

TRIAL DIRECTIVES OF WATER TENDER

272

Date of Trial.....

Temperate.....

Time of trial

Altitude

Place of Trial.....

Weather condition.....

GR of Trial Area.....(Clear/cloudy/Partially cloudy/Hot and Humid/rainy/Foggy and Humid/snow or hard ice)

Sl. No.	Specification	Parameter	Procedure suggested for Trial	Result expected/desired
1	CHASSIS	The chassis shall be suitable to carry minimum 16 tons G V W, 4X2. The engine fitted on the chassis shall comply with the respective emission norms in force at the time of delivery of chassis. The chassis shall be branded new with the following specifications.	The vehicle shall be driven in all the gears including reverse gear	Should meet the QRs
1.1	Engine	06 cylinders, in line, 04 stroke, water cooled, Turbo charged, inter cooled, Diesel engine developing not less than 150 bhp and conforming to prevalent emission norms.	As per the certificates provided by the firm and to be checked /tested by BOO.	Should meet the QRs
1.2	Clutch	Single plate dry friction type hydraulically actuated.	As per the certificate provided by the firm	Should meet the QRs
1.3	Gear	Synchromesh gear box with 6 forward and 1 reverse gear.	The vehicle shall be driven in all the gears including reverse gear	Should meet the QRs
1.4	Front Axle	Heavy duty, forged, 'I' beam.	As per the certificates provided by the firm and to be checked /tested by BOO.	Should meet the QRs
1.5	Rear Axle	Single reduction, hypoid gears, fully floating axle shaft.	As per the certificates provided by the firm and to be checked /tested by BOO.	Should meet the QRs
1.6	Steering	Integral hydraulic power assisted steering.	The vehicle shall be driven and turned right and left	Should meet the QRs
1.7	Brakes	Dual circuit fully air braking system with pneumatically operated parking brakes on rear wheels.	All the brakes shall be applied physically on moving vehicle. The parking brake shall be applied on the vehicle parked on 8 to 10 degree slope.	Should meet the QRs

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1.8	Suspension	Semi- elliptical leaf spring at front and rear with hydraulic double acting shock absorber on front.	As per the certificates provided by the firm	Should meet the QRs
1.9	Frame	Ladder type heavy duty frame with riveted / bolted cross members.	As per the certificates provided by the firm	Should meet the QRs
1.10	Wheels and Tyres	Suitable size available in local market with minimum 16 PR – 7 Nos. (including spare wheel)	The BOO has to physically check	Should meet the QRs
1.11	Fuel Tank	Minimum 160 litres capacity.	The Board has to physically check.	Should meet the QRs
1.12	Electrical System	12/24 volts. 120 Ah capacity battery with Alternator.	As per the certificate provided by the firm	Should meet the QRs
1.13	Cowl	Standard cowl duly painted in RED colour with instrument cluster, rear view mirrors, Wiper system, original driver seat, safety belts.	As per the certificate provided by the firm.	Should meet the QRs
1.14	GVW .	Not less than 16000 Kgs	As per the certificate provided by the firm.	Should meet the QRs
1.15	Safety features	Anti-Lock Breaking System (ABS)	AS per the certificate provided by the firm.	Should meet the QRs
2	PUMP	<p>2.1 The pump shall be centrifugal type, multi pressure, having output capacity of 2000 LPM at 7 kg/cm² and 300 LPM at 35 kgs/cm² at 3 mtrs suction lift at NTP condition. The low-pressure side will be of single stage and the high-pressure side also with single stage having regenerative type impeller.</p> <p>2.2 The pump shall comply to the following performance parameters.</p> <p>a) Normal Pressure output :2000 LPM at 7 kgs/cm²</p> <p>b) High pressure output :300 LPM at 35 kgs./cm²</p> <p>c) Maximum pressure in :14 kg/cm² (shut off pressure) normal pressure mode.</p> <p>d) Maximum pressure in :45 kgs/cm² High pressure mode</p> <p>e) Deep lifting capacity of :30 cm/sec. max. upto 7 Mtrs in 30 sec. at NTP condition.</p>	As per the certificate provided by the firm. The BOO has to physically check and tested the pump for operation.	Should meet the QRs

