DETAILED SPECIFICATIONS FOR

NAME OF WORK: **Designing, Commissioning, Fabrication, Erection & Testing of Fire Tender for the use of Fire Services of Urban Local Bodies with following details**

Minimum – 16 Ton Chassis ; Water capacity – 4500 Ltrs

The said fire tender is the basic requirement for any fire service. As per Standing Fire Advisory Committee (SFAC), Government of India, one fire tender is required for every 50 thousand population or part thereof up to 3 Lac Population and thereafter 1 fire tender for every 1 lac population. (The word fire tender / water tender / fire tanker should be read as one only).

The successful tenderer will be solely responsible for the safe custody and proper maintenance of the chassis or any part thereof till the fabrication is completed and the vehicle is handed over to the Directorate of Maharashtra Fire Service with satisfactory test. The successful tenderer will haveto complete the work as per specifications stipulated below and complete the vehicle in all respectto put into operation and ready to use.

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Note:

1. Wherever makes of any equipment is given it shall always be read in continuation word “or equivalent”
2. Wherever the numerical is used indicating dimensions of any equipment or material, tolerance of +/- 10% shall be accepted.
3. IS 6067:1983; IS 950:2012; or latest revision to be followed.
4. Wherever the items / equipment is mentioned having NFPA or EN requirement, for all those equipment, proper certificate regarding the same shall be supplied by the OEM / Fabricator.

2.0 CHASSIS

2.1 The chassis shall be of Reputed make and shall be right hand drive, BS VI OBD II or latest applicable emission norms having wheel base of min. 4000 mm with driver cabin.

2.2 The engine shall be Four / six cylinders in line, water cooled, Turbo charged, Intercooled, diesel engine, developing Min. 160 horse power.

2.3 The chassis shall be with cabin fitted with air conditioner.

3.0 The Specific Specification for Fire Tender shall be as follows:

Chassis GVW	**Horse Power**	**Whe el Base (min)**	**Water tank Cap Ltrs**	**Hose ReelHose**	**Pump Discharge Ltr/ Bar**	**Water Monitor**
Minimum 16.0 ton	180 HP	4200mm - 4500 mm	4500 ltrs	Hose Reel shall be fitted with 60-meter length and of 19-20 mm ID high pressure hose having bursting pressure shall not be less than 100 bar	Normal pressure output-2000 LPM @ 8.5 bar b) High pressure output-300 LPM at 35 bar	**Discharge – lpm at 1800 @ 8.5 Bar with effective height of 45 mtr**

4.0 BODY WORKS AND LOCKERS:

4.1 SEATS

4.1.1 Both the seats (driver and officer in charge) shall be independent and fully adjustable for horizontal as well as vertical adjustments. The crew seat shall have provision for brackets for placement of Breathing Apparatus in an upright position.

4.1.2 Suitable locker space shall beprovided below the crew seat

4.2 REAR BODY

4.2.1 The rear body shall be fabricated in continuation and in line of the crew cabin. The under frame cross members shall be fabricated and made out of rolled ISMC M.S. channel of 100 x 50 x 5 mm.

4.2.2 The mild steel runner of 100 mm × 50 mm × 5 mm size shall be provided over the chassis member for the uniform distribution of load over the chassis. Each cross members shall be secured to the chassis frame

4.2.3 The complete superstructure shall be made of 38 mm x 38 mm x 2 mm thick GI square tube and other rolled steel of MS sections like Channels and angles of sufficient strength. The superstructure shall be strengthened specifically on the members where the doors and lockers are to be fitted and also on the other members by providing brackets and the gusset plates securely fitted.

4.2.4 The flooring shall be fabricated out of MS angles of 40 x 40 x 5 mm thick which shall be properly welded / bolted to the cross members.

4.2.5 The complete Internal and external panelling including doors (if any) shall be of 1.6 mm aluminum sheet with all the joints riveted and bided.

4.2.6 The flooring shall be fabricated from 3 mm aluminum chequered plates fixed to the under frame by means of nuts and bolts or riveting. Trap doors for topping up wherever necessary shall be provided.

4.2.7 The entire rear deck of the vehicle and locker floor shall be covered with minimum 3 mm thick aluminium chequered plates. All the lockers sides and complete rear of the vehicle shall be covered with minimum 2 mm thick aluminium sheets / chequered plates

4.2.8 Two numbers of 25 mm diameter aluminum pipe railing with sufficient number of aluminum socket brackets shall be provided to the rear body over the deck. All the super structuralmembers and under frame cross members shall be painted with three coats of rust preventivepaint i.e. Red Oxide primer, after 'Deep Phosphating'.

4.2.9 All the super structural members and under frame cross members shall be painted with two coats of epoxy coat paint.

4.2.10 All the under frame cross members shall be painted with two coats of chassis black paint.

4.2.11 The doors shall open outward side, and shall be hung forward and shall have locks with double catch striking plates. Non-slip steps and rail handles shall be provided to assist the driver to get in and out. All windows glasses shall be splinter proof. Safety belts shall be provided for each seat.

4.2.12 No part of the body works shall reduce the ground clearance the overall width of the vehicle to more than 2.50 mtrs. The highest part of the Fire Tender with the extension ladder and the monitor mounted on it shall not exceed 3.60 mtrs.

