Directorate of Maharashtra Fire Services
Maharashtra Fire Service Academy, Vidyanagari,
Hans Bhugra Marg, Santacruz (East),
Mumbai – 400098

SPECIFICATION FOR DESIGNING CONSTRUCTION, FABRICATION, ERECTION, TESTING, AND COMMISSIONING OF MINI FIRE WATER TENDER UP TO 7 TON

The Directorate of Maharashtra Fire Service earlier have issued specification for various capacities water tender but few Municipal Councils still insist for water tender of lower capacity. Thus, in order to meet their expectation, small version of water tender hence forth referred as "Mini Fire Water Tender" to be equipped with some basic Ancillary Equipment, following specification is designed and suggested by Directorate of Maharashtra Fire Services. The aforesaid specification is for "Mini Fire Water". Details of specification are as follows.

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 ULB i.e. Municipal Corporation or Municipal Council with a satisfactory test. The successful tenderer will have to complete the work as per specifications stipulated below and complete the vehicle in all respect to put into operation and ready to use. The said vehicle should not be considered as substitute for Quick Response Vehicle as QRV are also equipped with specialised rescue tools and equipment.

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.

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2.0 **CHASSIS**

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

3.0 The Specific Specification for Various Vehicle:

Sr. No.	Chassis GVW	Horse Power	Wheel Base	Water tank Cap Ltrs	Foam tank cap Ltrs	Hose Reel Hose	Pump Discharge Ltr/ Bar
1	Approx up to 5 Ton SFC Rear twin tyre	Minimum 98 HP	3300 mm	Minimum 1500 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	a) Normal minimum pressure output- 1200 LPM @ 7 bar b) High pressure output- 250 LPM at 20 bar
2	More than 5.5 ton up to 7 Ton SFC Rear twin tyre	Minimum 98 HP	3300 mm	Minimum 1800 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	Fire Pump of High Low Pressure type having discharge capacity of 1800 LPM @ 7 bar & 250 LPM @ 30-35 bar pressure

4. WATER TANK: -

A Water Tank shall be installed on the Fire Tender. The tanks have the following parameters:

Capacity	1500-1800 Liters
Material of Construction	Mild steel (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 mm
No of compartments in water tank	Suitable
Numbers and Size of Manhole	1 x 450 mm

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Numbers and Size of Cleaning Hole (Bottom of Tank)	1 x 250 mm
Drain Pipe on Cleaning Hole	25 mm
Overflow Pipe Size	100 mm
Tank Filling Line Size	65 mm
Number of Tank Filling Connections	1 x 63 mm
Tank to Pump Line Size.	100 mm

5. DESIGN & PLUMBING: -

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. Inspection manholes will be provided on top of the tank at rear. The manhole will have a hinged cover so that the manhole will also act as a filling orifice. For Water tank All welding area will be smoothening with the use of grinder. Tank will be cleaned and dried. All the welding of the tank shall be by MIG welding process only. The welded surface shall
be cleaned of all slags, scale etc. There shall be minimum joints in the tank shell and hence plates used for fabrication of tank shall be of maximum size. The tank shall be hydraulically tested at 0.3 kg/cm2.

Suitable eyes will be provided on the shell of the tank to enable it to be lifted off the vehicle for repairs when required. 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. The tank will be fitted with an overflow pipe taken down to a point well below the chassis that discharges the water away from the wheels. Hydrant connection incorporating a strainer will be provided for filling the tank. A pipeline will be taken from the tank to the suction inlet of the pump incorporating a quick action butterfly valve.

The tank will be connected with the pump in such a manner that pressurization of water tank or water tank → pump connection is avoided when pumping water from an outside source of supply. Reinforcement & corrugation of the tank from all side shall be done.

Visual Level Gauge of the glass tube will be provided at the Control Panel Calibrated ¼, ½, ¾ & Full.
All hardware nut-bolt shall be Stainless steel SS304 only. The water tank with its piping and filament shall withstand hydrostatic pressure 0.3 bar.

Following operation shall be possible -
- Cooling Water Circuit Control
- Hydrant Connection for filling Water Tank
- Pump Inlets and Outlets
- Water Tank to Pump Butterfly Valve
- Pump to Monitor Butterfly Valve
- Pump to Hose reel ball Valve
- Operating Instruction Plate.