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- 2.3 The overall pump shall be constructed from gunmetal. The normal (low) pressure impeller, volute, and impeller wearing shall be made from gunmetal confirming to Gr II of IS 318/1981 and the regenerative type high pressure impeller shall be of Aluminum, Bronze (AB-2). The pump shaft shall be made from stainless steel confirming to IS 6603/1972. The bearing housing will be made of C.I. and all the studs and bolts coming in contact with water shall be of stainless steel. The bearings used in the pump shall be of reputed make.
- 2.4 The normal and high-pressure impeller shall be mounted on a single shaft and normal (low) pressure impeller shall be dynamically balanced.
- 2.5 The pump shall be provided with self-adjusting mechanical carbon seal with interface plate. The mechanical seal assembly shall with stand dry running of pump upto 2 minutes without any damages
- 2.6 The pump shall be provided with an inbuilt filter of easily removable type, which shall filter the water before entering into the high-pressure stage impeller.
- 2.7 Operation of low pressure to high pressure or vice-a-versa shall be possible by actuation of single lever.
- 2.8 The pump shall have facility to operate low pressure and high-pressure mode simultaneously or individually. While high pressure mode is in operation and delivering 300 LPM at 35 kg/cm², the pressure in low pressure side shall not exceed 8.5 kg/cm².
- 2.9 The size of high-pressure outlet shall be of 25 mm connected to high-pressure hose reel.
- 2.10 The pump shall be provided with one suction inlet of 100 mm dia. having round threads confirming to IS:902 of 1974 and TWO numbers of 63 mm delivery outlets having screw down type valves fitted with instantaneous couplings as per IS: 903/1993. The delivery valve spindle sealing shall not be of gland type. The high-pressure outlet shall not be less than 25 mm and shall either be flange on screw type.
- 2.11 The efficiency of the pump shall be such that the power and RPM required shall not be more than available with the engine.
- 2.12 The pump housing shall have provision to connect to internal cooling system

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		<p>2.13 The pump shall be mounted at the rear of the vehicle connected to P.T.O. by propeller shafts and universal and slip joints with sufficient number of bearing supports.</p> <p>2.14 Pump Primer – The priming system shall be Reciprocating type or fully automatic watering type which shall not require any operation whatever from the pump operator other than throttling the engine to the required RPM. The primer shall get automatically disengaged once the pump is registered the pressure. The primer shall be capable of lifting the water in 30 seconds from the depth of 7 mtrs. (up to pump inlet) at NTP condition. The reciprocating pistons shall be made up of stainless steel or Gun Metal. The cylinder and priming valve housing shall be made from gunmetal.</p> <p>2.15 In addition Exhaust ejector type primer capable of lifting water from 7 mtrs within 30 seconds shall also be provided</p>		
3	PUMP TEST:	<p><u>The pump fitted on the vehicle shall be subjected to various tests as detailed below:</u></p> <p>3.1 The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 kgs./cm².</p> <p>3.2 The pump shall be run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After this test there shall not be any leakage of water through carbon seal.</p> <p>3.3 The pump performance test will be carried out by running the pump at constant RPM at 2600 and measuring the discharge at various pressures.</p> <p>3.4 The pump will be subjected to Endurance test for a period of FOUR hours continuous running. The first Three hours, the pump shall deliver rated out put of 2000 LPM at 7 kg/cm² and next one hour will be 200 LPM at 35 kg/cm².</p>	As per the certificates provided by firm and tested by the BOO.	Should meet the QRs