4.2.13 The complete external paneling of crew cabin including doors shall be of 14 SWG Aluminium sheet with all the joints riveted and bided except the roof top paneling, whichshall be of 2 mm thick aluminium sheet. The domes and the corners shall be as small as possible and shall be of 14 SWG Aluminium sheet with all joints riveted to the super structural members. The roof top plates shall be overlapped by 70 mm and riveted in a double row with solid rivets.

4.2.14 The complete internal paneling of crew cabin shall be of 18 SWG P.V.C. coated aluminium sheet properly riveted and bided to the super structural members. (The colour of P.V.C. coated aluminium sheet will be decided at the time of fabrication).

4.2.15 The complete flooring of the crew cabin shall be fabricated from 3.00 mm aluminium chequered plates rigidly fixed to the under frame cross members by means of nuts and bolts or riveting. Trap doors for topping up wherever necessary shall be provided.

4.2.16 Water proofing treatment shall be given to cabin to avoid water leakage inside the Crew cabin.

4.2.17 The flooring shall be provided over the super structure with minimum 3.00 mm Aluminium chequered plates. Drain holes of suitable size shall be provided.

4.2.18 Each cross member shall be secured to the chassis framed by 'U' clamps with aluminium packing block and self locking nut.

4.2.19 Ballato packing of 12mm thickness shall be provided in between the chassis and cross members.

4.2.20 Suitable gallows shall be provided to carry 10.5 m Truss type extension ladder. And designed to facilitate easy and quick removal of the ladder from the rear portion of the appliance. 35 feet Trust type Aluminium ladder shall be mounted on gallows.

4.2.21 The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.

4.2.22 Drag hooks/eyes shall be fitted on each chassis member at front and rear and one towing hitch shall be provided at the rear portion for towing one ton trailer / vehicle.

5.0 LOCKERS:

5.1 All lockers provided above the chassis frame shall be covered with aluminium roller shutters – The roller shutters shall be made from double layer aluminium extruded profileswith suitable side guide channels.

5.2 All aluminium profiles use shall be proper anodized with the thickness of each profile not less than 30mm

5.3 The opening roller shutters shall be done means of the bar type handle provide.

5.4 This shall be self-locking type so that while vehicle is moving, the shutters do not open accidently during movement of vehicle.

5.5 Roller shutter profile/panel links shall be inter connected with rubber/plastic/PVC sealing to make the roller shutter watertight when close

5.6 The roller shutter winding rolls shall be of suitable size

5.7 Suitable lockers with doors shall be provided below the chassis frame depending upon the availability of space on the chassis / requirement of the fire services. All lockers shall be provided with proper lighting system for illumination with auto "On/Off" switch.

5.8 **Provision for Stowage of Equipment**: For all water fittings like branch pipes, etc, quick release type couplings are provided which enables the operator to locate the desired equipment instantly and thereby save valuable time at the time of fire. These couplings also ensure that none of the item damage the internal panelling and thereby increase the life of vehicle. Suitable clamps, brackets, holders, etc, are provided for all other items. The lockers shall be so made that the load distributed shall be equal to both sides.

5.9 Suitable storage space shall be provided to store min. four 2.5 m lengths of suction hoses of same size as that of the pump suction inlet at convenient location.

5.10 Lockers and other suitable accommodation shall be provided for all equipment required for Fire Tender. Lockers shall be accessible from the ground level to a man of average height i.e. at 5'.6". All lockers shall be fitted with internal light with ON/OFF switch operated automatically, while opening and closing of the shutter type. Extra master switch isolating the electric supply for lockers lighting shall be provided in drivers cabin.

5.11 The pump at Rear side should be covered with shutters.

5.12 The size and placement of lockers shall be clearly shown in the drawing. There shall be one full width lockers shall be provided just behind the crew cabin and one locker shall be provided behind the water tank. There shall be lockers provided at the skirt level of suitable size on both the sides. Under the equipment body, small lockers shall be provided with flap doors, opening downwards which can be used as a “steps” while in open position. The hinges used shall be die-pressed spring loaded fail safe design and positive locking with tower bolt. (gas spring cylinders not acceptable)

5.13 One of the lockers shall be provided with Swing door for keeping hydraulic/ Fire rescue tools **& fire accessories along with three Point Locking shall be provided for stowage of tools / accessories on both sides of the swing door.**

5.14 The lockers shall be divided into compartments and halves as per the requirement. The final design will be decided at the time of fabrication work.

5.15 All lockers shall be provided with Aluminum shutters including the pump compartment but excluding the lockers provided below the chassis level. The Aluminum shutters shall be water tight with suitable rubber packing.

5.16 The flooring of the lockers shall be fabricated from MS angles of 40 x 40 x 5 mm thick

6.0 WATER TANK

6.1 A water tank shall be installed on the Fire Tender. The tanks have the following parameters:

PARTICULARS	REQUIREMENT
Capacity	**4500**
Material of Construction	**MS**
Bottom Plate Thickness	4 mm
Side Plate Thickness (Die Pressed Stiffened on Two Sides)	4 mm
Top Plate Thickness	4 mm
Baffles Thickness	3.15 mm
Number of compartments	Minimum 04 nos.
Numbers and Size of Manhole	1 x 450 mm
Numbers and Size of Cleaning Hole (Bottom of Tank)	1 x 250 mm
Drain Pipe on Cleaning Hole	25 mm
Overflow Pipe Size	100mm
Number of Tank Filling Connections	2 x 63 mm
Tank to Pump Line Size	Suitable to pump.

