

GOVERNMENT OF ARUNACHAL PRADESH
OFFICE OF THE DIRECTOR, FIRE & EMERGENCY SERVICES
ITANAGAR

No. No.DIR/F&ES/MT-200/2022

Dated Itanagar the ¹² June' 2023

TENDER NOTICE

Sealed tenders on plain paper are invited by the Director of Fire & Emergency Services, Arunachal Pradesh, Itanagar from the well established and reputed fabricators for fabrication of 28(twenty-eight) Fire Tenders as per enclosed terms & conditions and technical specifications. Tenders will be received upto **1600 hrs on 04/07/2023** and will be opened on **05/07/2023 at 1130 hrs**. The tenderers or their representatives may remain present at the time of opening of tenders.

The tender papers containing full details with specification and terms & conditions can be obtained from Directorate of Fire & Emergency Services, Ganga, Itanagar on any working day during office hours w.e.f. **14/06/2023 to 04/07/2023** on payment of Rs.1,000/-(Rupees one thousand) only (non refundable) as tender fees in the form of Demand Draft/ Bankers Cheque in favour of the Superintendent of Police, Fire & Emergency Services, Itanagar, payable at SBI Itanagar. It may also be downloaded from website www.arunpol.nic.in. The tenderers downloading the documents from website are also required to submit a bank draft of Rs. 1,000/-(Rupees one thousand) only (Non refundable) as tender fee at the time of submitting tender paper.

In complete tenders are liable to be rejected.



Director
Fire & Emergency Services
Arunachal Pradesh
Itanagar

NOT TO BE PUBLISHED

M/No. No.DIR/F&ES/MT-200/2022

Dated Itanagar the ¹² June' 2023

Copy to:

1. The I/c Computer Cell, PHQ Itanagar may kindly upload the Tender Notice, Terms & Conditions and 03 (three) copies of Technical Specifications of Fire Tender on the website www.arunpol.nic.in.
2. Notice board.
3. Office copy.



Director,
Fire & Emergency Services
Arunachal Pradesh
Itanagar

**GOVERNMENT OF ARUNACHAL PRADESH
OFFICE OF THE DIRECTOR, FIRE & EMERGENCY SERVICES
ITANAGAR**

No. DIR/F&ES/MT-200/2022

Dated Itanagar the 12 June' 2023

TERMS AND CONDITIONS

1. The Director of Fire & Emergency Services, Arunachal Pradesh, Itanagar invites sealed tender on plain paper from the well established and reputed fabricators for fabrication of 28 Fire Tenders i.e. 7 nos. of Advance Fire Tender on 1920 cowl Chassis, 13 nos. Medium-Fire Tender on 914 Cabin Chassis and 8 nos. of Medium-Fire Tender on 407 SFC Cabin Chassis for Arunachal Pradesh Fire & Emergency Services as per the Deptt. specifications. The sealed tenders will be received upto **1600 hrs on 04/07/2023** and will be opened **on 05/07/2023 at 1130 hrs**. The tenderers or their representatives may remain present at the time of opening of tenders.
2. Tender fee of Rs.1000.00 (Rupees one thousand) only (non-refundable) per bid should be paid in the form of Demand Draft/Bankers cheque drawn in favour of the Superintendent of Police, Fire & Emergency Services, Itanagar payable at State Bank of India, Itanagar which is also applicable for those bidders downloaded the tender papers through web site/online.
3. Tenders submitted after scheduled date and time will not be entertained.
4. Tenders must be typed clearly or written in block letters. Rates quoted should be written both in figures and words.
5. Tenders will not be accepted unless properly sealed.
6. Tenderers should submit separate envelope for each fabrication.

(A) Envelope, containing tender shall be superscribed in block letters with the heading 1. **“TENDER FOR FABRICATION OF ADVANCED FIRE TENDER on 1920 COWL CHASSIS FOR ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES”**.

2. **“TENDER FOR FABRICATION OF MEDIUM FIRE TENDER ON 914 CABIN CHASSIS FOR ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES”**.


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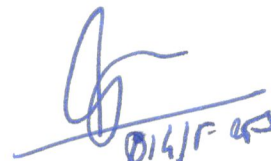
3. "TENDER FOR FABRICATION OF MEDIUM FIRE TENDER ON 407 SFC CABIN CHASSIS FOR ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES".