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		<p>3.5 During the endurance test the water shall not be replenished in the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturers' standards recommendations for the continuous operation and engine should not show any sign of temperature increase.</p>		
4	POWER TAKE OFF:	<p>The P.T.O shall be Heavy duty type of suitable ratio capable of transmitting the full torque of the engine in first gear. The lever for engaging the P.T.O. shall be provided in the Driver's cabin with proper locking arrangement. The PTO shall be mounted on heavy duty cross members and support brackets between the longitudinal members of the chassis frame. Means shall be provided to check the oil level in the PTO and suitable drain plug shall be provided at the bottom. A cooling coil made of copper tubes shall be provided inside the PTO at the bottom to prevent the oil of the PTO from heating.</p>	As per the certificates provided by firm and tested by the BOO.	Should meet the QRs
5	WATER TANK :	<p>The capacity shall not be less than 4500 litres. The tank body and baffles shall be of minimum 5 mm thick MS plates conforming to IS 2062. The sides of the tank shall have DIE PRESSED reinforced webs for better strength and rigidity. The design of the tank should be such that the complete width of the vehicle is utilized and the height of the tank is to be kept as low as possible for better stability.</p> <p>5.1 A tank of required capacity constructed out of mild steel treated for anti-corrosion shall be suitably mounted on the chassis in a manner keeping in view the proper load distribution on the axles.</p> <p>5.2 A full length runner from behind the driver cabin till end of chassis frame shall be provided and made out of M.S. Channel of 100 x 50 x 5 mm suitably fixed to the chassis, frame with 6 mm thick M.S. plate and bolted to chassis frame wherever holes are available in the chassis frame and also with 5/8" 'U' bolts and nuts shall be nylock nuts only.</p> <p>5.3 The tank shall be suitably baffled with minimum 2 nos of baffles fitted longitudinally and 2 nos baffles fitted transversely to prevent surge when the vehicle is braking, cornering or accelerating.</p> <p>5.4 The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose.</p> <p>5.5 The tank shall be mounted on minimum three cross members to</p>	As per the certificate provided by the firm. To be physically checked and tested by the BOO.	Should meet the QRs

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counter act the stresses caused by chassis flexion and shall be so secured that it can be easily removed. The water tank shall be provided with six chairs, three on either side for mounting the tank on the runner and chassis frame.

5.6 The water tank shall be fixed to the chassis frame and runner with 'U' clamps and aluminum packing block and self-locking nuts.

5.7 Suitable eyes shall be provided on the shell of the tank to enable it to be lifted from the vehicle for repairs / replacement as and when required.

5.8 The tank shall be fitted with a 50 mm bore overflow pipe. Two 63 mm instantaneous hydrant connection, incorporating a strainer with NRV, shall be provided close to the pump control panel for filling the tank through 75 mm bore pipe. Minimum 125 mm bore pipe line shall be taken from the tank to the suction inlet of the pump incorporating minimum 125 mm internal dia butterfly type valve. Drain valve shall be provided at the bottom of the tank.

5.9 The MS plates used for the tank shall be ZINC PLATED or galvanized and shall be given adequate anti-corrosive treatment of epoxy treatment consisting of one coat of primer with two coats of finish after preparing the surface by sand or shot blasting from inside and outside after fabrication if it is not galvanized. The open end of the overflow pipe should 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.

5.10 Visual level gauge of the glass / acrylic tube shall be provided at the control panel calibrated 1/4, 1/2, 3/4 and full (preferably calibrated in litres).

5.11 The tank shall have a bolted manhole of 60 cm dia minimum and should have a gun metal threaded ring and gun metal cap of 30 cm dia for filling the water tank from the top. The manhole cover shall be made from 5 mm thick M.S. plate and epoxy coated from inside and outside. A cleaning hole of at least 25 cm dia shall also be provided at the bottom.

5.12 The tank shall be connected with the pump and hose reel and valve(s) shall be provided in such a way that any of the following operations are possible:

