TRIAL DIRECTIVES (TDs) FOR WATER TANKER 12 KL CAPACITY WITH FIREFIGHTING PUMP

Sl	Specification	Revised QRs by Board	Trial Directives for POs
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.	The vehicle shall meet the requirement as per relevant standards and QRs.
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.	The vehicle shall meet the requirement as per relevant standards and QRs.
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.	Shall meet the requirement as per relevant standards and QRs.
		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.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
		1.2 Type: 6X2, cowl chassis, full forward control, RHD, wheel base shall not be less than 4600 mm.	Shall meet the requirement as per relevant standards and QRs.
		1.3 Engine: 6 Inline cylinder, water cooled, direct injection, turbo charged diesel engine developing minimum 180 B.H.P. with Bharat Stage VI/ equivalent latest version chassis	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
		1.4 GVW: Shall not exceed maximum permissible limit weight of chassis	Shall meet the requirement as per relevant standards and QRs

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		2.5 Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.6 The tank construction shall be such that there shall be no leakage and shall have overlapped joints of 25.4mm between the bottom sheet and side sheets. The bottom sheet corner shall be rolled upward up to a minimum of 300mm height and shall be welded to side sheets. The dimensions of the tank shall be clearly stated in the offer along with detailed volumetric calculation.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.7 All the welding shall be by MIG welding process only. The welding of the tank shell be in such a manner that the first beading is from inside the shell and subsequent bead from outside the shell. The welded surface shall be cleaned of all 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.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.8 The water tank shall be mounted on the chassis on a sub frame using Rubber Metacones with sufficient saddle supports placed as per the availability of bolt holes in the chassis frame. The details shall be submitted along with the offer. These supports shall be fabricated from S.S. plate of minimum 10mm thick with a reinforcement plates of 6mm thick welded to tank shell from outside to the bottom sheet up to with continuous welding.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.9 S.S. plate of suitable size and thickness shall be welded to the tank mounting pedestal for mounting the tank on mounting brackets provided in the chassis frame. The plates/brackets fitted to chassis frame shall also be provided with suitable gusset plates for reinforcement.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.10 The Tank shall be fitted on the chassis with the help of 5/8" dia. High tensile bolts with nylock nuts.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.11 The tank shall be mounted slightly sloping towards the rear so as to decant the tank completely.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.

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		2.22 The complete top of water tank shall be covered with 10SWG aluminium chequered plate and fixed to the frame fabricated from 40x40x4 mm S.S. angles properly welded to the tank shell. The chequered plates shall be bolted to this frame and shall be removable type.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.23 Suction hose brackets of aluminium sheet of 3.15 mm thick with suitable fastening arrangement shall be provided on the top deck to accommodate 4 Nos. 140 mm dia. and 2.5 mtrs. Length suction hoses with male and female couplings.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.24 The locker of suitable size shall be provided with doors and locking arrangement on both sides. The location and size shall be shown in the drawing. These lockers will be used for keeping delivery hoses accessories and high pressure hose reel. The structure of the locker shall be made from 40x40x4 mm thick S.S. angles with 16SWG aluminium panelling from outside and 16SWG aluminium chequered plate from inside. The floor panelling of locker shall be 10 SWG aluminium chequered plates	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.25 Suitable rear mudguards made from 16 SWG M.S. sheet with reinforcing ribs shall be provided and supported on MS. brackets.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.26 A suitable towing hook shall be provided at the rear of vehicle.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.27 An additional draw pipe of 150 mm dia. of 'C' class galvanized incorporating 150 mm butterfly " Audco" make valve with gun metal, female suction hose coupling shall be provided to the rear side of the vehicle.	Shall be checked and should meet the requirement as per relevant standards and QRs.
3	**Fire pump (Multi pressure)**	**3.1** The water pump shall be centrifugal type, multi pressure made of bronze/gunmetal, having output capacity of 4000 LPM at 10 Kg/cm^2 and 300LPM at 35 Kgs/cm^2 at 3 mtrs suction lift at NTP condition with automatic primer. The low pressure side will be of single stage and the high pressure side also with single stage having regenerative type impeller.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
		3.2 The pump shall be CE marked meet international standards and confirming to EN-1028 Part-I & II.	Necessary certificates from statutory authority as per QRs, shall also be checked and verified.

