ON' and 'OFF' by the opening of shutters. A master switch for isolating the locker lighting circuit shall also be fitted in the driver's cabin.

6.2.4 Lockers shall have arrangement for self draining of any water entering inside

6.2.5 Sufficient number of lockers shall be provided for storage of all accessories listed. Lockers shall also be provided to accommodate 2 nos., 10 kg DCP extinguishers & 02 Nos. CO2 extinguishers.

6.2.6 Lockers shall be accessible from ground level by a man of average height (1.67M). All the Lockers shall be provided with 3M make, 4MM thick, vulcanized synthetic rubber mat at bottom and up-to 12 inch on three sides.

6.2.7 The hose storage area(s) shall be reinforced at the corners.

6.2.8 The bottom shall be made of removable sections fabricated from noncorrosive materials.

6.2.9 The bottom shall be constructed to prevent the accumulation of water and allow ventilation to aid in drying of hose.
6.2.10 The interior shall be smooth and free from all projections, such as nuts, sharp angles, or brackets that might cause damage to the hose.
6.2.11 Ladders and equipment holders shall be placed so as not to obstruct the laying or removal of hose from the storage area.

6.3 Compartmentation :

6.3.1 Any enclosed external compartments shall be weather resistant and ventilated and have provisions for drainage of moisture.
6.3.2 All electrical junctions or wiring within compartments shall be protected from mechanical damage resulting from equipment stored in the compartment.

6.4 Radio Space:
6.4.1 A protected space or compartment shall be provided in driver's cabin for the installation of radio equipment.

6.5 Equipment compartments:

6.5.1 Equipment holders or compartments shall be provided for all tools, equipment, and other items that are on the Fire Water Bowser.
6.5.2 Equipment holders shall be attached and shall be designed so that equipment remains in place under all vehicle operating conditions.
6.5.3 All tools and equipment shall be readily accessible.

6.6 Pump and Plumbing Access:

6.6.1 WATER PIPING:
6.6.1.1 Water piping shall be of SS-316 grade.
6.6.1.2 Pipes, fittings and valves in the water circuit that will come in contact with Foam solution (water/Foam mixture) shall be of SS-316.
6.6.1.3 Stainless Steel lines joint - The bolting (studs, bolts) at break flanges shall be of SS-316 with SS washers.
6.6.1.4 A flow chart/schematic diagram shall be made and supplied with the Fire Water Bowser.
6.7 One or more doors or panels that open or are removable without the use of tools shall be provided to allow visual inspection or access for checking the fire pump and plumbing area(If required).
6.8 All valves, gauges, controls, and other plumbing equipment shall be accessible for service and replacement.
6.9 The clear space required by the pump manufacturer to perform in-truck overhaul and maintenance shall be provided.

6.10 Stepping, Standing and Walking Surfaces:

6.10.1 Steps, platforms, or permanently attached ladders shall be provided so that fire fighters have access to all working and storage areas of the Fire Water Bowser.
6.10.2 The maximum stepping height shall not exceed 18 in. (460 mm), with the exception of the ground to first step, which shall not exceed 24 in. (610 mm).
6.10.3 All ladders shall have at least 7 in. (175 mm) of clearance between any rung and the body or other obstruction.

6.10.4 All steps, platforms, or ladders shall sustain a minimum static load of 500 lb (227 kg) without deformation.
6.11 All materials used for exterior surfaces designated as stepping, standing, and walking areas and all interior steps shall have slip resistance.
6.12 All materials used for interior floors shall have slip resistance.

6.13 Access Handrails:

6.13.1 Access handrails shall be provided at each entrance to a driving or crew compartment and at each position where steps or ladders for climbing are located.
6.13.2 Access handrails shall be constructed of, or covered with, a slip-resistant, noncorrosive material.
6.13.3 Handrails shall be between 1 in. and 1 in. (25 mm and 42 mm) in diameter and have a minimum clearance between the handrails and any surface of at least 2 in. (52 mm).
6.13.4 All handrails shall be designed and mounted to reduce the possibility of hand slippage and to avoid snagging of hose, equipment, or clothing.