- a) Hydrant - tank,

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		<p>b) Hydrant - reel, c) Tank - pump - high and low pressure hose reels, d) Hydrant - pump - low pressure hose reel, and e) Tank - Pump - Monitor (Foam/Water) f) Off.</p>										
6	DELIVERY OUTLETS:	There will be 2 Nos. delivery outlets having standard GM inst. female coupling with screw down type delivery valves with blank caps. It will have twist type lugs made of gun metal.	As per the certificate provided by the firm.	Should meet the QRs								
7	HIGH PRESSURE HOSE REEL:	<p>Two high pressure hose reel to facilitate operation of the high pressure section of the Fire Pump will be provided and mounted so as to be accessible for use from either side of the appliance. The hose should be prevented from kinking. The hose shall be light weight PVC nylon braided hose and the working pressure of hose will not be less than 40 Kg/cm². The high pressure Hose reels will hold not less than 30 M of hose in one length, terminating in High pressure fog/jet trigger type gun connected by quick connect couplings. The fog gun shall be made of Aluminium alloy or stainless steel (SS 304). The inlet connection shall have a leak proof rotating type hose connector. The gun shall be of constant flow type and shall have a discharge capacity of 150 LPM approximately. Provision shall be made in the gun controls to achieve combat mode (straight jet) or a fog shield in split second. The gun shall have the ability to work on pressure from 20kg/cm² to 40kg/cm² without affecting discharge pattern. The weight of the gun assembly shall not be more than 3 kg.</p>	As per the certificate provided by the firm.	Should meet the QRs								
8	WATER/FOAM MONITOR:	<p>One water cum foam self aspirating type monitor will be provided on the top at suitable location, with cap. of 2000 LPM of water @ 7 Kg/cm². The monitor will be capable of traversing through 360° in horizontal plane, +75° & -15° in vertical plane with discharge range of 70 M (water). The detailed specification of the Monitor is as under:</p> <table border="1" data-bbox="533 1220 1377 1420"> <tr> <td>Size</td> <td>75mm</td> </tr> <tr> <td>Body</td> <td>Barrel of SS, GM swivel joint for horizontal & vertical motion manual operation</td> </tr> <tr> <td>Rotation</td> <td>360°</td> </tr> <tr> <td>Elevation</td> <td>90° (+75° -15°)</td> </tr> </table>	Size	75mm	Body	Barrel of SS, GM swivel joint for horizontal & vertical motion manual operation	Rotation	360°	Elevation	90° (+75° -15°)	As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs
Size	75mm											
Body	Barrel of SS, GM swivel joint for horizontal & vertical motion manual operation											
Rotation	360°											
Elevation	90° (+75° -15°)											

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6.1	CONSTRUCTION DETAILS		Working pressure	7 Kg/cm ²		As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs
			Painting	As per IS:5 (2 coats of red enamel paint)			
8.2	SELF INDUCTION NOZZLE		Material of construction	Aluminium alloy to IS:617 or GM LTB Gr.2 of IS: 318.		As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs
			Type of Foam used	AFF Foam			
			Discharge capacity				
			Throw horizontal	Water: min. 60 mtrs., Foam: min. 50 mtrs.			
			Foam Expansion	Min. 1:6			
			Fog (curtain)	160°			
			K Factor	100.			
		A suitable pick up tube of min 5 mtrs long with perforated piercing tube shall be provided along with the monitor.					
9	PIPELINES AND VALVES		<p>9.1 All pipelines and pipe fittings shall be of Stainless steel (SS 304) and all valves upto 50mm size shall be 3 piece design SS 304 ball valves. All valves above 50mm size shall be standard butterfly valves.</p> <p>9.2 All piping shall be sized so as to have minimum pressure drop and achieve the required pressure and flow at various locations.</p> <p>9.3 All piping shall be designed for 10% over the maximum pressures encountered in the pipe.</p> <p>9.4 The piping shall be flanged for ease of maintenance. However, flange joints shall be kept to minimum.</p> <p>9.5 All lines shall be hydraulically tested at 1.5 times of the design pressure and pressure shall be held for two hours. In no case the lines shall be tested below 25 kg/sq.cm. (g).</p> <p>9.6 All lines shall be suitably supported so as to provide rigidity and avoid vibrations.</p> <p>9.7 All lines less than 50 mm NB size can be socket welded to</p>		As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs	

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		<p>9.8 matching rating fittings. 9.9 All lines above 50mm NB size shall be butts welded with full penetration welds. 9.10 All bolts, nuts and washers used shall be of SS-304.</p>		
9.10	COOLING SYSTEM:	<p>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</p>	As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs
10	CONTROL PANEL	<p>10.1 Adequately illuminated control panel shall be provided near the pump. 10.2 The control panel(s) shall include the following: a) Throttle control for engine; b) Pressure gauge — 0 to 17.5 kgf/cm²; for low pressure (glycerine filled) Pressure gauge — 0 to 50 kgf/cm²; for high pressure (glycerine filled) c) Compound gauge (glycerine filled) calibrated as under: Vacuum — 0 to 75 cm Hg, preferably in black; Pressure — 0 to 15 kgf/cm², preferably in black; d) Primer control for exhaust primer e) Temperature gauge and glow lamp for lubricating system f) Cooling water circuit control. g) Water tank valve h) Monitor valve i) Delivery valves j) Suction inlet k) Hose reel valves l) Water level indicator</p>	As per the certificate provided by the firm. To be checked physically and tested by the BOO.	Should meet the QRs