7.0 Design & Plumbing

7.1 The Water Tank shall be designed to carry approx. 2 % excess capacity of the designed capacity. The Water tank shall be so installed as to allow the full flow of water to the pump. The tank will have baffle plates in order to avoid surge when the vehicle is braking, accelerating and cornering.

7.2 The tank shall have a bolted manhole of 450 mm diameter of the same material as that of the tank and shall have cap of 200 mm diameter for filling the water tank from the top. The filler cap shall be clearly marked 'WATER' . The manhole cover shall be made from 5 mm thick plate of suitable metal.

7.3 Reinforcement & corrugation of the tank shall be done. Visual Level Gauge of the glass tube will be provided at the Control Panel Calibrated ¼, ½, ¾ & Full. Tank will be treated for anticorrosion by Sand Blasting and Min. 1 Coat of Primer and Min. 1 Coat of Epoxy Paint

7.4 All hardware / bolts used for the **water tank** shall be of Stainless steel SS304 only. The water tank with its piping and filament shall withstand hydrostatic pressure 0.3 bar

7.5 Suitable eyes will be provided on the shell of the tank to enable it to be lifted off the vehicle for repairs when required. The tank shall be fitted with a 100 mm sized overflow pipe. 2 X 63 mm instantaneous hydrant connections, incorporating a ball valve and strainer, shall be provided for filling the tank through 63 mm bore pipe work. Suitable size pipe line shall be taken from the tank to the suction inlet of the pump incorporating quick action spherical / butterfly type valve as per IS 13095.

7.6 The open end of the overflow pipe shall be taken down to a point well below the chassis without affecting the effective ground clearance when fully loaded and shall discharge away from the wheels.

7.7 A cleaning hole shall be provided at the bottom of the tank. It will be fitted with a drain pipe & valve which will be taken down to a point well below the chassis without reducing the effective ground clearance.

7.8 The tank shall be connected to the pump and hose reel in such a manner that pressurization of water tank or water tank-pump connection is not possible when pumping water from an outside source of supply.

7.9 Pipelines and Valves

a. All pipelines shall be of stainless steel grade SS 304 and all valves up to50 mm size shall be 3 piece design grade 304 stainless steel ball valves . All valves above 50 mm shall be standard butterfly valves.

b. The piping shall be flanged for ease of maintenance. **Flanges shall have 'O' ring sealing.** However, flange joints shall be kept to minimum

c. All lines shall be hydraulically tested at 1.5 times of the design pressure and pressure shall be held for 2 h. In no case the lines shall be tested below 25 kg/cm2

d. All lines less than 50 mm size shall be socket welded to matching rating fittings.

e. All lines above 50 mm size shall be butt welded with full penetration welds

8.0 TANK MOUNTING SYSTEM

8.1 The water tanks will be mounted on the vehicle on suitable Rigid mounting with suitable number of mounts clamped with chassis by EN-8 U bolts wherever necessary. 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 full length runner. The Centre of Gravity shall be maintained as low as possible.

9.0 SUBFRAME

9.1 Compartment Superstructure shall be mounted on secure brackets of the steel sub frame made from Anti-Corrosive Treated MS 4" section and shall be bolted with the chassis using the high tensile bolts. Use of "U" bolts as well as direct mounting of Superstructure on chassis frame is strictly non-permissible.

9.2 The fire tender shall be so fabricated that Gross Weight of the vehicle shall not be more than as mentioned in Clause 03 above.

10.0 FIRE PUMP (HIGH LOW PRESSURE TYPE)

10.1 As on today there is no BIS standards are available for High-Low pressure Pumps, hence EN-1028 standards are considered for this work.

10.2 A Centrifugal high and low pressure fire pump made up of gun metal / stainless steel of Godiva OR Rosenbauer or Firefly make or any equivalent but complying to EN 1028-1, CE Certified and confirming to following features shall be mounted on the appliance

10.3 The pump should be Certified with EN -1028 Pump has to be tested & Certified by the International accredited organizations like TCE (Tata Consulting Engineering)/ EIL (Engineers India Ltd.) /TUV/ SGS/ UL.

10.4 Pump manufacturer or the fire engine fabricator should have such testing facility as per EN -1028 at their own premises. It's the responsibility of manufacturer / fabricator to ensure for such test facility available with pump manufacturers.

10.5 The pump should be certified with EN- 1028, Pump of normal & high-pressure centrifugal type capable of delivering the requisite capacity at required pressure as mentioned in Clause 03 as mentioned for normal pressure and High pressure. The complete pump assembly shall be made of GM.

10.6 The design of the pump shall be such that the normal pressure & high-pressure stages can be operated simultaneously or independently. The pump housing shall have provision to connect normal pressure hose reel & cooling water line. Simple mechanism shall be provided to change over from normal pressure to high pressure with a single lever operation.