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6. FIRE PUMP (HIGH LOW-PRESSURE TYPE) FIREFLY/GODIVA MAKE: -

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

10.1 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

10.2 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.

10.3 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.

10.4 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. However fabricator / manufacturer can also quote optional price for Alluminium alloy pump assembly.

10.5 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.

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10.6 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.

10.7 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.

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

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

10.10 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.

10.11 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.

10.12 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.

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

10.14 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.

10.15 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 deliverieswith 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.

10.16 The entire high pressure section of the pump shall either be made of stainless steel(CF8) or Aluminium Alloy. 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.

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

10.18 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 for high pressure of not less than 1.00" size.

10.19 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^{0}C while operating under closed discharge conditions.

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10.20 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 High strength light aluminium alloy Gr.4450 of IS:617:1994 (Duly heat treated and hard anodized) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr. 8 Ni).

b. **High pressure impeller:** Lead tin bronze (Grade LTB 2 of IS 318) or High strength light aluminium alloy Gr.4450 of IS:617:1994 (Duly heat treated and hard anodized) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr. 8 Ni)

c. **Impeller neck ring** : Lead tin bronze (Grade LTB 2 of IS 318) or High strength light aluminium alloy Gr.4450 of IS:617:1994 (Duly heat treated and hard anodized) or Stainless steel as per IS 6603 (AISI – 304 -18 Cr. 8 Ni) or POLYMER BASED MATERIAL

d. **Pump shaft:** Stainless steel (Grade 04Cr18Ni10 of IS 6603)

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.

10.21 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.

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

6.3 MATERIAL OF CONSTRUCTION -

The pump volute shall be made of Gunmetal. The pump delivery manifold, delivery valves shall be made of Stainless Steel. Both the low/normal pressure centrifugal impeller and the high-pressure impeller of regenerative type shall be made up of GM/stainless steel (CF8). The entire high-pressure section of the pump shall also be made of stainless steel. The pump wearing rings shall be renewable. The pump shaft shall be made of stainless-steel confirming to IS 6603/1972. The bearing housing shall be made of C.I. All stud/bolts coming in contact with water shall be of stainless steel.

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6.4 PUMP CONSTRUCTION -

The normal pressure and high-pressure (HP) impeller shall be mounted on a single shaft. The normal low-pressure (LP) impeller shall be dynamically balanced. The pump shall have self-adjusting Mechanical Carbon Seal. The pump shall have an inbuilt filter of removable type. The filter made of stainless steel "V" wire mesh and shall have self-draining facility while the pump is operating in low pressure mode.

Operation of HP to LP and LP to HP shall be made possible by actuation of single lever and both the stages can operate simultaneously or individually.

The pump shall have inbuilt Pressure Release Valve (PRV) which operates automatically, not to allow the high-pressure to increase beyond 54.5 bar. The HP outlet size shall be of 25 mm.

An automatic Thermal Relief Valve (TRV) should be fitted with the pump, which helps to control the temperature within 55° C of pump water when both deliveries (HP & LP) are shutoff for long time.

The pump shall be modular in design and shall have no gaskets/packing. The arrangement shall be such that while carrying out the pump maintenance work none of the discharge piping is necessary to be removed and the pump impellers and the carbon seal can be attended/removed without removing the pump body. The pump shall have deep groove heavy-duty dual angular contact bearings immersed in oil bath.

Horizontal Distance up to 25 to 30 Mtr & Vertical Distance up to 17 to 20 mtr depends upon atmosphere

6.5 PUMP PRIMING SYSTEM -

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 not more than 30 seconds when tested with the 100 mm suction hose at sea level & at NTP conditions and considering the allowances as stated in IS: 950-2012.

7. PUMP CONTROL PANEL -

The pump shall be fitted with Control panel comp rising following features:

- 1.1 Compound gauge
- 1.2 Low and high-pressure gauges
- 1.3 Engine throttle
- 1.4 Glass tube type water level indicator.