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11	BODY WORK AND STOWAGE	11.1 Enclosed accommodation for six persons shall be provided in the driver cab-cum-crew compartment including the driver and the in-charge of the crew. Both the seats should be independent. The driver's seat should be adjustable and comfortable. The rear compartment of driver's cabin should have one removable seat for full width of cab for 5 (five) crew members. The cab floor should be covered with 3 mm thick Aluminium chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or riveting except the mudguard arches which shall be covered with 1.60 mm Aluminium chequered plates. Trap doors for topping up oil etc wherever necessary shall be provided.	The firm shall provide the certificates. In addition, the BOO shall physically inspect the body of the vehicle.	Should meet the QRs
		11.2 One roof light system should be provided in the driver's cabin dwell vision and external rear view mirrors should be fitted to the cab.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.3 The driver cum crew cabin shall be provided with full four doors, one for driver, one for officer and two at the crew compartment. The doors shall be generously sized for easy embarking / disembarking of crew members. All the doors shall be fitted on the super structural members, each hung upon three invisible coach type M.S. stout hinges and fitted with best quality handles.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.4 The door handle on out side of driver seat shall have a locking arrangement. Other doors shall be lockable from inside. In addition to the doors locks, aluminum tower bolt shall be provided for all the doors from inside. Adequate grab rails shall be provided for easily boarding and alighting from the appliance.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.5 The windscreen glass shall be provided in the two halves and shall be semi curved type. Each glass shall be fitted in E.P.D.M. rubber beading. The glasses shall be 5 mm thick toughened safety glass.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.6 The rubber beading used for fitting glasses and window frame shall be E.P.D.M. rubber.		
		11.7 The driver seat shall be adjustable type vertically, forward and backward. The officer seat shall be fixed type. Both the seats shall be rigidly fixed to the flooring by means of nuts and bolts.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs

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		11.8 The seat cushion shall be of latex foam rubber 75 mm thick upholstered in good quality foam leather cloth. The back seat shall be of latex foam rubber 50 mm thick upholstered in good quality foam leather cloth.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.9 Below the crew seat, two lockers shall be provided One for battery box and another for keeping accessories. The extra length of battery cable if required shall be provided	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.10 The crew seat shall be rigidly fixed to floor by means of nuts and bolts, running full width of the vehicle suitable for sitting five firemen, covered with 75 mm x 50 mm cushion latex foam rubber upholstered in good quality foam leather of approved shade.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.11 The rear body shall be fabricated in continuation and in line. The under frame cross members shall be fabricated from the rolled M.S. channel of 100 x 50 x 5 mm size.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.12 The M.S. runner of 100 x 50 x 5 mm size shall be provided over the full length of the chassis member for the uniform distribution of load over the chassis.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.13 The M.S. runner of 100 x 50 x 5 mm size shall be provided over the full length of the chassis member for the uniform distribution of load over the chassis.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
		11.14 Balata packing of thickness 6 mm shall be provided in between the chassis frame and across members.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs

