DETAILED SPECIFICATIONS FOR

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

Minimum 18.5 Ton; Water Capacity : 6000 Ltrs; Foam - 3000 Ltrs

The said fire fighting tender with rescue equipment is the upgrade version of basic fire fighting vehicle which is used for any fire service. The said rescue tender shall consist of normal fire fighting equipment along with various special rescue tools and equipment (The word fire tender / water tender / fire tanker / Foam Tender / rescue tender etc should be read as one only).

The successful tenderer will have to complete the work as per specifications stipulated below and complete the vehicle in all respectto put into operation and ready to use.

Note:

1. Wherever makes of any equipment is given it shall always be read in continuationword "or equivalent"
2. Wherever the numerical is used indicating dimensions / measurement of any equipment ormaterial, 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 bythe OEM / Fabricator.

2.0 CHASSIS

2.1 Suitable Chassis of Bharat Benz / Mahindra / Tata / Ashok Leyland or equivalent make having minimum GVW, HP, Wheel base etc., with power steering, AC and meeting BS VI standard shall be provided.

2.2 The complete cabin shall be manufactured by the body fabricator as per the following specifications :-

2.3 The front end structure, cowl shall be original and shall be retained as supplied with the chassis.

2.4 The size of driver-cum-crew cabin shall be :

Length of cabin	- 2200 mm - 2400 mm.
Width of cabin	- 2200 mm - 2480 mm..
Internal height	- Not more than 1700 mm.

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

2.6 Quick removable type wire mesh guard made from 25 mm × 25 mm size mild steel galvanized wire mesh of 1.6 mm covered in mild steel angle frame shall be provided toall the glasses of driver-*cum*-crew cabin.

2.7 Each cross member shall be secured to the runner running full length of the chassis frame with suitable mounting plates. The runner shall be fixed to the chassis frame.

2.8 The complete superstructure of the cabin shall be made out of SS 304 square tube of 40 X 40 X 1.6 mm. The superstructure shall be strengthened specifically on the members where the doors and window frames are to be fitted and also on the other members by providing brackets and the gusset plates securely fitted

2.9 The flooring of the driver cum crew cabin 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

2.10 The complete Internal and external paneling of driver-cum-crew cabin, including doors shallbe of 1.6 mm and 2.0 mm respectively of aluminum sheet with all the joints riveted and bided.

2.11 The flooring of the driver-cum-crew cabin shall be fabricated from 3 mm aluminum chequeredplates except over the mudguard arches which shall be of 2 mm aluminium chequered platerigidly fixed to the under frame by means of nuts and bolts or riveting. Trap doors for toppingup wherever necessary shall be provided.

2.12 The driver-cum-crew cabin shall be equipped with full four doors, one for driver, one for officerin the front and two at the rear for the crew members

2.13 All the doors shall be fitted on the super structural members each hung upon the two/three numbers coach type hinges and handles.

2.14 For all the above windows, 5 mm. thick laminated safety glasses shall be provided

2.15 The wind screen shall be 5 mm thick laminated safety glass curved type single piece with EPDM rubber beading.

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

Chassis GVW	Horse Power	Wheel Base (min)	Water tank Cap Ltrs	Hose ReelHose	Pump Discharge Ltr/ Bar	Water Monitor
Minimum 18.5 ton	Not less than 200 HP	Min. 4000 mm	6000 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-3000 LPM @ 7 bar b) High pressure output-300 LPM at 35 bar	**Discharge – lpm at 1800 @ 8.5 Bar with effective throw of min 45 mtr**

BODY WORKS AND LOCKERS:

4.0 SEATS

4.0.1 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.

4.0.2 Suitable locker space shall beprovided below the crew seat

4.1 REAR BODY

4.1.1 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.

4.1.2 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

4.1.3 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.

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4.1.4 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.

4.1.5 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.

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

4.1.7 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

4.1.8 Two numbers of 25 mm diameter aluminum pipe railing with sufficient number of aluminumsocket 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'.