10.7 The low and high pressure sections of the pump may be either multi-stage or single-stage type. Preference will be given for the multistage pump. Anti-friction bearings external to the casing be provided so as to avoid any bearings within the pump casing. The gland shall be of the mechanical carbon / self-adjusting type.

10.8 The impeller(s) of the low pressure section shall be closed type and shall be dynamically balanced. The impeller(s) of the high pressure sections may be closed or regenerative or non-regenerative type. A drain cock plug shall be provided at the bottom of the casing in a way to prevent the cock being opened due to vibrations. Studs, etc, used in the pump casing coming in contact with the water shall be stainless steel. The castings shall be without any blow holes, internal cracks, etc. The interior of the casting shall be smooth finished. The pump casing and impeller shall be subjected to a hydraulic pressure of 21 kgf/cm2 to detect leakage, performance, etc.

10.9 The pump along with the controls shall be placed in a closed locker provided with openable doors or aluminium roller shutter.

10.10 The pump shall be coupled to the prime mover of the chassis through a power take-off capable of transmitting full torque of the engine used for the appliance or a side mounted PTOof suitable torque and ratio.

10.11 All propeller shafts and all fittings used for coupling the PTO, pump, etc., shall be of the suitable size and type required for driveline as used by the chassis manufacturer for the drive line and all shall be dynamically balanced. Any changes in the original driveline of the chassis shall be approved by the chassis manufacturer.

10.12 The PTO shall have a suitable gear ratio to maintain the engine RPM of max. torque and power range as recommended by the chassis manufacturer to achieve the output required from pump.

10.13 A cooling coil made of copper pipe shall be provided in the bottom of the PTO casing in case a split shaft PTO is used for driving the pump.

10.14 A control lever or switch for engaging and disengaging the pump shall be provided in the driver's cab.

10.15 The pump shall be designed to give its rated output with an engine and pump input at shaft speed safe enough to operate the engine. The pump capacity shall be as mentioned in Clause 03.

10.16 The pump shall be compact and of modular design having one 100 mm suction with round threads with an removable strainer and 2 X 63 mm deliveries with hose pressure relief arrangement shall be fitted with instantaneous delivery coupling. The discharge manifold shall have inbuilt provision for monitor (as applicable) and tank filling piping.

10.17 The entire high pressure section of the pump shall either be made of stainless steel(CF8). The pump shall be of front access design such that maintenance of important components like low pressure impeller, high pressure impeller, mechanical seal etc. can be carried out on vehicle without removing the pump and pumps discharge side piping.

10.18 Both the low and high pressure impellers shall be mounted on a single stainless steel shaft. The pump shaft shall be held in heavy duty ball/roller bearings running in oil bath.

10.19 The pump shall be capable of high / low pressure operations and operation of high pressure shall be controlled by an easily accessible single changeover lever. There shall be two outlets forhigh pressure of not less than 1.00" size.

10.20 An inbuilt pressure relief valve to control the high pressure within specified limits shall be fitted on pump or pipeline and a suitably sized thermal relief valve shall also be to ensure that the pump water temperature does not exceed 60^0C while operating under closed discharge conditions.

10.21 Pump casing and impellar shall be of following material:

a. **Pump casing and low pressure impeller**: Lead tin bronze (Grade LTB 2 of IS 318) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr.8 Ni). or high strength light Aluminium Alloy Gr. 4450
b. **High pressure impeller:** Lead tin bronze (Grade LTB 2 of IS 318) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr. 8 Ni) or high strength light Aluminium Alloy Gr. 4450
c. **Impeller neck ring** : Lead tin bronze (Grade LTB 2 of IS 318) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr. 8 Ni) or POLYMERBASED MATERIAL or high strength light Aluminium Alloy Gr. 4450
d. **Pump shaft:** Stainless steel (Grade SS431)
e. **Pump bearing housing** – Cast iron as per IS----------Gr. FG260
f. **Pump panel:** Aluminium sheets (IS 737) or Stainless steel sheet (IS 6911-2017) or FRP/GRP.

10.22 High-Pressure Filter: In case of regenerative impeller, the water going to high-pressure impeller suction shall be filtered before entering in to the high pressure impeller. A filter capable of filtering particle size up to 0.75 mm or less shall be used. This filter shall be of stainless steel and shall be easily accessible for cleaning.

10.23 The pump shall give performance as given in Table 1, when working with strainers (except basket strainer) at 27 ± 5°C

10.24 HOSE REEL HOSE & HIGH PRESSURE GUN

a. Two CE Certified high pressure hose reel of UDOR / DYNAMIC / ROSENBAUER / Firova / Reeltech / Lighttec India Brand or equivalent make capable of discharging water shall be provided and mounted so as to be accessible for use from either side of the appliance. The hose shall be prevented from kinking.

b. The hose shall be light weight polyster fibre braided hose meeting the requirement given in EN 694 and the working pressure of hose shall not be less than 40 kg/cm^2. The high pressure hose reels shall hold not less than 19mm X 60 mtr of hose in one length, weight of 60 mtr hose not more than 14 kg terminating in high pressure fog/jet trigger type gun **AWG / Speciany / FireBug / Firefly make or equivalent make** connected by quick connect couplings.

