QUALITATIVE REQUIREMENTS (QRs) OF WATER TANK 12KL CAPACITY WITH FIREFIGHTING PUMP

Sl	Specification	Qualitative Requirements
A	**Scope of supply**	i) The chassis shall be supplied by the manufacturer. ii) A 6x2, full forward control, BHARAT STAGE VI/latest version or equivalent with cowl chassis. iii) Fabrication and mounting of 12000 Ltrs capacity water tank as per specification. iv) Supply and mounting of high & low pressure firefighting pump as per specification. v) Supply and mounting of water monitor.
B	**Purpose**	The Water Tanker shall be used to carry the water for fire fighting purposes. The pump will be driven by P.T.O.
C	**Detailed specifications**	
1	**Chassis**	The chassis shall be suitable indigenous make as per following specifications suitable for mounting Water Tank having 12000 ltrs. capacity with pump.
		1.1 Make of the chassis: 6x2, 25T, 180 BHP (minimum), full forward control, cowl chassis, BS-VI or latest version emission ratio complaint/ any equivalent latest version chassis.
		1.2 Type: 6x2, cowl chassis, full forward control, RHD, wheel base shall not be less than 4600 mm.
		1.3 Engine: 6 Inline cylinder, water cooled, direct injection, turbo charged diesel engine developing mintmum 180 B.H.P. with Bharat Stage VI/ equivalent latest version chassis.
		1.4 GVW: Shall not exceed maximum permissible limit weight of chassis.
		1.5 Fuel Tank: As per OEM.
		1.6 Tyres & Wheels: As per OEM, Spare wheel : 1 No.
		1.7 Steering: Integral power steering
		1.8 Tools: a) Hydraulic jack 40 Ton with lever b) Wheel spanner with lever c) Standard Tool kit. d) Tyre inflation hose.
		1.9 Manuals (1 copy): a) Workshop manual b) Spare parts catalogue
		1.10 Driver Cabin: The chassis shall be fabricated for accommodation of 06 personnel including driver, Driver view mirror Cabin , windscreen, side windows, doors, adjustable driver seat, fixed Co-driver seat, wiper system. Horn, complete instrument cluster, preferably in PO RED colour.

		2.10 The Tank shall be fitted on the chassis with the help of 5/8" dia. Hi ghtensile bolts with nylock nuts.
		2.11 The tank shall be mounted slightly sloping towards the rear so as to decant the tank com pletel y.
		2.12 There shall be two circular manhole of 600mm dia. Mounted on topof the tank .
		2 .B The water tigh tmanho e cover of SS with good qual ty of rubber gasket shal lbe bolted to the co lar of manhole . The manho e cover shal lbe provided with round threaded blank ca pwith l ugsof 10" dia. with rubber gasket.
		2 .14 The tank shal l be prov ded with suitab e arrangemen t of baffle p ates to prevent the surge of water when the vehic e is in mot on and accelerating, braking n speed and covering. The arrangement of baffle plates shall be clearly shown in the dra wing.
		2.15 The baffle shall be arranged in a manner to facilitate the movement of a person throughout the tank for cleaning and weldin g purposes .
		2.16 Suitable eyes shall provide on the shell of water tank to enable it to be lifted from the vehicle for repairs/replacement as and when required.
		2.17 The tank shall be fitted with 100mm dia. Overflow pipe of 'C' class galvanized taken down below the chassis but without reducing the ground clearance.
		2.18 The tank shall be fitted with four 63 mm instantaneous hydrant connection with non-return valve, closed to pump panel for filling the tank throughout 50mm above galvanized 'C' class pipe.
		2.19 A draw pipe of 100 mm dia. of 'C' class galvanized shall be taken from the tank to the pump suction inlet, incorporating 100 mm butterfly valve of flexible connection (Rubber Below) shall be provided to this pipe to take the vibrations. A suitable size sump shall be provided below the tank to connect water draw pipe with SS strainer.
		2.20 A drain cock with 50 mm suitable ball valve shall be provide d at the bottom of water tank.
		2.21 A cat ladder shall be provided and fitted at the rear of water tank and fabricated out of 1" dia. M.S. tabular pipe and 2mm thick
		2 22 The complete top of water tank shal be covered w th 1 0SWG a umi n um chequered p ate and fixed to t he frame fabricated from 40 x40x4 mm S S angles properly welded to the tank shell. The chequered plates shall be bolted to this frame and shall be removabletype.