(B) Tenderers should write his full address at the bottom of the left side of envelope.

7. Tender should be quoted in two bid system, **Part-I Technical Bid** and **Part-II Financial Bid** which should be kept in separate sealed covers. Price should not be indicated in the technical bid. (Rate should be quoted in Indian currency) only.
 - a. Financial bid shall be opened only for those bidders who have been declared technically qualified by the committee. The criteria for eligibility and qualifications are to be met by the bidders such as minimum level of experiences, past performances, facilities and financial position etc.
8. Correction(s) in the Tender, if any must also be typed clearly or written in block capital letters in ink and duly initialed. Overwriting on the tender is liable to be rejected.
9. Tender once submitted shall be final. No alteration/modification in the rates and terms and conditions of the tenders shall be entertained after opening of tender.
10. Tenders will remain valid upto **31st March'2025.**
11. The Fire Tender duly fabricated as per specifications shall have to be delivered within 60 (sixty) days from the date of issue of work order or delivery of the chassis to the fabricators whichever is later, failing which 5% of the total value of the fabrication will be forfeited and work order will be cancelled.
12. The Tenderers shall clearly mention the factory's address where the Fire Tenders will be fabricated and shall give undertaking to the effect that the fabrication works shall be fully insured against fire, theft, riots and burglary.
13. The firms should be financially sound and capable of undertaking fabrication of Fire Tenders within stipulated time given by the undersigned and no advance payments will be disbursed.



14. A board of officers to be nominated by the department shall inspect the Fire Tenders at (factory/workshop) in terms of satisfactory fabrication and effective functionality of all fittings. Proper testing facilities of the appliances must be available at the factory site itself and must be provided by the fabricator at their cost. Any defect(s) observed out by the committee shall have to be rectified by the fabricator before acceptance of the Fire Tenders by the department. Bills/payments for fabrication shall be released only if the fabrication works in the opinion of the accepting authority are found to have worked satisfactorily/effectively.
15. Rates quoted shall be F.O.R. Itanagar destination. All taxes/charges, levies, transportation charges, etc. shall be shown separately.
16. The Tenderers should submit GST registration certificate and valid attested trading license issued by the competent authority.
17. All the tenders must be accompanied with earnest money of **Rs.15,00,000/- (Rupees fifteen lakh)** only in the name of the **Superintendent of Police, Fire & Emergency Services, Itanagar, Government of Arunachal Pradesh**. Tenders without the earnest money will be summarily rejected. The tenderers within the State of Arunachal Pradesh have to pledge EMD for tenders in the form of NSC/KVP. The tenderers/ firms outside the State of Arunachal Pradesh have to pledge EMD in the form of Demand Draft or Bank Guarantee. However, the firms registered under Small Scale Industries (SSI) are exempted from pledging EMD, for which the firms should submit a copy of certificate of SSI alongwith the tenders.
18. The successful Tenderers shall have to submit Bank Guarantee/Insurance coverage from any Nationalized Bank/Insurance Company covering 100% of the cost of the Chassis delivered to them for fabrication at the time of execution of the contract agreement.
19. The successful Tenderer shall have to execute the contract agreement with the Department.
20. Earnest money in respect of unsuccessful Tenderers will be released soon after the finalization of the Tenders. The earnest money of the successful Tenderers will be released after signing of the contract agreement and production of Bank Guarantee in respect of the chassis delivered for fabrication.



21. Successful tenderers will be required to deposit 5% of the total value as performance security money within ten days from the date of issue of letter of acceptance of tender. The successful tenderers will have to enter into a "DEED OF AGREEMENT " stipulating the terms and conditions of the contract. Security deposit will be subject to forfeiture in case of non fulfillment of any terms and conditions of contract. Earnest money of the successful tenderers will be forfeited to the government in case of failure to furnish security money, Bank Garantee and execution of "**DEED OF AGREEMENT**".
22. TDS/Income Tax will be deducted from the bill as per applicable rate.
23. The fabrication work & equipments installed shall cover guarantee of 3(three) years. The defect develop with guarantee period shall be repaired/replacement of defective parts by the fabricator at own cost.
24. The fabricator should have following the pre qualification criteria:
- a) The Fabricator should be ISO: 9001:2000 certified and should enclose such valid certificate alongwith tender documents.
 - b) Bidder/Fabricator should have at least three years good experience in fabrication of Fire Tenders (Documents to be submitted as evidence).
 - c) The tenderers should be financially sound and necessary documents in this regard should be submitted with the tender papers.
 - d) Bidder/Fabricator should have all the testing facilities at the factory premises, which would be required for Inspection and testing during 3(three) stages inspection:-
 - i. 1st stage : Construction of under structure, water tank, placement of tanks, fittings lockers & pump etc.
 - ii. 2nd stage : Testing of equipments & systems at workshop
 - iii. 3rd/final stage : Final Acceptances Test will be conducted at Itanagar in presence of acceptance board constituted by the Govt. of Arunachal Pradesh.
 - e) Tenderer should have their Regional Office/Representative at NE region for immediate response and better after sales and service support.