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		<p>11.15 The structure/frame work shall be of welded constructions and made from 2mm thick MS pressed sections and square tubes. The Angles and channels used shall be of min. 3mm thickness. The complete structure material shall be treated for anti corrosion by ZINC PLATING. The plating thickness shall not be less than 20 microns. Two coats of Epoxy paint shall be applied to the completely welded structure. The structure shall be designed so as to avoid any vibration / rattling / deformation in the intended usage of the vehicle.</p>	<p>The firm shall provide the certificates. In addition, the BOO shall physically inspect</p>	<p>Should meet the QRs</p>
		<p>11.16 The details of super structure are as follows:</p> <ul style="list-style-type: none"> a. Under frame cross members :100 x 50 x 5 mm (Min.) b. Floor longitudinal members :50 x 50x 6 mm(Min.) <ul style="list-style-type: none"> ❖ The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. ❖ The interior panelling shall be done from 1.22mm thick aluminium sheets & the exterior panelling shall be done from 1.60mm thick aluminium sheets. ❖ The roof on the cabin of the vehicle shall be covered with min 1.60mm thick aluminium chequered plates. All the lockers sides & complete rear of the vehicle shall be covered with min. 1.22mm thick aluminium chequered plates. The complete rear deck and all lockers floors and the rear foot boards shall be covered with minimum 3 mm thick aluminium chequered plate. 	<p>The firm shall provide the certificates. In addition, the BOO shall physically inspect</p>	<p>Should meet the QRs</p>

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- ❖ Sufficient number of Lockers with suitable shelves, partitions and roll in roll out type drawers / trays shall be provided on both sides of the vehicle for secure stowage of all equipment given in annexure. One through and through locker shall be provided immediately behind the drivers cab. All space available below the chassis frame level shall be utilized by providing lockers with proper doors. These doors shall be fitted with suitable chains and hooks on both sides so that the same can be used as foot board.
- ❖ All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cab.
- ❖ All lockers above chassis floor shall be covered with Aluminium roller shutters. The roller shutters shall be made from extruded aluminium sections with suitable roller, spring, guide channels etc. All aluminium sections used shall be properly anodized.
- ❖ The Roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire fighting material.
- ❖ These roller shutters should open in every position of the vehicle even in rough terrain. Guide rails shall support the shutters over entire length on both sides to make them absolutely torsion free. The roller shutters should have a sturdy lock, preventing accidental opening during movement of vehicle.
- ❖ Roller shutters shall be made of hollow rectangular shaped aluminium links which shall be inter connected with rubber /plastic/ PVC profiles sealing the roller shutter watertight when closed. These roller shutters should be durable, maintenance free, weather and corrosion resistant.
- ❖ Suitable storage space shall be provided to store four 2.5-m lengths of suction hoses with couplings at convenient location

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		<p>❖ SPECIAL PROVISION FOR STOWAGE OF EQUIPMENTS: For all hose 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 items damage the internal paneling & thereby increase the life of the vehicle. Suitable clamps, brackets, holders etc. are provided for all other items.</p>		
12	MISCELLANEOUS	<p>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.</p> <p>b. Two cat ladders made out of S.S. round or square pipe of 25mm dia shall be provided.</p> <p>c. 2 nos of 25mm dia aluminium pipe railing with sufficient number of aluminium double socket brackets shall be provided to the rear body over the deck.</p> <p>d. A heavy duty Towing hook shall be provided and fitted the rear bumper by means of nuts and bolts.</p> <p>e. Quick removable type wire mesh guard made from 25x25mm size MS wire mesh of 1.60 mm covered in MS angle frame shall be provided to all the glasses of driver-cum-crew cabin.</p> <p>f. CABLE WINCH. An electrically operated cable winch of not less than 6.5 tons pulling capacity (single layer) shall be provided. The winch unit should be complete with minimum 5.5 hp, 12v or 24v DC series wound electric reversible motor for pulling operations. The motor and solenoids shall be grounded to the battery. It shall have an automatic load holding brake system for holding the load. For free spooling the clutch design shall be easy to use type with spring loaded pull and rotate system. The gear system should be 3 stage planetary type for faster line speed and the gear</p>	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs

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g. reduction ratio shall not be more than 300:1, for maximum duty cycle, the rope drum shall not be of more than 8 inches dia and shall be supplied with minimum 90 ft heavy duty galvanized wire rope with replaceable self locking clevis hook and shall be mounted on the front bumper of the vehicle with suitable strong supports and a 4 way roller fairlead. Weather resistant clutch housing and solenoid assembly for maximum durability under any weather should be provided. Winch shall be provided with a wireless remote control mechanism for ease of operation.

h. TELESCOPIC LIGHT MAST

A Pneumatic telescopic mast should be mounted on the vehicle. It should be manufactured from Anodized aluminum pipes and have a minimum of 115 mm diameter on its base for stability. The temperature range shall be from -25 deg.C up to 60 deg.C, with anti-twist lock, with safety valve and drainage outlet valve.