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8. HIGH PRESSURE HOSE REEL AUTOREWIND TYPE CE CERTIFIED: -

One no high-pressure electrically operated Auto Rewind hose reel of either UDOR / DYNAMIC / ROSENBAUER / Firova / Reeltech / Lighttec India Brand or equivalent make shall be located at appropriate location of the Fire Appliance to facilitate operation of the high-pressure section of the Fire Pump. Auto rewind hose Reel shall be equipped with a universal frame and 12/24volt motor to be mounted, additional Manual rewinding mechanism shall be providing. The hub shall easily be removed for ease of installation by removing the chain guards and bolts that secure the hub to the frame. All metal parts, except for the electric motor and sprocket teeth, shall be powder painted. All hardware shall be stainless steel. Hose Reel shall have die. pressed disc with rolled edges to prevent sharp edges. Reels shall include a 1" leak proof swivel with female threads on the inlet and swivel with male threads on the outlet.

The hose shall be light weight PVC nylon braided hose 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 50 m of hose in one length, terminating in high pressure fog/jet trigger type gun **AWG / Speciany / FireBug / Firefly make or equivalent make** connected by quick connect couplings. The Hose Reel shall be compact in size to accommodate in the lockers of the appliance.

Dimensions of hose reel shall be as per below:

Length –not more than 900 mm

Width –not more than 450 mm

Height –not more than 470 mm

Weight - not more than 30 kg. (except hose pipe)

9. POWER TAKE OFF UNIT -

The designed throughput torque of Power Take Off shall be such that it can safely transfer the maximum torque coming from the engine/ gearbox of the vehicle to the rear axle of the vehicle. The PTO shall have suitable input to output ratio so as to keep the engine rpm within the maximum torque range specified by the chassis/engine manufacturer. The main casing shall be made of Light Aluminium Alloy. the bearing holders however shall be made in cast iron, the gears shall be ground for noiseless operation. The gear shifting shall be of single lever type only and multiple linking to engage/disengage the pump side shall not be allowed. There shall be inbuilt self-locking arrangement to keep the unit firmly in the gear selected. The PTO shall have inbuilt water-cooling arrangement to enable the usage of PTO in harsh environments on continuous basis.

The max. Operating temperature of the oil shall not exceed 85-90°C when the PTO is tested for endurance test with cooling arrangement. The PTO unit shall have provision to judge the oil level reasonably and shall have be fitted with a magnetic drain plug along with breather and oil filter cap. Oil seals used shall be of highest quality.

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The gear shifting shall be achieved pneumatically with the aid of vehicle's air tank shall be given near the driver. A rope type flexible manual over ride for gear shifting shall also be provided near the driver's seat in case of loss of air pressure.

The design of the PTO shall be such that all the gears/oil seals/bearings etc. on the drive and driven side can be removed from the casing in situ (without taking the PTO down from the vehicle), this is particularly important to reduce the down time of the vehicle under maintenance.

Operation/workshop maintenance manual depicting all the spares and dismantling/assembly procedure shall be supplied by the PTO manufacturer.

10. WATER MONITOR: -

Water monitor having Discharge capacity of minimum 1200-1500 LPM @7 Kg/ cm2 duly treated with anticorrosion treatment will be mounted on the top of the appliance in such a manner that it can be manually operated by one operator. The monitor will be capable of traversing through 360° in horizontal plane. Elevating from horizontal to 45° & depressing from horizontal to not less than 15° & fully rotation in both directions. The monitor will be capable of projecting the discharge to an effective distance of not less than 45 to 50 m in still air when operated at design pressure. Monitor will be provided with Jet-spray type Nozzle.

11. WATER PIPING: -

All piping and plumbing will be designed to have minimum pressure drop & achieve the required pressure & flow at various locations. All pipe fitting & valves (except butterfly valves) will be of GI material. All piping will be designed for 10% over the maximum pressures encountered in the piping. The piping will be flanged as far as possible for ease of maintenance. All lines will be hydraulically tested at 1.5 times the design pressure however in no case will the lines will be hydraulically tested below 18 bar. All bolting will be of SS 304.