6.14 PAINTING AND MARKING:

6.14.1 Vehicle and monitor should be painted with 2 coats of zinc phosphate epoxy primer each of 50 microns DFT and two coats of polyurethane finished red paint each coat of 50 microns DFT
6.14.2 All the lockers / cabins shall be provided with Stainless steel Name Plates with letters itched on it boldly indicating the content.
6.14.3 Water lines should be painted with of zinc phosphate epoxy primer each of 50 microns DFT and two coats of polyurethane finished paint each coat of 50 microns DFT. Water lines shall be painted red in colour.
6.14.4 Paint shall be of Asian/Burger/Akzonoble/3M make only.
6.14.5 Owner's emblem in original colour together with name (in Hindi and English) as below shall be written in golden yellow colour on both sides of the vehicle.
6.14.6 On the front of the vehicle "Fire Water Bowser" shall be written IN ENGLISH.
6.14.7 The inside of lockers shall be painted in pale Cream colour.
6.14.8 The chassis frame shall be painted black and wheel arch shall be painted white.
6.14.9 Mud flappers of sufficient length and width shall be provided at wheels.
6.14.10 Under frame of Chassis shall be painted with chlorinated rubber paint.
6.14.11 The appliance shall be clearly having the following marks at suitable locations.
(a) Manufacturer's name & trade mark.
(b) Year of manufacture
(c) Pump serial numbers and capacities.
(d) Capacity of water tank in litres.
(e) Engine and chassis number.
(f) All instrument control & valves shall be identified with properly itched metallic Name plates.
(g) All valves and hoses inlet and outlet shall also be identified by suitable metallic Nameplates.
6.14.12 All exposed ferrous metal surfaces that are not plated or stainless steel shall be cleaned and prepared and shall be painted or coated.
6.14.13 The paint or coating, including any primer, shall be applied in accordance with the paint or coating manufacturer's recommendation.
6.14.14 A reflective stripe(s) shall be affixed to the perimeter of the Fire Water Bowser.
6.14.15 The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width and shall conform the requirements.

6.14.16 At least 50 percent of the cab and body length on each side, at least 50 percent of the width of the rear, and at least 25 percent of the width of the front of the Fire Water Bowser shall have the reflective material affixed to it.

7.0 Fire Water Pump and Associated Equipment:

7.1 General:

7.1.1 Make & Model: Suitable Make & Model.
7.1.2 Pump shall be CE approved, meet international standards & Comply EN 1028.
7.1.3 The water pump with automatic water ring & exhaust ejector type priming device shall be installed.
7.1.4 The pump shall be single stage & centrifugal type.
7.1.5 The pump should be capable of delivering minimum 3200 LPM at 7 Kg/Cm2 (g) at discharges flange. Vendor shall match other parameters of operation w.r.t. Engine of the chassis.
7.1.6 The pump shall be capable of taking suction from:
a. Water Tank mounted on chassis. (In normal condition).
b. Underground water reservoir through flexible suction line with suction lift up to 7.0 M with aid to automatic water ring & exhaust ejector type primer.
7.1.7 The pump shall be rear mounted and shall be accessible and readily removable for repair and maintenance. It shall be driven by the chassis diesel engine through a power take-off unit and propeller shaft.
7.1.8 The primer shall be capable of lifting water at least through 7.0M depth (Suction lift) at a rate of not less than 30 cm per second in the suction line. The auto primer should work satisfactory even if it is left dry for long period.
7.1.9 The pump discharge shall be able to be routed to :
a. 4 Nos. outlets (on rear side of vehicle along with control panel) each fitted with ISI marked 63MM, SS instantaneous female coupling fitted with stainless steel end caps by suitable chain link/ suitable flexible steel rope cable.
b. The outlets should be angled around 30 deg. towards downward direction.
c. Water-cum-Foam Monitor fitted on top of vehicle.
7.1.10 The pump shall have a suitable box type suction strainer made of Stainless steel. The strainer should easily be removable for maintenance.
7.1.11 Pump impeller shaft should be fitted with anti-friction bearing.

7.2 Design and Performance Requirements:

7.2.1 Intake Strainer:
7.2.1.1 Intake shall have a removable or accessible strainer inside the connection.
7.2.1.2 The strainer(s) shall restrict spherical debris that is too large to pass through the pump.
7.2.1.3 Intakes having male threads shall be equipped with caps; intakes having female threads shall be equipped with plugs but remain secured to the Fire Water Bowser by means of suitable connection.

7.2.2 Pump Drains:
7.2.2.1 A readily accessible drain valve(s) that is marked with a label as to its function shall be provided to allow for draining of the pump and all water-carrying lines and accessories.