		3.5 The normal and high-pressure impeller shall be mounted on a single shaft and normal (low) pressure impeller shall be dynamically balanced.
		3.6 The pump shall be provided with self-adjusting mechanical carbon seal assy.
		3.7 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.
		3.8 Operation of low pressure to high pressure or vice a versa shall be possible by actuation of single lever.
		3.9 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/cm^2, the pressure in low pressure side shall not exceed 8.5 kg/cm^2.
		3.10 The pump shall be provided in built (integrated in the pump outlet manifold) Pressure Relief Valve (PRV) which shall operate automatically and shall not allow the high pressure to increase beyond 45 kgs/cm^2.
		3.11 The size of high – pressure outlet shall be of 35mm connected to high pressure hose reel.
		3.12 The thermal relief valve (TRV) shall be provided and fitted in the pump housing, which will open when both deliveries (HP and LP) are shut off for long time to control the temperature of pump water. The Thermal Relief Valve (TRV) should open at 60^0C and shall reset automatically when the temperature of water is within limit.
		3.13 The pump design shall be modular type and shall not have gaskets/packing. The arrangement shall be such that the carbon seal can be attended/ removed without removing the pump body. The pump shall be provided deep groove heavy duty dual angular contact bearing immersed in oil bath.
		3.14 The pump shall be provided with one suction inlet of 140 mm dia having round threads confirming to IS:902 of 1974 and four numbers of 63 mm delivery outlets (IS:903) having screw down type quick closing clack valve (IS:4928) fitted with instantaneous couplings as per IS 903:1993. Blank caps fastened with chains and incorporating means to relieve pressure between the valve and the cap shall be provided one for each delivery valve and one 38 mm outlet with ball valve and female instantaneous coupling. The delivery valve screw shall not be with gland. The high pressure outlet shall not less than 25mm and shall either be flange on screw type.
		3.15 The efficiency of the pump shall be such that the power required shall not be more than available with the chassis at safe RPM for stationery and continuous operation.

		POWER TAKE OFF UNIT: The power take off unit of make Firehawk/Webster/Vas/Syall/ Hale/ Rosenbauer shall be able to transfer full torque of the engine to the axle. The PTO shall have an input to output ratio of minimum 1:1.62 so as to keep the engine rpm within the maximum torque range specified by the chassis/ engine manufacturer while the pump is operated at its duty point. The main casing shall be made in light aluminum alloy and shall be heat treated for additional strength, the bearing holders however shall be made in cast iron, and the gears shall be helical and 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 (at NTP conditions) 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 be fitted with a magnetic drain plug along with breather and oil filler cap. Oil seals used shall be of highest quality and rotary seals/ water slingers shall be used over & above the oil seals to prevent dust/water entering into the oil seals. The gear shifting shall be achieved pneumatically with the aid of vehicle's air tank and an illuminated indication shall be given near the driver to indicate the completion of PTO engagement. A cable type flexible manual over ride for gear shifting shall also be provided near the driver's seat in case of loss of air pressure.
5.	**Control Panel**	**5.1** An adequately illuminated control panel shall be provided near the pump and easily accessible to operator for operating different controls. The control panel of required size shall be made from 3.15 mm aluminium sheet (Aluminium sheets / chequered plates IS 737). **5.2** The control panel shall include the following items- **5.2.1** Throttle Control for engine **5.2.2** Pressure gauge : Low pressure: 0 to 21 kg/Cm^2 (Glycerine filled) : High pressure: 0 to 70 kg/cm^2 **5.2.3** Compound gauge : Vacuum: 0 to 680 mm of Hg In Red. Pressure 0 to 10 kgs/cm^2 in Black. **5.3** The pressure gauges shall be Glycerine filled with min 3" dia. Panel mounted. **5.4** High pressure hose reel circuit control **5.5** Change over lever from LP to HP mode located at convenient position. **5.6** LED level gauge/Clear acrylic glass tube, unbreakable type water level indicator calibrated on full, ¾ , ½, ¼ and empty.