12. COOLING SYSTEM: -

An indirect cooling system of open circuit type heat exchanger shall be provided for cooling the radiator water & Engine. The heat exchanger tank shall be made from minimum 1.22 mm thick brass sheets and the coil in the coolant tank shall be of copper for effective cooling. The design of the heat exchanger shall be such that the temperature of the engine shall not exceed the operating temperature specified by the chassis manufacturer when the vehicle is being used in stationary conditions.

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13. BODY WORK AND STOWAGE: -

Original drivers' cabin shall be supplied by Chassis OEM.

The rear body would be of composite construction with sufficient rigidity, reinforcement, and as far as possible 30mm X 30 mm X 2 mm thick GI square tube and other rolled steel MS sections like Channels and angles of sufficient strength will be used for the super structure. 16-gauge aluminum sheets will be used for exterior paneling work all over & for inner lockers-walls18 gauge aluminum plain sheet / chequered sheet will be used. 3mm thick aluminum checkered plate will be used on all lockers floor, roof top.

Suitable arrangement for strapping and clipping of the equipment in the lockers for non-shifting of the equipment's, while the vehicle is in motion should also be provided. There shall be lockers provided at the level of suitable size on both sides. Suitable number of Lockers on both side shall provide with hinged doors.

Grab rail and non-slip steps with chequered plates should be provided wherever necessary. The flooring will be of all chequered plate of 10 gauges SWG. A suitable box shall be provided to keep all the tools contained in the appliances. Footboard at the rear of the appliances shall be provided with chequered plates. Suitable non-skid steps to give access to the roof of the appliance shall be provided.

Behind the Cabin Lockers should be provided for secure stowage of all accessories and equipment provided with Mini tender. All equipment should be stowed very scientifically & systematically in the lockers and each piece of equipment will have its designated location so that at the time of Emergency the required equipment can be very easily located & removed for use. Location of equipment (labels) should be provided on lockers for immediate identification. Each equipment should be properly clamped and strapped in the lockers to prevent shifting of the equipment while the vehicle is in motion. All the space below the rear body and chassis should be utilized for making lockers for storage of equipment. These lockers should be covered with flap type doors opening downwards with hydraulic shock absorber and positive locking inside tower bolt. These doors when open can be used as climbing steps for access to the lockers above it. Guide rails over entire length on both sides.

14. MISCELLANEOUS: -

a. A suitable bumper shall be provided at the rear rigidly fixed to the super structural members by means of nuts and bolts which is supplied along with the chassis

b. Two cat ladders made out of M.S. pipe only of 25mm diameter shall be provided.

c. 25mm diameter aluminum pipe railing with sufficient number of aluminum socket brackets shall be provided to the rear body over the deck.

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15. ELECTRICAL SYSTEM & ELECTRICAL ACCESSORIES: -

All important electrical circuits will have separate fuses suitably indicated & will be grouped into a common fuse box located in an accessible position in Driver's cab and fitted with means for carrying spare fuses. All the wiring will be monopole and shall not be exposed to the atmosphere. Conduits will be used wherever necessary. All equipment's lockers will have individual lights and these will be operated by means of a master switch on the dash board in the driver's cabin

16. FITTED ACCESSORIES: -.

Fire bell 250mm as per IS:928	1
Fog Lamps	2
Electrical siren 1.5 km range	1
LED Light Bar with Inbuilt PA System with Multitone Siren & Hooter in one unit SIPHON MAKE	1
Search Light with 30 meters Cable Reel	1
Spot Light (mounted near driving compartment)	1
LED Flasher Light (Three sides of the vehicles) Red, Yellow, Blue & White	6

17 PAINTING AND MARKINGS:

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

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

17.3 **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.

17.4 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 will be written on both-sides with yellow colour (in English & Marathi).

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

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

a) Manufacturer's name, or trade-mark, if any;

b) Serial number of the pump body and year of construction;

c) Capacity of pump, in l/min;

d) Capacity of water tank, in litre;

e) Nominal speed, in rev/min;

f) Transmission ratio of the PTO;

g) Working pressure, in kg/cm^2;

h) Direction of rotation of the pump shall be indicated by an arrow and this shall be permanently marked on the pump body; and

i) Lubrication points, drainage devices, etc, shall be colour coded.

j) Engine & Chassis no.

k) Instructions for Driver in cabin

19 DOCUMENTS :

19.1 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. GUARANTEE: -

The successful contractor will have to furnish a maintenance guarantee, undertaking for service, repairs, replacement, maintenance etc. against any defects in the material used, body construction, pump, P.T.O. accessories etc. for 12 calendar months commencing from the date of acceptance of the appliance.