7.2.3 Pump Operator's Panel:
7.2.3.1 Each pump control, gauge, and other instrument necessary to operate the pump shall be located on a panel known as the pump operator's panel and shall be marked with a label as to its function.
7.2.3.2 All gauges, discharge outlets, pump intakes, and controls shall be illuminated.

7.2.4 Instrumentation:

7.2.4.1 Pump Operator's Panel: The following controls and instruments shall be provided and installed as a group at the pump operator's panel:

a) A master pump intake pressure-indicating device
b) A master pump discharge pressure-indicating device
c) A pumping engine tachometer
d) A pumping engine coolant temperature indicator
e) The pumping engine throttle
f) The primer control
g) The water level indicator

7.2.4.2 Any instrumentation exposed to the elements shall be weatherproof.
7.2.4.3 Each pressure-indicating device or flow meter, and its respective display, shall be mounted and attached so it is protected from accidental damage and excessive vibration.

7.2.5 Required Testing:

(a) Pumping Test
(b) Pressure Control System Test
(c) Priming Device Tests
(d) Vacuum Test
(e) Water Tank-to-Pump Flow Test.
(f) The manufacturer shall conduct a piping hydrostatic test prior to delivery of the Fire Water Bowser.

7.3 SPARES:

The following mandatory spares shall be supplied by the vendor:

7.3.1 FOR WATER PUMP:
7.3.1.1 Pump Shaft with keys & impeller nut- 1 No
7.3.1.2 Impeller- 1 No.
7.3.1.3 Shaft sleeve- 2 Nos.
7.3.1.4 Set of DE & NDE bearings- 3 Sets
7.3.1.5 Mechanical seal spares:
- Rotating & stationary faces with packing -2 Sets
- Springs pins, gaskets etc- 2 Sets.
7.3.1.6 Couplings between PTO Unit & Pump- 2 Nos.

7.4 WATER CUM FOAM MONITOR:

7.4.1 Foam-cum water monitor with manual override shall be mounted on rooftop of the "Fire Water Bowser" having following specification:
(a) Make & Model: Suitable Make & Model
(b) Foam/ Water monitor should be UL listed /FM approved.
(c) Capacity: Variable flow of 750 to 500 US GPM single Nozzle with Jet, Spray & Fog Pattern and suitable Jet Ratio Controller Pump (JRCP) along with all fittings required to be fitted with above monitor to induct Foam at time of requirement externally.
(d) Type : Non-aspirating
(e) Discharge Capacity: 750 US GPM at 7.0 KG/CM2 (at the base flange of the monitor).
(f) Barrel Size: Suitable size as per requirement

(g) Material of Construction: Entire body along with all components shall be SS-316.

7.4.2 PERFORMANCE:

(a) Water Throw at 7.0 KG/CM2 (Monitor inlet pressure): Minimum 60 meter-Horizontal.
(b) Foam Throw at 7.0 KG/CM2 (Monitor inlet pressure): Minimum 50 meter-Horizontal.
(c) Foam expansion :7-8
(d) Type of nozzle: Non-aspirating aqua fog/Foam type.
(e) Rotation: Vertical:90 deg.(+75 degrees:-15 degrees)
(f) Horizontal: 340 deg stop to stop.

7.4.3 Operational control for the monitor shall be provided at the rooftop for horizontal movement, vertical movement & jet/spray pattern of the monitor.
7.4.4 One oil filled pressure gauge shall be provided near the monitor inlets flange.
7.4.5 Separate connection shall be made to operate Foam/Water Monitor directly from pressurized hydrant mains by means of suitably sized inlet line 4 nos., 63MM, ISI marked instantaneous male connectors with strainer fitted on the rear side of the Water Bowser, shall be connected to the Monitor line with a SS isolation valves.