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		7.5	During he endurance es tthe water shall not be replen shed in the coo ling system and he temperature of he cooling wa er and engine o ilshould no texceed the manufacturer s standard recommendations for the continuous operation and eng he should not show any sign of stresses.
		7.6	The primer shall be capable of lifting water at east 7 0 m n not more han 36 seconds and preferablybe ful lyautomatic.
8.	**Water Monitor**	8.1	A water monitor of 2000 LPM capacity confirm to IS 8442 shall be mounted on the top of the vehicle between the driver cabin and water tank.
		8.2	The monitor shall be of standard make. The output shall be set to three ranges varying from 900 to 2000 LPM.
		8.3	The monitor shall be rotated 360^0 left and right and also move up and down.
		8.4	The monitor shall be made from light alloy and shall be hard coated from inside to avoid abrasion and corrosion.
		8.5	The monitor shall have horizontal reach of minimum 50 mtrs when supplied with water at pressure of 8 kg/cm^2
		8.6	The monitor shall be flange mounted with 80 mm butterfly valve provided at the bottom of monitor
		8.7	The monitor pipeline shall be 'C' class galvanized pipe of 80 mm dia with suitable flanges.
		8.8	The monitor shall be hydrostatically tested to the pressure of 16 kg/cm^2
		8.9	Thc monitor pipeline shall be supported suitably to avoid vibrations and cracking.
9.	**Electrical System**	9.1	All the important electric circuit shall have separate fuses, suitably indicated and shall be grouped into a common fuse box at an accessible position. The wiring shall be single pole with negative earth.
		9.2	Suitable sized wire shall be selected for different circuits considering the current consumption for that circuit.
		9.3	All other light, dashboard light, cabin, light lockers lights shall be approved marked.
		9.4	All the controlling switches of lights fitted on dashboard shall be of approved marked.
		9.5	Two new Fog Lamps of approved make shall be provided and fitted on front bumper with controlling switch on dashboard.
		9.6	Two rotating revolving beacon lamps of 24 volts, Amber colour lens duly mounted over the roof of cabin.
		9.7	24 volts DC one mile range electric siren of standard make mounted on suitable place and heavy duty push button on driver and cleaner side.
		9.8	Two–tone hooter cum P.A. System having 25 watt capacity with speaker mounted on the cabin roof and amplifier in the cabin.
		9.9	Illuminated sign board with letter "FIRE" over the cabin.

16	Workmanship & Finish	The vehicle shall be fabricated, painted with standard workmanship.

(Nancy Singla)
AC/SB
Member

(Dayavir Singh)
Comdt
Team
Member

(Naresh Namdev)
AC/ITBP
H/NSG
Member

(Neeraj Shahi)
AC/CRPF
Member

(Kailash Yadav)
DC/BSF
Member

(S. Tomar)
DO/ DFS
Co-opt Member

(Dr. M.M Gosal)
SSO(T)BPR&D
Member

(K. Verma)
IG/Fire(CISF)
Member

(Prashant Lonkar)
Scientist (E)/DRDO
Co-opt Member

(Rajnath Singh)
IG(Fire)/CISF
Member

(Udayan Banerjee)
IG(Admn)/CISF
Member

(Alok Kumar Pateria)
SDG(HQ)/CISF
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RAJESH RANJAN, IPS
महानिदेशक / Director General
केन्द्रीय औद्योगिक सुरक्षा बल
Central Industrial Security Force
गृह मंत्रालय / Ministry of Home Affairs
नई दिल्ली -110003 / New Delhi-110003

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