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21. WORKMANSHIP AND FINISH: -

a) All parts of the appliance shall have good workmanship.
b) The appliance shall be painted in Fire Red Color wherever applicable.

22 ANCILLARY EQUIPMENTS :

The ancillary equipment as given in the Annexure – A shall be provided along with the vehicle. Depending upon the budget availability, the option at Annexure – B may be looked into.

23.0 STAGEWISE INSPECTION.

23.1 Each stage wise inspection will be carried out by head of the local fire service or any authorized person by him. It is hereby suggested that there should be minimum three member panel in the inspection team.

23.2 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.

23.3 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 Municipal Corporation / Council, as case, may be.

23.4 Following stagewise inspection needs to be carried out.

Following shall be inspected at the fabricators place before vehicle is dispatched to ULB's

Final stage Inspection	a. Body Structure Inspection b. Testing of Loose (unmounted) Water Tank c. Inspection of Panel Work. Hydrotesting of Pump d. Installation of Pump, PTO & Piping Pre finishing inspection. e. High Pressure Hose Reel Hose operation test f. Stability (Tilt) test as per IS standard g. Gradient Test for entire vehicle h. Articulation Test for vehicle i. Road Test for full laden vehicle for min 30kms

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	j. Four Hours Pump Operation Testing, k. Monitor & Hose Reel performance test. l. Complete functions-operations of all systems installed. m. Checking of all catalogues, Operation manual of appliance n. Any Other : Test as may be required for Final Acceptance

23.5 Approval and Certification towards Chassis and BodyBuild Vehicle- After full Body Building, the entire vehicle should be got fully checked, examined and tested from the concerned chassis Manufacturer / Dealer and Test Report to the effect to be got by the Body builder party / Tenderer as follows –

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. The pump 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.

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24.0 TRAINING

24.1 The successful tenderer has to arrange training for the personnel of fire brigade department in handling, operation and maintenance of the above equipment. The training of minimum 4 sessions either at Fire Station of the concern ULB's or any other suitable location mutually agreeable to Head of the Fire Service of the ULB's and the contractor. The training shall cover operation, handling and maintenance of all the tools equipment and gears listed under this tender.

24.2 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. The training program shall be chalk out in consultation with Head of the Fire Service or any other officerauthorized by the him.

25 COMPREHENSIVE SERVICE MAINTENANCE CONTRACT (CSMC):

25.1 The Contractor shall offer the vehicle with three years COMPREHENSIVE SERVICE MAINTENANCE CONTRACT which includes the cost of repairing of vehicle at periodic intervals or at the time of break down of vehicle including the supply of original spare parts.

25.2 The CSMC shall be for superstructure as well as for the chassis. The servicing of the superstructure and the chassis shall be carried out strictlyas per the manufactures recommendations at periodic intervals.

25.3 During the contract the vehicle shall be checked periodically at the interval of every three months and all the test and checks shall be carried out as per manufacturers recommendations.

25.4 The spare parts used at the time of periodical servicing shall be original and brand new.

25.5 Any break down of the vehicle shall be attended within 72 hrs. from the time of intimation of break down (telephonic / written) to the contractor.

25.6 The servicing and repairing of vehicle including chassis shall be carried out through skilled workers as certified by the manufacturer (within the ULB's District Region).

25.7 All the tools, consumables etc. required for the servicing of the vehicle shall be arranged by the contractor.

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25.8 The servicing and repairing of the vehicle shall be carried out either at the fire station or at the fire brigade workshop or at the authorized workshop of vehicle manufacturer.

25.9 The complete servicing of the vehicle shall be carried out well in advance as per the provisions of Motor Vehicle Act and Central Motor Vehicle Rules whenthe vehicle is due for renewal of mechanical fitness certificate.