c. The gun shall be made for Aluminum alloy with rubber grip handle. The inlet connection shall be of ¾" BSP & shall have leak proof rotating type hose connector. The gun shall be constant flow type & shall have discharge capacity of 150 LPM approx. The Gun shall have facility to set either Jet or Spray pattern reparably in handle grip. The gun shall have ability to work on pressure from 20 Kg/Cm² to 40 Kg/Cm² without affecting the discharge pattern. The weight of the gun assy. shall not be more than 4.0 kgs.. The inlet connection shall be of 20 mm and shall have a leak proof rotating type hose connector.

d. The hose reel shall be of electrically rewinding type 12 / 24 V. This shall be additional to manual rewinding. The hose reel side plates shall be made of CR Sheet and drum shall be made from aluminium or Stainless steel. The hose reel mounting base frame shall be compact and rigid designing.

e. The Hose Reel shall be compact in size to accommodate in the lockers of the appliance. Dimension of hose reel shall be as per below:

Length –not more than 900 mm
Width –not more than 510 mm
Height –not more than 570 mm
Weight - not more than 35 kg (except hose pipe)

Authorization letter and catalogue from manufacturer shall be attached with bid document otherwise bid shall be summarily rejected

11 POWER TAKE OFF:

11.1 The vehicle shall be provided with suitable PTO to drive the pump through propeller shaft.

11.2 The PTO of reputed make shall have suitable ratio so that it should deliver rated power and torque to drivefire pump at rated output simultaneously which is below:

Make - PZB/ VAS / Fire hawk make or equivalent
Type - Split Shaft
Ratio - 1:1.15 or suitable to Pump requirement respect to selected chassis.
Torque – minimum 400 Kgm (main drive) ;
Actuation - Pneumatically from Cabin with manual override

11.3 The PTO shall either be gear mounted supplied along with chassis by chassis manufacturer or split shaft of reputed make.

11.4 The PTO actuation shall be pneumatically from driver's cabin with manual override

Note: The PTO details shall be submitted with offer.

12.0 Pump Priming System-

12.1 The pump shall be fitted either with inbuilt twin piston / reciprocating / rotary vane / diaphragm / pneumatic type priming system capable of priming the pump from 7 meters within 50 seconds at NTP conditions.

12.2 The entire priming system shall be constructed either in stainless steel or brass or bronze. Arrangement shall be made to actuate the primer in Manual and AUTO modes.

12.3 **When operating in Manual mode** primer should be engaged simply by pressing a single button, only when it is needed.

12.4 **When operating in Auto mode,** primer must be internally actuated and must automatically re -engage when pressure is lost.

12.5 However, in both operating modes the primer shall disengage automatically at a pump discharge pressure of not more than 0.8 bar.

12.6 The primer deactivation shall be controlled directly by a pump pressure sensing device. Priming system driven by any external belts / chain is not acceptable.

13.0 Pump Control Panel

13.1 The pump shall be fitted with Pump OEM fitted Control paned comprising following features:

a. Digital Tachometer (optional)

b. Digital Pump Hour Meter

c. Digital as well as Analogue Vacuum (Compound gauge)

d. Digital as well as Analogue Low and High Pressure gauges

e. Pump prime button for Auto mode

f. Pump prime button for Manual mode

g. Oil Temperature warning light

h. Electronic Water Tank Level Indicator

i. Emergency Call Bell (optional)

j. Audio Visual Alarm for tank indication (Optional)

k. PTO engage lamp in driver's cabin and rear control panel (optional)

13.2 The pump control panel shall be designed keeping in mind the ease of operation and maintenance. The system shall ensure that scheduled operations and preventive maintenance is easily possible.

13.3 It shall be ergonomically designed to ensure that all controls come to hand easily. The entire area shall be covered \by roller shutters.

13.4 All controls of the system will be spaced properly & marked for easy operation. All valves will be of lever-operated type and will be made of SS with Teflon seats. The following controls shall be provided on rear side of the vehicle near the control panel:

a. Compound Gauge
b. Normal Pressure Gauge
c. High Pressure Gauge.
d. Engine Throttle Control (Auxiliary / Electronic)
e. Cooling Water Circuit Control
f. Hydrant Connections for filling water tank.
g. Pump Inlets and Outlets
h. Water Tank to Pump
i. Butterfly Valve – Pump to Monitor Valve
j. Operating Instruction Plate

14.0 WATER MONITOR :

14.1 Should be of ELKHART BRASS/AKRON/TFT or equivalent made.

14.2 Should be made of Pyrolite® high Strength material protected against corrosion

14.3 Should have T-handle for vertical and horizontal movement.

14.4 Should be capable for delivering up to 1000 GPM (3800 LPM)

14.5 Horizontal movement adjustment lockable by knob.

14.6 Vertical movement adjustment lockable by knob.

14.7 It should be capable for +90 degree to -45 degree vertical movement. It should be capable 360 degree horizontal movement.