The telescopic mast should be extremely strong and designed with a minimum of 5 sections with an internal spiraled electrical cable. Each section of the mast should have a water drainage outlet. The maximum height of the mast when deployed should be minimum 6000 mm (from the ground). The retracted height should be of maximum 1750 mm.

The light mast will have 4 x 1000 Watt Halogen flood light projectors in weatherproof casing. The floodlights on the top should have a minimum electrical rotation of 355° and a tilt of 350°. The fully extended mast shall be capable of withstanding wind speed of min. 120km/hr.

Suitable connections for taking permanent Power Supply from generator set through an internal spiral wire mounted inside the mast should be provided. Each halogen light should have the possibilities to be switched independently through individual switches.

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		<p>All the functions of the mast, including extension and return to the original position, lights on/of, automatic restore should be capable of being done through a wire remote control. An additional remote control without cable (wireless) should be provided. The lamps shall be provided in a weather proof box with top cover which will be extended along with the lamps when in use. A 5 KVA portable Petrol engine operated GENSET shall be installed at a suitable location in the rear locker and necessary wiring /connections shall be given to the light mast.</p>		
13	ELECTRICAL SYSTEM :	<p>13.1 All the important electrical circuit shall have separate fuses suitably indicated and shall be grouped into a common fuse box located at an accessible position. The wiring shall be single pole with negative earth.</p> <p>13.2 The suitable size wire shall be selected for different circuits considering the current consumption for that circuit.</p> <p>13.3 Electrical siren of 1.6Kms range 12/24 volts D.C. shall be provided and fitted at suitable place with two controlling push buttons on one officer side and another at Driver side.</p> <p>13.4 Two rotating beacon lights with Amber lens shall be provided over the top of driver's cabin.</p> <p>13.5 The other lights, pump cabin light, locker lights shall be of approved make.</p> <p>13.6 All the controlling switches of lights on dashboard shall be approved make.</p> <p>13.7 Two fog lamps of approved make shall be provided and fitted on front-bumper with controlling switch on dashboard.</p> <p>13.8 New wiper motor assembly of 17 watts with new blades and arms shall be provided if not provided with the chassis. The location of wiper motor shall be such that it shall be easily accessible for repairs.</p> <p>13.9 Adjustable search light assembly shall be provided at a convenient position on the top of rear body deck with 30 mtrs Cable drum with Rexene cover.</p> <p>13.10 Hooter cum P.A. system shall be provided with a speaker mounted on the top of Driver's cabin with Rexene cover. The output shall be 25 watts.</p> <p>13.11 Adjustable spot light, mounted in a convenient position to give flood or beam of light at the rear of driver cabin shall be provided.</p>	<p>The firm shall provide the certificates. In addition, the BOO shall physically inspect</p>	<p>Should meet the QRs</p>

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14	PAINTING:	<p>14.1 The complete structure material shall be treated for anti-corrosion by ZINC PLATING. The plating thickness shall not be less than 20 microns. Two coats of Epoxy paint shall be applied to the completely welded structure.</p> <p>14.2 The complete external and internal aluminium paneiling of driver cum crew cabin and rear body shall be painted with two coats of Zinc Chromate paint.</p> <p>14.3 The complete exterior of the vehicle shall be painted with two finish coats of "POST OFFICE RED" polyurethane paint manufactured by ICI Dulux / Nerolac / Dupont.</p> <p>14.4 The internal painting of cabin lockers etc. shall be done with two coats of Grey Synthetic enamel paint made by ICI Dulux / Nerolac / Dupont.</p> <p>14.5 The name of the fire service/organization shall be painted on both sides of vehicle in letter of suitable size in golden yellow paint with black colour shading.</p> <p>14.6 The "EMBLEM" of the department shall be painted on both sides of vehicle in natural colours at suitable place.</p>	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs
15	LADDER WITH GALLOWS:	<p>An aluminum extension ladder of Trussed type 10.5 mtrs height shall be provided with the vehicle and mounted on suitable ladder gallows.</p> <p>The design of the gallows shall be such that the ladder can be released without difficulty from a reasonably accessible position. Means shall be provided for locking the ladder when stowed</p>	The firm shall provide the certificates. In addition, the BOO shall physically inspect/test.	Should meet the QRs
16	B.A. SET BRACKETS	B.A. set brackets for fixing with its fitments shall be provided just behind the crew seat. The mounting of B.A. set bracket shall be such that, it can allow fireman to wear B.A. set while vehicle is approaching to fire scene. Proper padding and harnessing arrangement shall be made in the bracket to avoid damages to the critical parts of the BA set.	The firm shall provide the certificates. In addition, the BOO shall physically inspect	Should meet the QRs