25. The successful bidder has no right to claim for additional fund in any case.
26. **The Director General of Police, Arunachal Pradesh, Itanagar reserves the right to reject the lowest or all or any of the tender without assigning any reason thereof.**
27. In case of any dispute, legal jurisdiction will be at Itanagar, Arunachal Pradesh.
28. In case of any bandh call on the date of opening of tender, the tenders will be opened on next working day.

NOTE:-THE CHASSIS WILL BE PROVIDED BY THE DEPARTMENT



Director
Fire & Emergency Services
Arunachal Pradesh
Itanagar



026 / F-023

**TECHNICAL SPECIFICATION FOR FABRICATION OF ADVANCED
FIRE TENDER ON 1920 MODEL COWL CHASSIS FOR ARUNACHAL
PRADESH FIRE & EMERGENCY SERVICES GENERAL REQUIREMENTS**

1. Scope of Supply: This specification covers design, materials construction features, manufacturing, inspection & testing at our/vender's works, suitable painting & performance testing requirements, workmanship & finish, accessories & equipment of Fire tender as per **IS 950** for fire service use.

2. Vehicle Chassis: The chassis carrying on fabrication work of Fire Tender will be of 1920. The chassis will be equipped with power assisted steering. The Arunachal Pradesh Fire & Emergency Services shall supply the chassis for fabrication.

3. General Requirements:

The Fire Tender will be designed & manufactured as per BIS/ISI & sound engineering practice. All the equipments & accessories will be fixed on the appliance in a compact & neat manner & will be so placed that each part is easily & readily accessible for use & maintenance. The vehicle will incorporate a Fire Pump having water discharge capacity of at least 2250 LPM at 8 Kg/cm² and 250 LPM at 40 kg/cm², a water tank of 6000 Ltrs. capacity made of SS304 drag hook or eye of adequate strength & design will be provided at the rear & front of chassis.

The Fire tender will be fabricated in a manner so as to confirm to the following characteristics:

- a. GVW will not be less than GVW of chassis mfg. Specification with all equipment & crew.
- b. Maximum speed on level road fully laden will be 72 Km/hr.
- c. Acceleration from a standing start through the gears (fully laden) will be 64 Km/hr in 55 sec
- d. The appliance will be capable of being started from rest on a gradient of 1 to 4.
- e. When traveling at 48 km/hr on a level dry surface the foot brake will be capable of stopping the vehicle within a distance of 15 mtrs. from the point at which brake is applied. The hand brake will be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
- f. The appliance will have following overall dimensions.

Wheel base : Not more than 4500mm
Mtrs.

Road clearance : Not less than 24 cm

Turning circle: Not more than 15.3

Overall width : Not more than 2.50
Mtrs.

4. MATERIAL SELECTION AND TREATMENT

The choice of material to be used in construction of the appliance shall be made with a view to combine lightness with strength and durability.

4.1 The timber shall not be used for body construction.

4.2 All parts which form water ways shall be of corrosion resistance material or suitable treated with corrosion resistance compound. All metal pipeline shall be dipped galvanized

after completing fabrication of pipe line inclusive flanges/joints. All metal parts exposed to atmosphere shall either be corrosion resisting material or treated suitably to resist corrosion. Pipe used shall at least be of medium duty and shall stand two times of the maximum working pressure.

5. Pump and Primer:

5.1 The pump shall be Godiva/Hale/Magirus/Rosenbauer/Firefly makes only and shall be a combined high-low (multi) pressure rear mounted pump with output capacity of 2250 LPM at 8 kg/cm² and 250 LPM at 40 kg/cm². The fire pump should be certified with EN 1028 standard.