8.0 Water Tank

8.1 WATER TANK:
8.1.1 Net capacity of water tank shall be of 12000 litres. In addition a 2% expansion space shall be made in the water tank over & above the water capacity. A calibrated dip tape shall be provided on the tank to measure the tank level
8.1.2 The water tank shall be fabricated out of minimum 5MM thick SS-316 plates for the bottom & 4 MM thick SS-316 plates for the sides & top. The tank shall be of welded construction and shall be suitably stiffened with SS-316 angles/flats so as to avoid buckling and distortion.
8.1.3 The tank shall have baffles, of minimum 3MM thickness, SS-316 plates, so as to avoid water surging due to movement of vehicle. Baffle plates will be connected to the tank with SS nut/bolts. The threads of bolts shall be TAC welded beyond the nut to prevent the nuts falling in the tank due to vibrations.
8.1.4 Tank shall be provided with anti-vortex device at the nozzle for pump suction.
8.1.5 An inspection manhole of 500MM size shall be provided on top with a hinged and bolt able cover with suitable gasket. The manhole shall be fitted with SS nameplate having etched marking 'WATER' (letter size 100MM).
8.1.6 Suitable lifting lugs shall be provided on the tank shell to enable it to be lifted off the vehicle for repairs/replacement as necessary.
8.1.7 The tank shall be fitted with a sludge trap. The bottom of the tank shall have a slight slope towards the sludge trap.
8.1.8 The tank shall also have a cleaning hole of 250MM dia. Manhole shall be fitted with 50MM drain pipe with AUDCO make SS ball valve and 63MM (SS) ISI marked instantaneous male coupling incorporated in it.
8.1.9 The tank shall be fitted with overflow pipes of suitable diameter and the discharge end shall be taken below the chassis without reducing the effective ground clearance. The overflow pipe shall be routed to outside water tank.
8.1.10 The tank shall be filled by means of suitably sized inlet line from pressurized hydrant mains. 4 nos. 63MM ISI marked, SS instantaneous male connectors (2 on each side of the Fire Water Bowser) shall be connected to the filling line. The inlet lines will be provided from AUDCO Make SS ball valve. Water filling arrangement to the tank shall be provided from upper side of the tank only and the filling line shall be routed to outside water tank.

8.1.11 The tank shall have an adequately sized breather valve. The inlet line in the tank shall have an adequately strong deflector plate, which will avoid the incoming jet of water from hitting the tank sides/bottom.
8.1.12 All nozzles for the tank shall have suitable reinforcement pads. Nozzles shall also have adequate stiffeners to take the loads from piping.
8.1.13 Tank supporting structure on the chassis shall be of SS-316.
8.1.14 Reinforcement pads at tank supporting structure shall be of same thickness and material as that of the water tank.
8.1.15 Suitable strainer (SS) shall be provided at the tank bottom on pump suction line.
8.1.16 Provision shall be made on either side of the body for visual inspection/maintenance of the water tank.

8.1.17 Tank Construction & Mounting:

8.1.17.1 All water tanks shall be constructed of noncorrosive material or other materials that are protected against corrosion and deterioration.
8.1.17.2 The water tanks shall have a means to permit cleaning of the tank.
8.1.17.3 Water tank should be independent of the body and compartments, it shall be equipped with a method for lifting the tank(s) off of the chassis.
8.1.17.4 Tank shall be cradled, cushioned, spring-mounted, or otherwise protected from undue stress resulting from travel on uneven terrain.
8.1.17.5 Water tank shall be provided with baffles to form a containment or dynamic method of water movement control.
8.1.17.6 Containment method of baffling should be used, a minimum of two transverse or longitudinal vertical baffles shall be provided.
8.1.17.7 There shall be a maximum distance of 48 in. (1220 mm) between any combination of tank vertical walls and baffles.
8.1.17.8 Each baffle shall cover at least 75 percent of the area of the plane that contains the baffle.
8.1.17.9 The water tank will be mounted on the vehicle on a sub frame using Rubber Metacones. This sub frame will be made from Anti-Corrosive Treated MS 4" section and will be bolted with the chassis using the high tensile bolts. 'U' Bolts shall not be used for mounting of tanks on vehicle. The rubber metacones shall facilitate to absorb the jerks and bending torsions in expansion as well as compression mode without high deflection. The manufacturer shall provide complete design data of metacones and sub frame including the load calculations and metacone quantity sufficiency. Tank will be mounted on the chassis in a manner keeping in view the proper load distribution on the axles. The baffles will be arranged in a manner to facilitate easy cleaning of the tanks. The tank will be mounted on two / three cross bearers to counteract stresses caused by chassis flexing. The Centre of Gravity shall be maintained as low as possible.

8.1.18 Cleanout Sumps:

8.1.18.1 One cleanout sumps shall be provided.
8.1.18.2 A 3 in. (75 mm) or larger removable pipe plug shall be furnished in each sump.