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7	ACCESSORIES :	<p>The following accessories shall be provided.</p> <p>17.1 Fire Bell: (Bell Carillon) : One Gun metal fire bells of 250 mm size confirming to IS: 1928 shall be mounted externally on the top of crew compartment and shall be operated within the crew compartment by firemen is seating position.</p> <p>17.2 Six aluminum hooks for keeping the uniform clothing shall be provided in crew compartment.</p>	The firm shall provide the certificates. In addition, the BOO shall physically inspect/test .	Should meet the QRs
18	WIRELESS SET BOX :	Box made from 2 mm gauge aluminum sheet with lid shall be provided just behind the officer seat with 13mm wooden plank for fitting the wireless set bracket. The design and mounting will be shown at the time of fabrication work.	The firm shall provide the certificates. In addition, the BOO shall physically inspect/test .	Should meet the QRs
19	WORKMANSHIP & FINISH: »	<p>The GVW of appliance will not cross the GVW of chassis mfgs. Specification with all equipment & Crew. The weight distribution diagram should be submitted for approval. The entire appliance will be painted fire red on the outside. The user name will be written on both-side with yellow colour. Before final painting of Fire Tender two coats of anti-corrosion and primer coat will be applied.</p> <p>The appliance will clearly have the following markings at suitable locations.</p> <ul style="list-style-type: none"> » Manufacturers name and Trade mark » Engine and Chassis No. » Pump No. and capacity of the pump » Capacity of Water tank, Foam tank » All instruments control will be identified with nameplates 	The firm shall provide the certificates. In addition, the BOO shall physically inspect/test .	Should meet the QRs

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<p>29</p>	<p>ACCEPTANCE TESTS:</p>	<p>The following acceptance tests shall be carried out to the complete satisfaction of the user. The design of vehicle to be such that it shall not affect the Chassis Characteristic as specified by the chassis manufacturer such as speed, turning circle, acceleration, braking distance etc.</p> <p>The stability of the appliance will be such that when under fully equipped & laden condition, if the surface on which the appliance stands is tilted to either side, the point at which over turning occurs is not passed at an angle of 27° from horizontal. This test should be carried out at the vendor's factory/premises in front of all the inspecting officers.</p> <p>i) The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 kgs./cm²</p> <p>ii) The pump shall be run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After this test there shall not be any leakage of water through carbon seal.</p> <p>iii) The pump will be subjected to Endurance test for a period of FOUR hours continuous running. The first Three hours the pump shall deliver rated out put of 2000 LPM at 7 kg/cm² and next one hour will be 300 LPM at 35 kg/cm².</p> <p>iv) During the endurance test the water shall not be replenished in the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standard recommendations for the continuous operation and engine should not show any sign of stresses.</p> <p>v) The other tests shall be as per detailed performance parameters given for chassis, superstructure, fire fighting system which include monitor output & throw, foam induction & expansion, load etc. Accessories shall also be subjected to relevant tests as per the specification indicated above.</p>	<p>The firm shall provide the certificates. In addition, the BOO shall physically inspect/test .</p>	<p>Should meet the QRs</p>
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21	List of Mandatory Accessories	As per list enclosed with QR will be checked by B.O.O.	To be checked by B.O.O as per the list enclosed with QRs. However the list is not exclusive new inventions can be added according to user requirements	Should meet the QRs
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 (VIJAY KR. PATHAK)
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 BSA

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 Asstt.Comdt/CRPF

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 (Hardeep Singh)
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