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

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

4.1.11 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.

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

4.1.13 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, which shall 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.

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

4.1.15 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.

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

4.1.17 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.

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

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

4.1.20 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.

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

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

5.0 LOCKERS:

5.0 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 profiles with suitable side guide channels.

5.1 All aluminium profiles use shall be proper anodized with the thickness of each profile notless than 30mm

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

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

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

5.5 The roller shutter winding rolls shall be of suitable size

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5.6 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.

5.7 **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.

5.8 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.

5.9 Lockers and other suitable accommodation shall be provided for all equipment as mentioned in Annexure-I as well as Annexure A-II required for Fire Tender. Lockers shall be accessible from the ground level to a man of average height i.e. at 5'.6".

5.10 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 butexcluding the lockers provided below the chassis level. The Aluminum shutters shall be watertight with suitable rubber packing.

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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 followingparameters:

PARTICULARS	REQUIREMENT
Capacity	**6000 ltrs**
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.

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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 forrepairs when required. The tank shall be fitted with a 100 mm sized overflow pipe. 2 X 63mm 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 thewheels.

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 effectiveground 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' ringsealing.** However, flange joints shall be kept to minimum

c. All lines shall be hydraulically tested at 1.5 times of the design pressure and pressureshall 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

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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 frameis 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, henceEN-1028 standards are considered for this work.

10.2 A Centrifugal high and low pressure fire pump made up of gun metal / stainless steel / aluminium alloy 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 madeof GM / SS/ Aluminium alloy.

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10.6 The pump housing shall have provision to connectnormal 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. Anti-friction bearings external to the casingbe 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 PTO of 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 lineand all shall be dynamically balanced. Any changes in the original driveline of the chassis shall beapproved 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 shaftspeed safe enough to operate the engine. The pump capacity shall be as mentioned in Clause 03.

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10.16 The pump shall be compact and of modular design having one 100 mm suction with roundthreads with an removable strainer and 2 X 63 mm deliveries with hose pressure relief arrangementshall 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 gun metal / stainless steel / aluminium alloy.

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 Suitable 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 thepump 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.

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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 theappliance. 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 connectionshall be of ¾" BSP & shall have leak proof rotating type hose connector. The gun shallbe 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 havea leak proof rotating type hose connector.

d. The hose reel shall be of electrically rewinding type 12 / 24 V. This shall be additionalto 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 mmWidth -not more than 510 mmHeight -not more than 570 mm
Weight - not more than 35 kg (except hose pipe)

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

10.25 Constant Flow Multi-Pressure Pump:

A constant flow multi-pressure pump capable of delivering 150 LPM @ 30 bar outputs at nozzle on ground level as well as at 60th Floor shall be mounted in the vehicle. The pump shall be driven suitably through power take off and the output of this pump shall be connected to common high pressure hose reel.

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 pumps.

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 which is below:

Make - PZB/ VAS / Fire hawk make or
equivalentType - 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 overrideNote: 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 secondsat NTP conditions.

12.2 The entire priming system shall be constructed either in stainless steel or brass or bronze or aluminium alloy. 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 singlebutton, only when it is needed.

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

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

12.6 The primer deactivation shall be controlled directly by a pump pressure sensing device.

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 maintenanceis easily possible.

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

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

a. Compound Gauge

b. Normal Pressure Gauge

c. High Pressure Gauge.

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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.

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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 outputat 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 thetest. 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.

16.0 FOAM COMPOUND TANK - (SS MAKE)

16.1 The foam compound tank of min 300 Ltr capacity shall be mounted on the chassis in addition to the water tank and as a separate and distinct unit which can be removed for replacement, maintenance etc.

16.2 The foam compound tank shall be of rigid type. The Stainless Steel (SS) Tank should be fabricated out minimum 3 mm thick SS sheets and the bottom thickness of the foam tank should be minimum of 4 mm. The foam tank should be hydraulic tested at 2 psi pressure tofind out any leakages. Rigid tank shall be of stainless steel sheets should be marked with Steel Authority of India (SAIL).