14.8 Inlet should be 3” inch Flanged & outlet shall be 2.5” NH.

14.9 Capable to be mounted on the suitable place at rooftop of the vehicle.

14.10 Monitor dimensions shall not exceed depth 250 mm x width 280 mm x height 338 mm without the T-Handle.

14.11 Weight shall not exceed 7 kgs.

14.12 The monitor shall have built in pressure gauge

14.13 The monitor shall have cast in turning vanes & integrated removable stream shaper for maximum reach and stream performance

14.14 Nozzles shall have wide, dense, fully adjustable fog pattern.

14.15 Nozzle shall be constructed of lightweight Pyrolite Material & shall have spinning teeth.

14.16 Nozzle shall have Manual Pattern fixed gallonage setting of 500 GPM (1900 LPM) at 7 Bar.

14.17 Nozzle dimensions shall not exceed 180mm x 130mm x 130mm (LxWxH)

14.18 Nozzle shall have 2.5" NH inlet matching to monitor outlet & weight shall not exceed 2.5 kg.

14.19 It shall have reach of not less than 45 meters at 7 bars is provided at nozzle inlet.

14.20 Monitor and Nozzle shall have CE certified.

Authorization letter and catalogue from manufacturer shall be attached with bid document otherwise bid shall be summarily rejected.

15.0 COOLING SYSTEM:

15.1 Indirect cooling system of open circuit type for power takes off unit only shall be provided.

16.0 Pump Test –

16.1 The pump shall be run for a period of three hours non-stop delivering the rated output at 7 kg/cm^2 and for one hour at 35 kg/cm^2 with a lift of 3 m at NTP.

16.2 During the test, the water shall not be replenished for the cooling system and the temperature of the engine oil shall not exceed the engine manufacturer rated temperature for continuous working. The engine shall show no sign of stress during the test. The temperature of the cooling water (radiator water) tank shall not exceed the engine manufacturer rated temperature for continuous working.

16.3 The PTO sump oil temperature shall not exceed 100 percent of the manufacturers recommended temperature for the grade of oil used. The pump casing and impeller shall be subjected to hydraulic pressure of 21 kg/cm^2 for 10 minutes to detect leakage, perforation, etc.

16.4 Other Test related to Pump shall also be carried out as given below:

16.4.1 **Thermal Relief Valve (TRV) Test:** The TRV shall be tested as follows- After priming the pump from open well let the pressure within the pump build up upto7 kg/cm^2, this shall be followed by engaging the pump in HP mode. Now, close all the delivery outlets (including the engine cooling valve) then throttle the engine so as to maintain a high pressure of 30-35 kg/cm^2 let the pump heat up until the TRV opens automatically and hot water comes out of it , measure the temperature of this hot water. This temp. shall not exceed the specified value (48º or 80ºC). Slowly open the delivery valve so as to allow fresh cold water to enter into the pump. The TRV must close automatically once the ambient temperature is reached by the pump.

16.4.2 **Pressure Relief Valve (PRV) Test:** The PRV shall be tested as follows- After priming the pump from open well let the pressure within the pump build up up to7 kg/cm^2, this shall be followed by engaging the pump in HP mode, now close all the delivery outlets (including the engine cooling valve) then throttle the engine so as to increase the high pressure until the PRV opens automatically and the pressure should not be more than 40 kg/cm^2 The PRV must close automatically once pressure is less than 40 kg/cm^2

17.0 ELECTRICAL SYSTEM & FITTED ACCESSORIES:

17.1 All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse box located in an accessible position in driver's cab and fitted with means for carrying spare fuses.

17.2 The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used, wherever necessary. The wire selected shall be of suitable size for different circuits considering the current consumption of that circuit with min. 20% higher capacity. All the wires shall necessarily be copper conductor with proper insulation.

17.3 All equipment lockers will have individual lights and these will be operated by means of a master switch on the dash board in the driver cabin.

17.4 A trickle type battery charger having capacity of 250 volts to charge 24 volts battery will be provided for recharging the battery in situ. A red pilot lamp indicating when the batteries are being charged from an external supply will be provided. This is required to be fitted at appropriate location on the appliance.

16.5 Following electrical fittings will be provided on the appliance at suitable locations

Hand Lamps	2
Battery operated siren 1km range	1
Fog Lamps	2
LED Light Bar with Inbuilt PA System with Multi tone Siren & Hooter in on Unit	1
Search Light (min. 1000 Lum.) with 30 meters Cable Reel	1
Spot Light (mounted near driving compartment)	1
Inspection Lamp with bracket	1
LED flasher lights (both side & rear side) Red, Yellow, Blue & white etc.	6
LED WORK LIGHT –operated on DC mounted on top rail each side, @ 500lm Lighting power.	5
LED scrolling or flashing display sign board (scrolling letters willgiven by Fire Dept)	1
Reverse Sound Hooter, with Additional Lights and Reverse Camera with Picture Screen in Cabin	1 Set
Separate special Master ON/OFF Switch for all lights together, shall be give on Dash Board	1
Fire Bell made of Gun metal 250 mm	01
PUBLIC ADDRESS SYSTEM: Battery operated public address system Ahuja or equivalent make having range of the sound of the public address system would be within 500 mtrs & 12 volts power supply shall be drawn from the battery of the chassis should be provided. The PA system should consisting of amplifier, loud speaker and mike shall be fitted inside the drivers cabin in front of the officer's seat. Amplifier andmicrophone shall be clamped / fixed type in front of officer's seat. Horn unit / loud speaker shall be mounted on roof of the cabin.	01 No.