8.1.19 Water Level Indicator:

8.1.19.1 An indicator shall be provided that shows the level or amount of water in the tank(s).
8.1.19.2 A mechanical (dial type) level gauge also to be provided.
8.1.19.3 A suitably protected water level indicator of the graduated glass tube, clear acrylic shall be provided close to the control panel. Isolation valve shall be provided just after the tap off point near the water tank for the level indicator.

8.1.19.4 Electronic LED Water Level Indicators indicating the tank levels as EMPTY,¼,½ ,¾ and FULL shall be provided on the pump control panel. These levels shall be indicated by number of glowing LED lights (no LED Lights means and empty tank, All LED Lights means full tank). The indicators shall sense the fluid level in the tank with help of a pressure sensing probe. The indicators shall be located on the rear pump control panel in such a manner that the Operator / Firemen can easily view the tank levels while being away from the vehicle. Repeater Secondary Level Indicators shall be provided in the driver's cab to help the crew members to check the fluid level from the cab while traveling.

8.1.20 Tank-to-Pump Intake Line:

8.1.20.1 The water tank shall be connected to the intake side of the pump with a valve controlled at the pump operator's position.
8.1.20.2 Filling and Venting:
(a) Fill Opening: - A convenient covered fill opening designed to prevent spillage shall be provided.
(b) Vent/Overflow Outlet: - A vent/overflow outlet that is sized to allow water to be drawn from the tank.
(c) External Fill: - An external fill connection leading directly to the tank shall be provided.
(d) The external fill connection shall be provided with a removable or accessible strainer, a shutoff valve capable of being throttled, a minimum 30-degree sweep elbow positioned downward, and a closure cap or plug.

8.1.21 Water Tank Capacity Certification:

8.1.21.1 The manufacturer shall certify the capacity of the water tank prior to delivery of the Fire Water Bowser.
8.1.21.2 The certified capacity shall be recorded on the manufacturer's record of construction and the certification shall be provided to the OIL when the Fire Water Bowser is delivered.

8.2 PIPING:

8.2.1 All piping shall be designed to have minimum pressure drop and achieve the required pressure and flow at various locations.
8.2.2 All piping shall be seamless and designed for 10% over the maximum pressures encountered in the pipe. All lines shall be hydraulically tested at 1.5 times the design pressure and shall be to hold the pressure for minimum 2 hours. However, in no case shall the lines be hydraulically tested below 25 KG/CM2 (G) pressure.
8.2.3 The piping shall be flanged for ease of maintenance. However, joints to be kept minimum.
8.2.4 Valves of less than 1.5 inch size shall be forged construction and valve more than 2" size or more size shall be of cast construction.
8.2.5 All lines shall be suitably supported so as to provide rigidity and avoid vibrations.
8.2.6 Al lines less than 1.5" NB size can be socket welded to matching 3000 LBS rating fittings. All lines above 2" NB size shall be butts welded with full penetration welds.

8.3 ACCESSORIES:

8.3.1 CONTROL PANEL:

Adequately illuminated pump operating panel shall be provided at the rear side of the appliance and these shall include the following areas:

a. Auxiliary throttle control for the engine.
b. Independent pressure gauges calibrated to 25 KG/CM2 for pump discharge.
c. Threaded suction inlet of water pump with blind cap.
d. Quick opening valve for lining up water tank to pump.
e. Level gauge for water tank.
f. Priming valve for water pump.
g. System schematic etched on Stainless Steel plate.
h. Operating instruction plate and flushing out instruction plate (both on boldly etched Stainless steel plates).
i. Compound pressure gauges.
j. RPM for pumps.

In addition to the items mentioned above, vendor shall provide any other items that he may find essential. Any of these items which are also required in the driver's cabin shall be provided at suitable locations in the driver's cabin. Each lever, switch, valve, gauges, outlet/inlet etc. shall have identification made on metal plate and duly riveted. The microphone of the PA system shall be fixed inside the driver cabin on a flexible stand at a suitable location.

9.0 PERFORMANCE GUARANTEE:

9.1 The manufacturer shall guarantee the design, material, workmanship and the performance of the unit for a period of 18 months from the date of the supply of completed vehicle. The vendor, at owner's premises, shall rectify any mechanical defect, faulty workmanship or operational defects found during this period within reasonable time without any extra cost.

10.0 TRAINING:

10.1 After supply of the vehicle, the vendor shall provide two days training on operation & maintenance of fire vehicle including chassis at owner's site and charges for the same shall be included in the price.

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