16.3 All the welding shall be by TIG welding process only. The welding of the tank shell shall be in such a manner that the first beading is from inside the shell and subsequent bead from outside the shell. The welded surface shall be cleaned of all slugs, scale etc. There

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shall be minimum joints in the tank shell and hence plates used for fabrication of tank shall be of maximum size.

16.4 The tank shall have a filling orifice of not less than 130 m.m. diameter with a removable strainer fitted to it. The strainer shall be of such material as shall not be affected by constant

contact with the foam compound and its total screening area shall be adequate to permit quick filling of compound into the tank. The filler cap shall be clearly marked 'FOAM' preferably pressing, casting or embossing.

16.5 The rigid tank fitted shall have its top dished tunneling arrangement provided to enable easyfilling from 20 ltrs. drums. Suitable sharp-edge tin opener may also be provided at the foamtank filling mount for puncturing the foam compound drum for facilitating quick filling of thefoam compound directly from the drums into the tank. The tank shall suitably be baffled toprevent surging while the vehicle is in the motion/standing on uneven ground or brakes areapplied to the moving appliance.

16.6 The design of the tank shall incorporate a removable sumpfitted with a drain valve. The foam compound draw off tube shall be positioned in the centreof the sump in such a manner that foreign body or sludge shall not pass into the compoundline. The draw-off tube shall be fitted with gauge strainer of suitable material, mesh, size, and adequate straining area.

16.7 The tank shall be removable and it shall be ensured that the joint between the top and the body of the tank is leak proof. The rigid tanks shall be flexiblymounted unless attached to a rigid structure. The tank shall be separate and distinct from the body and shall be easily removable as a unit.

16.8 Means shall be provided for automatic venting of the foam compound tank when the foam is being produced or the tank is being filled. This shall not be incorporated with the cap. The device employed shall be as simple as possible and shall not easily operate during normal use of the appliance.

16.9 The draw-off tube shall be connected to the foam compound proportionator / inductor and pump, as necessary, and an automatic flow control valve shall be incorporated in it so as to maintain a constant induction rate of not more than 6 percent with varying foam out put.The plumbing for this purpose shall have a clear and unobstructed passage of not less than 30 m.m. throughout, without any construction and shall.

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.

20.0 PAINTING AND MARKINGS:

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

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

20.2 **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.

20.3 The entire appliance shall be painted with Fire Red paint i.e. RAL 3000 using double coat spray painting on the outside. The user's (ULB's) name and logo will be written on both-sides with yellow colour (in English & Marathi).

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

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

21.1.1 Manufacturer's name, or trade-mark, if any;
21.1.2 Serial number of the pump body and year of construction;
21.1.3 Capacity of pump, in l/min;
21.1.4 Capacity of water tank, in litre;
21.1.5 Nominal speed, in rev/min;
21.1.6 Transmission ratio of the PTO;
21.1.7 Working pressure, in kg/cm^2;
21.1.8 Direction of rotation of the pump shall be indicated by an arrow and this shall be permanently marked on the pump body; and
21.1.9 Lubrication points, drainage devices, etc, shall be colour coded.
21.1.10 Engine & Chassis no.
21.1.11 Instructions for Driver in cabin

22.0 DOCUMENTS :

22.1 Following Documents has to be submitted during the bidding process and after the deliverysuch as :

General layout of the tender / equipment layout.
EN / CE Certificate as per applicability from third party (self-certification notpermissible)
Flow diagram Electrical systemLocker drawings