18.0 PAINTING AND MARKINGS:

17.0 The entire structure will be prepared by grinding the welded surfaces, priming the finished material with a zinc rich primer.

18.1 **Surface Preparation**: This would be poly- urethane (PU) based paint.

18.2 **Vehicle Exterior Paint**: The complete vehicle (all exterior surfaces) & monitor would be painted with at least 2 coats of zinc phosphate primer each of 50 microns DFT & 2 coats of polyurethane finish paint each coat of 50microns DFT. Further improvement on the paint maybe carried out by the manufacturer beyond that mentioned above, to give better protection & surface finish.

18.3 The entire appliance will be painted with Fire Red paint preferably of ASIAN PPG make using double coat spray painting on the outside. The user's (ULB's) name and logo and the lettering "Maharashttra Agnisuraksha Abhiyaan" will be written on both-sides with yellow colour (in English & Marathi).

19.0 Marking / Name Plates: All the lockers / cabins will be provided with SS name plates with letters itched on it boldly indicating the content

19.1 Each appliance shall be clearly and permanently marked with the following information:

19.1.1 Manufacturer's name, or trade-mark, if any;
19.1.2 Serial number of the pump body and year of construction;
19.1.3 Capacity of pump, in l/min;
19.1.4 Capacity of water tank, in litre;
19.1.5 Nominal speed, in rev/min;
19.1.6 Transmission ratio of the PTO;
19.1.7 Working pressure, in kg/cm^2;
19.1.8 Direction of rotation of the pump shall be indicated by an arrow and this shall be permanently marked on the pump body; and
19.1.9 Lubrication points, drainage devices, etc, shall be colour coded.
19.1.10 Engine & Chassis no.
19.1.11 Instructions for Driver in cabin

20.0 DOCUMENTS :

20.1 Following Documents has to be submitted during the bidding process and after the delivery such as :

General layout of the tender / equipment layout.

EN / CE Certificate as per applicability from third party (self-certification not permissible)

Flow diagram Electrical system

Locker drawings

User Manual and Instruction Booklet- Instruction books for the guidance of the user including both operation and normal maintenance shall be supplied for all the equipment in English language. The books shall include an item wise and illustrated spare parts list giving reference numbers of all the possibly wearing parts. The workshop manual and spare parts catalogue of chassis shall also be supplied with vehicle preferably with soft copy.

20.0 ANCILLARY EQUIPMENTS :

The ancillary equipment as given in the Annexure A-1 of this specification shall be provided along with the vehicle.

21.0 STAGEWISE INSPECTION.

21.1 Each stage wise inspection will be carried out by representative from the Directorate of MFS or any authorized person by Director. It is hereby suggested that there should be minimum three member panel in the inspection team.

21.2 Expenses towards lodging boarding of inspecting team members should be born by the Company. To and fro expenses towards the travelling of the team members from the journey place to the works will be borne by the successful tenderer and the offer shall contain all such expenses.

21.3 Advance notice of at least 1 week should be given by the fabricator; however the fabricator must keep the vehicle ready for stage wise inspection before giving such notice to Purchaser i.e MFS.

21.4 Following stagewise inspection needs to be carried out.

Ist Stage Inspection (Only for Proto type)	a) Chassis inspection b) Body Structure Inspection c) Testing of Loose (unmounted) Water Tank and hydrotesting and sand blasting test d) Inspection of Panel Work. Hydrotesting of Pump. e) Installation of Pump, PTO & Piping Pre-finishing inspection. f) Compliance of non-conformities, if any
IInd Stage Inspection / Final Stage (for Proto type and thereafter work order)	a) Stability (Tilt) test as per IS standard b) Gradient Test for entire vehicle c) Articulation Test for vehicle d) Road Test for full laden vehicle for min 30kms. e) Four Hours f) Pump Operation Testing. g) Monitor & Hose Reel performance test. h) Complete functions-operations of all systems installed. i) Checking of all catalogues, Operation manual of appliance Any Other : Test as may be required for Final Acceptance

Gradient Test. The vehicle will be tested on a gradient test ramp which has an angle of 1 Mtrs in every 4 Mtrs of distance travelled. The test will be done as per the Indian Standards.

Stability Tilt Test: The static stability of the appliance shall be checked such that when under fully equipped & laden condition (excluding crew), if the surface on which the appliance stands is titled to either side, to ensure that no overturning occurs till vehicle attains tilting if 27 -+ 1 degree from horizontal.

Endurance (Long Running) Test: The rating of pump would be min. 4 Hrs. Thepump will be tested for a continuous period of 4 Hrs nonstop & the water will not be replenished in the radiator during this test. The engine shall not show signs of overheating during this test.

Articulation Test: The vehicles shall be tested for articulation & will not show any signs of stress during this test. Also the clearances in the wheel wells will be checked for tolerances.

Other Test include Turning Radius Test, Road (Braking, Acceleration & Speed).

All these test needs to be cleared from ARAI (Automotive Research Association of India), Govt. of India OR from CIRT (Central Institute of Road Transport), and the Test Reports to the effect to be got from the Body Builder / Tenderer.