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		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.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		3.11 The size of high – pressure outlet shall be of 35mm connected to high pressure hose reel.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		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^{0}C and shall reset automatically when the temperature of water is within limit.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		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.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		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.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		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.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		3.16 The pump shall be rear mounted connected to P.T.O by propeller shafts and universal and slip joint.	Shall be checked physically and should meet the requirement as per relevant standards and QRs

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torque reactions, to constrain the PTO so as not to move significantly out of position, to allow chassis flexion. In no case welding/drilling shall be allowed on the chassis while mounting the PTO. Suitable sized U bolts may however be used for this purpose. The PTO alignment shall be in line with the existing drive line as far as possible. The new propeller shafts shall be free from welding defect and a spline and yoke arrangement shall be used. A general layout drawing of the PTO mounting shall be enclosed with the technical offer without which the tender shall not be considered. All the propeller shafts on the throughput side as well as at the pump drive side must be balanced to suitable standards.

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

QRs, wherever necessary, shall also be checked and verified.

		such that, it shall accommodate 60 mtrs. H.P. hose having 19.0 mm bore with quick connect couplings. The hose reel shall have 40 kgs/cm^2 working pressure and bursting pressure shall not be less than 120 kgs/ cm^2 **6.4** Additional 60 mtrs hose with quick connect coupling (male & female) of above specifications shall be supplied loose, to connect the hose reel whenever required. The loose hose shall be stored in one of the locker during hose reel in winded condition. **6.5** The HP hose reel shall be provided with High Pressure fog/ Jet trigger type gun connect by quick connecting couplings. The gun shall be made from aluminium alloy with rubber grip handle. The inlet connection shall be of ¾ BSP (British Standard Pipe) and shall have leak proof rotating type hose connector. The gun shall be of constant flow type and shall have discharge capacity of 150 LPM approx. The gun shall have facility to set of either spray or jet pattern preferably in pistol grip. The gun shall have ability to work on pressure from 20 kg/ cm^2 to 40 kg/cm^2 without affecting the discharge pattern. The weight of the gun assembly shall not be more than 3.0 kgs.	
7.	**Pump Test**	The pump fitted on the vehicle shall be subjected to various tests as detailed below **7.1** The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 Kgs/cm^2 to detect leakage perforation etc. **7.2** 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. **7.3** The pump performance test will be carried out by running the pump at rated RPM and measuring the discharge at various pressure.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.

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		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.	QRs, wherever necessary, shall also be checked and verified.
10	**Painting**	**10.1** The complete super structural members shall be painted with two coats of Red Oxide primer, and two coats of chassis Grey paint. **10.2** The complete external and internal aluminium panelling lockers shall be painted with two coats of Zinc Chromate paint. **10.3** The complete exterior of the vehicle shall be painted with two finish coats of "PO RED" Polyurethane" paint. The paint shade shall be similar to cabin shade. **10.4** The complete under chassis painting shall be carried out. **10.5** The words "Central Industrial Security Force" Fire Service Training Institute "in English shall be painted on both sides of vehicle on the water tank in a suitable size letters in Golden Yellow paint with Black colour shading.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
11	**Accessories**	**11.1** Quick removable type wire mesh guard shall be provided to wind screen glass. **11.2** Four aluminium hooks for keeping the uniform clothing shall be provided in driver's cabin.	Shall be checked physically and tested physically and should meet the requirement as per relevant standards and QRs.

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16	**Workman ship and Finish**	The vehicle shall be fabricated, painted with standard workmanship.	Shall be checked physically and should meet the requirement as per relevant standards and Rs.

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