25.10 Any break down of vehicle on emergency call or on road shall be attended immediately.

25.11 The complete servicing and repairing of vehicle shall be carried out under the supervision of technical officer of fire brigade department and all the instructions (oral or written) given by him time to time shall be incorporated / attended.

25.12 Any damage to the vehicle due to in proper handling or due to accident shall be attended promptly and the cost on account of such repairs including the cost of spare parts shall be got approved from Head of Fire Service prior to such repairs.

25.13 Any dispute arise out of this contract, Municipal Commissioner / Chief Officer will be the final authority and the decision given by him shall be binding to both the parties.

25.14 The tenderer shall give the details of work to be carried out at periodic interval of three months along with the offer.

25.15 The contractor shall maintain the log book of the vehicle and shall enterall the details of repairs /service of the vehicle carried out time to time and sameshall be got certified either from Officer in charge of the fire station or from workshop in charge.

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APPENDIX- A

BELOW EQUIPMENTS TO BE SUPPLIED WITH MINI FIRE TENDER.

SR. NO.	ITEM DESCRIPTION	QTY.
01	Aluminium Extension ladder 4.5mtr.	1 No.
02	Rubberlined delivery hose pipe confirming to I.S.636 Type B/Type-3 with ISI mark size 63mm X 15 Mtrs. length fitted with IS:903 marked SS couplings and copper wire binded.	2 Nos.
03	PVC rubber suction hose 100 mm dia in 2.5 Mtrs. length fitted with gunmetal round thread male and female couplings of 100mmsize conforming to I.S.902.	4 Nos.
04	GM Suction strainer 100mm size.I.S.907	1 No.
05	Basket strainer. I.S.3582	1 No.
06	Suction wrenches for 100mm suction couplings. I.S.4643.	1 Pair.
07	Short Branch Pipe, Steel (ISI Mark)	2 Nos.
08	FB-10X	1 No.
09	Tool Kit - Double-ended open and ring spanner set 6-32mm size, adjustable spanner -12", screwdriver -8", combination plier -8". Side cutting plier, hammer 0.5 kg, oil can, toolbox.	1 Set.
10	hooligan tools 36".	1 No.
11	Handheld torch (Rechargeable).	1 No.
12	Pick axe with fiberglass handle 3.5 lb.	1 No.
13	Crow bar.	1 No.
14	Sledge hammer with fiberglass handle 5Kg.	1 No.
15	Fire man axe with pouch.	1 No.
16	First aid Box – 10 Person	1 No.
17	ABC type Fire Extinguisher – 6KG as per IS.	1 No.
18	One man operated 1 phase electrical chain saw with 16" guide bar fitted with chain & 15 Mtr electric wire with Socket.	1 No.
19	Rubber gloves.I.S.4770.	1 Pair

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ANNEXURE – B

Depending on the budget availability of the ULB's, Annexure – B should be looked as an option and as per reqirement should go with Annexure – B as follows.

1. The material of Water Tank can be of MS IS 2062 instead of SS 304 or Polypropelyene (PP) can be accepted. (PP tank can be even accepted for foam tank also)

2. The items which are prescribed "made up of gun metal" can be substituted with "made up of SS"

3. Following given below items can be considered as per requirement of each individual purchaser.

A. Water Mist Special Purpose External Fire Fighting Lance with piercing tool – 01 No.

Imported low pressure Water Mist special purpose external fire fighting lance along with portable battery operated carry case piercing tool shall be supplied. Shall suit for use with existing vehicle pump, hydrant system & fire trucks which shall operate 7 bar pressure on standard fire pumps without the need for any additional equipment or engineering.

The gun should have capacity to reduce the compartment fire/room burn temperature from 800 degree Celsius to 60 degree Celsius within 90 seconds. The lance is a robust anodized alloy construction pistol grip gun with easy well know on/off valve technology.

The nozzle is fitted with 2 filters for protection against dirty water. The lance has a retractable nozzle tip for easy deployment through a premade orifice or entry point into any compartment. A protective screen plate is fitted to prevent any debris or heat radiation as well as to act as a stopper for the fire fighter and to provide stability.

The nozzle is coupled to the hose by a quick release coupling.