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<table>
<tr><td>23</td><td>PNEUMATIC LIFTING AIR BAGS (flat type) AND ACCESSORIES: Lukas /Holmatro make High pressure pneumatic lifting bags having working pressure not less than 12 bar, made of Kevlar reinforced nitrile rubber with 3 layers aramide reinforcement, nonslip design, capable of being interlocked when 2 bags are placed on top of each other, quick connection with automatic double locking system, insertion thickness not more than 25 mm including profile, resistant to ozone and range of chemicals, reflective markings on the corners of the bags, centering mark, etc of the following capacities shall be supplied :-
<table>
<tr><td>Lifting capacity</td><td>Min. Inflation height (mm)</td><td>Weight (not more thar kgs.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>31 TONS</td><td>320</td><td>8.6</td></tr>
<tr><td>53 TONS</td><td>410</td><td>15.0</td></tr>
</table>
The airbags are to be supplied with the following accessories
<table>
<tr><td>Pressure reducer 300 bar to 12 bar</td></tr>
<tr><td>Control box for operating 2 airbags with pressure gauges ad carryir strap</td></tr>
<tr><td>Air Hose 5 mtrs</td></tr>
<tr><td>Air hose 10 mtrs</td></tr>
<tr><td>Shut off hose with safety valve</td></tr>
<tr><td>Connection piece to connect two air cylinders</td></tr>
</table>
Authorization letter and catalogue from manufacturer shall be attached with bid document.</td><td>1 Set each</td></tr>
<tr><td>24</td><td>Thermal Imaging Camera having compliance to NFPA 1801:2021 for detection of the source of fire in smoky environment as well as search and rescue having resolution 320 X 240 pixels. Size of display shall not be less than 4 in. LCD, 320 X 240 pixels, backlight. Operating temperature range shall be -20°C to 85°C (-4°F to 185°F) 150°C (302°F): 15 min. 260°C (500°F): 5 min. shall also be provided with Li-ion, 3.6 V rechargeable battery</td><td>01</td></tr>
<tr><td>25</td><td>Confined space entry kit complete with tripod and other accessories Karam/Udyogi or equivalent make</td><td>1 Set</td></tr>
<tr><td>26</td><td>Circular saw Electric driven fitted with 30 cm wheel dia fitted with 15 mtr cable</td><td>1 No</td></tr>
<tr><td>27</td><td>FOLDING STRETCHER- Aluminum Alloy Folding ladder Two Fold - *Flexible handle and foldable outrigger *Made of high strength aluminum alloy material and oxford leather materials. *Being light-weighted, portable, and easy carried. *Good reputation for reliable quality and service. *Mainly used in battle</td><td>5 Nos</td></tr>
</table>

	field and outdoor to carry patients and wounded person. *Easy for use and sterilization. Load capacity -150kg. Color- black or orange	
28	700 Lumen Rechargeable Torches, Design :Right Angle Light, Run Time: 2 Hours, Power Consumption 3Watts, mode-3 High, Low, Blinker , Beam Angle 2 Degree, Max Beam Distance 5600 Feet (91760mtr) , Unit Weight- Not more than 700 Grams, Feathers - It should be able to cut through the white smoke impact	06 Nos.
29	WINCH: • Winch shall be operated suitably and fitted in the front of vehicle on heavy duty mounting bracket • A pulling capacity of the winch shall not be less than 2 ton and controlled by wired or wireless controller. • Wire cable of minimum 15 m length on rope drum with replaceable self-locking clevis hook shall be provided. • The winch should comply relevant safety standards.	01 no.
30	LIGHT MAST: • A compact, low profile, roof mounted lighting mast system shall be fitted with 2 x 50 watts or equivalent LED lamp. • The mast control is provided by a 12 V DC remote controller. • It shall have 180° downwards and 90° upwards tilting. • The total maximum weight of the light mast shall be less than 55 Kgs.	01 No.
31	MULTI GAS DETECTOR: • It shall be reputed make having rugged design, it has large buttons for easy use, made out of polycarbonate housing protects the detector from drops of up to 10 feet. • It shall be come with motion alert which lets others to know if the user has become in mobile and instant alert a manual alarm that shall alerts other about dangerous situation IP 65 certified. • It is to be equipped with sensors to detect various gases like gases like oxygen, carbon monoxide, carbon dioxide, hydrogen sulfide, sulfur dioxide, ammonia, chlorine and many more.	01 No.

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