22.0 TRAINING

22.1 The successful tenderer has to arrange training for the personnel of ULB's Fire Service in handling, operation and maintenance of the equipment as mentioned in the Annexures. The training of minimum 2 sessions at ULB's fire station shall be conducted. The training shall cover operation, handling and maintenance of all the tools equipment andgears listed under this tender.

22.2 All the expenses towards the training shall be included in the cost in addition to training material and the cost of tools and equipment and consumable required at the time of training.

Table 1 Pump Performance Data

Sl No.	Output Litres/minutes	Pressure Kg/cm2	Lift M	Remarks
(1)	(2)	(3)	(4)	(5)
i)	2000	7	3	When working through two 2.45 m Lengths of specified suction hose
iv)	300	35	3	When working through two 2.45 m lengths of specified suction hose

ANNEXURE - A-1

Equipment to be supplied with the appliance are as follows:

Sr. No	Description	Qty
1.	Pyroprotect RRL Delivery hoses, Type B, (ISI-636) 63 mm dia X 15 M with Copper winding Gun metal / SS couplings of 63 mm couplings.	4
2.	Pyrporotect RRL Delivery hoses, Delivery hoses, Type B, (ISI-636) 38 mm dia X 15 M with Copper winding Gun metal / SS couplings of 63 mm couplings.	4
3.	PVC Suction hoses 2.5 m length 100 mm dia fitted with Gun metal coupling & GI /copper wire binding.	04
4.	Suction strainer for 100 mm suction hose – brass as per IS: 907: 1984	01
5.	Dividing breaching with control 63 mm instantaneous pattern - GM as per IS: 5131:2002	01
6.	Collecting breaching 63mm instantaneous pattern – GM as per IS: 905: 1980	01
7.	Suction wrenches Conventional / Universal for 100 mm suction hose couplings as per IS : 4643:1984	02 pairs
8.	Short Branch pipe GM 63 mm male inlet as per IS: 903: 1993	02
9.	Foam branch – FB5X type, with pick up tube, GM as per IS:2097:1983	01
10.	Hand held Nozzle- Flow rate : Max Flow 470 lpm @ 6 bar Working pressure : PN 16 Throw : Full jet – 30m Spray – 4.5m Inlet : 2 ½" BIM Coupling Material : Al Alloy Dimensions LxWxH mm: (Not more than 347x80x80) Weight : Not more than 1.25 kgs Flow pattern : Hollow straight stream to fog spray with an angle not less than 120 deg Material : Operating head - Rubber and Chrome plated brass Barrel – EIR Plastic Coupling material – Pyrolite® Approval : SOLAS / MED approved Approved Makes : TFT / AWG / AKRON Authorization letter and catalogue from manufacturer shall be attached with bid document otherwise bid shall be summarily rejected	01

11	Suction adaptor GM 100 mm female x 63 mm male with lugs	01
12	Adaptor 63 mm male to 38 mm female GM	01
13	Adaptor 63 mm female to 63 mm female GM	01
14	Double Male Coupling 63 mm	01
15	Aluminum Extension ladder 10.5 mtrs with the provision of gallows	1
16	Rubber gloves, marked with IS-4770-1968.	06
17	Basket strainer as per IS-3882-1966	01
18	Spade with wooden handle	01
19	Pick axe wooden handle marked with IS-273-1973.	01
20	Crow bar marked with IS-704-1968.	01
21	Bolt cutter heavy duty	01
22	Sledge Hammer 6.5 kg. IS – 841	01
23	Ropes Terylene Nylon 1" (30mtrs each)	01
24	Ropes Terylene ½ " (30 mtrs. each)	01
25	Fireman Helmet as per IS 2745 (Non-Metal)	06
26	Gumboots (Knee Lenght)	06
27	Ceiling Hook	01
28	Drag Hook heavy duty	01
29	Metal Hooks for Water search use	01
30	POWER GENERATOR: - Heavy duty AC power generator shall be mounted at suitable location to provide continuous power source so that positive AC power will be available on board. The system will be very compact light weight and noiseless. The output capacity of generator shall be 5 KVA, Single phase, Power factor 1.0, Over all dimension are not more than 459LX 212W X 230H mm, Weight not more than 29 Kg, Suitable drive arrangement shall be made through on board PTO. Power generator shall be mounted at convenient place. Authorization letter & catalogue from system manufacturer / Dealer shall be attached with bid document.	01

31	Fire Fighter Forcible Entry Tool: (IMPORTED) i) Tool shall be small enough to fit into fireman pocket. Tool folding handle can be angled 90 degrees to block hinges, 135 degrees to breach doors, 0 degrees to utilize built-in tools and 270 degrees to create a different prying vantage. iii) This tool Used for following applications – • Breach doors. • Block door hinges. • Shut off gas meters. • Open fire hydrants. Weight not more than 3 lbs Authorization letter and catalogue from manufacturer shall be attached with bid document otherwise bid shall be summarily rejected	01
32	Electric Chain Saw : One Man Chain Saw Single Phase Electric Motor, Power Not More Than 2000Watt, Guide Bar Length Not Less Than 60 Cm (24 Inch), Weight with Guide Bar & Chain Not More Than 11 Kg With 30 Mtr Electrical Cable and Plug. of suitable and reputed make.	01