Outlet	: 60 LPM @ 7 Bar Pressure
Connection	: 63mm male instantaneous coupling
Length	: Length 1200 mm
Weight	: Not more than 4.5 Kg

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PIERCING TOOL: Rotary Hammer Drill with 50 mm dry cut core bits – one for concrete and one for general purpose. Comes with complete range of drill bits for door, window, steel, concrete, etc.

Battery Specification

Voltage	: 18 V
Fuel	: Yes
Length	: 12.8"
Weight	: 7.7 LBS
Power Source	: Cordless
Blow Energy	: 3.3 ft-lbs
BPM	: 0-5,000
Trigger Lock	: No
Solid Bit Capacity	: 1 – 1/8"
Battery System	: M18

Thin wall core Bit capacity: 3"

Tool Warranty : 5 years

Warranty	: 5 Year limited warranty
Drilling mode	: 3-Mode: Rotary Hammer, Hammer Only, Rotation Only
Handle Style	: Drop Motor
Charger	: M18TM and M12TM Multi-Voltage Charger
Vibration	: 8.6 m/s²
No Load Speed	: 0-1350

B. Low Pressure Water Mist Nozzle – 01 No.

Imported low pressure & light weight Water Mist nozzle shall be supplied, Designed to switch between mist and water jet. Suit for use with vehicle pump. The Nozzle is supplied as standard which is a robust anodized alloy construction pistol grip gun with easy well know on/off valve technology. The nozzle is fitted with 2 filters for protection against dirty water. Water mist technology is on the nozzle tip where flow is controlled from jet to mist by a simple twist grip. The nozzle generates 55-100 micron water mist at an optimum working pressure of 7 Bar with lay flat hose. The nozzle head is protected by a strong robust EPDM rubber guard marking it robust and durable against the bangs and pumps in the world of fire fighting. The fire fighting nozzle is safe on majority of types of fires including liquid, oils, and certain metals due to the water mist technology.

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NOZZLE-CHANGE FROM JET TO MIST CONTROLLED BY TWIST GRIP ON THE BRANCH.

Flow rate	: Approx 150 liters / min jet mode
	Approx 45 liters / min mist mode
Throw Distance	: Approx. 14-16M jet mode
Working Pressure	: 7 Bar
Agent	: Water & Foam
Branch / Nozzle	: Ball valve operated, mist or jet mode
Material	: Body : Aluminium (6082 t6) Nozzle: HE15 (2014 t6)
Inlet Size	: 63 MM
Approval	: EN

C. Power Generator:

(a) Heavy duty AC power generator shall be mounted at suitable location on the "Fire Engine" to provide continuous power source so that positive AC power will be available on the board.

(b) The system will be very compact light weight and noiseless.

(c) The output capacity of the generator shall be 3.5 KVA, Single phase, Power factor 1.0

(d) Overall dimensions shall not more than 435L X 212W X 230H mm and Weight not more than 26 Kg.

(e) Suitable drive arrangement shall be made through on board PTO.

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D. Telescope Light Mist :

(a) Pneumatic telescope mast manufactured from Anodized aluminium pipes with anti-twist lock shall be mounted at suitable location on the "Fire Engine".

(b) The mast should be extremely strong and designed with a minimum of 3 sections with internal spiralled Electrical cable.

(c) The minimum height of the mast when developed should be 5000mm (from the ground).

(d) The light mast has 2 X 100 Watt LED lights in the Weather proof casing.

(e) Each section of the mast has a water drainage outlet.

(f) The LED lights on the top have a minimum electrical rotation of 360deg. Including extension and return to the original position.

(g) Lights on/off automatic restore should be capable of being done through a wire remote control.

E. Hydraulic Cable Winch:

(a) A cable winch with the built in cable and hydraulically driven of reputed make shall be provided on the "Fire Engine"

(b) The cable which assembly shall be fully imported unit.

(c) The capacity of the cable winch shall be not less than 5 tons with minimum 27 meters cable rope length.

(d) The cable winch assembly shall be mounted inside the chassis frame at suitable place with strong mounting brackets,

(e) The cable rope shall be provided with anti-corrosive treatment (galvanized).

(f) The pulling direction shall be in the front of the "Fire Engine" and the winch shall be provided with the lever type on/off switch.

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