5.1 The vehicle fabricator or pump manufacturer should have such testing facility as per EN 1028 at their own premises.

5.2 The low pressure section should be of single stage centrifugal and the high pressure section should be single stage having re-generative type impeller.

5.3 The pump shall be capable of delivering not less than 2250 LPM at 8 kg/cm² at suction lift of 3 mtrs and high pressure output of 250 LPM at 40 kg/cm².

5.4 The pump should generate maximum outlet pressure of 17 kg/cm² in low pressure mode and 54.5 kg/cm² in high pressure mode respectively.

5.5 The pump shall be having one suction inlet of 100 mm having round threads conforming to IS 902-1974 and two nos. of 63 mm delivery outlets having screw down type valves fitted with instantaneous couplings as per IS:903/1993. The delivery valve screw will have no gland. The high pressure outlet will not be less than 30 mm and minimum two outlets for high pressure hose reel should be provided with 30m length.

5.6 The pump shall be capable of deep lifting upto 7 mtrs. in 30 sec. at NTP condition.

5.7 The pump shall be made of gun metal. The suction tube, primer body, impeller, volute body, central manifold, bypass connector, filter body shall be made of Gun Metal. The pump shaft, cover plate and high **pressure impeller** shall be stainless steel. The pump housing shall have provision to connect to internal cooling system.

5.8 The pump priming shall be fully automatic in operation and shall not require any operation whatever on the pump operator other than throttling the engine to the required RPM. The pump shall prime from rear side of low pressure impeller by utilizing internal passages within the high pressure pump body without using any external pipework from suction tube.

6. Pump Test:

6.1 The pump shall run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After the test there shall not be any leakage of water through carbon seal.

6.2 The pump performance test will be carried out by running the pump at constant RPM at 2600 and measuring the discharge at various pressures.



6.3 The pump will be subjected to Endurance Test for a period of 4(four) hrs. continuous running. The first three hours the pump shall deliver rated output of 2000 LPM at 7 Kgs/cm² and next one hour will be 300 LPM at 3.5 Kgs/cm².

6.4 During the endurance test the water shall not be replenished in all the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standards recommendations for the continuous operation and engine should not show any sign of temperature increase.

7. **Power Take Off:** The P.T.O. shall be Hale/Godiva/Firefly makes only and shall be Heavy Duty Power Take Off(PTO) unit shall have a torque rating of 21000 Nm maximum and weight of the assembly shall not exceed 150 kgs with its flanges fitted. The P.T.O shall have suitable ratio so as to achieve the specified duty point of the pump. The main gear box housing shall be of fine grain alloy cast iron with a tensile strength of 30,000 PSI for durability. Gears shall be electric furnace chrome nickel steel, bores ground to size and teeth integrated and hardened for smooth performance, long life and high load capacity. Accurately cut spur design to eliminate potential end thrust. The drive shaft shall be of heat treated chrome nickel steel, 2, 3/4 inches in diameter to withstand full engine torque in road and PTO operating conditions.

8. Water Tank:

8.1 The capacity shall be 6000 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.

8.2 A tank of required capacity constructed out of MS treated for anti-corrosion shall be suitably mounted on the chassis in a manner keeping in view the proper load distribution on the axles. A full length runner from behind the driver cabin till end of chassis frame shall be provided and made out of MS channel of 100 x 50 x 5 mm suitable fixed to the chassis, frame with 6 mm thick MS plate and bolted to chassis frame wherever holes are available in the chassis and also with 5/8" 'U' bolts and nuts must be Nylock types only.

8.3 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 breaking, concerning or accelerating.

8.4 The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose.

8.5 The tank shall be mounted on minimum three cross members to 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.

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

8.7 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.

8.8 The tank shall be fitted with a 50 mm bore overflow pipe. Two 63 mm instantaneous hydrant connection, incorporating a strainer NRV with Gate Valve, 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 diameter butterfly type valve. Drain valve shall be provided at the bottom of the tank.

8.9 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.

8.10 Visual level gauge of the glass/acrylic tube shall be provided at the control panel calibrated $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and full (preferably calibrated in liters).

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

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

- a) Hydrant-tank
- b) Hydrant-reel
- c) Tank-pump-high pressure hose reel
Hydrant-pump-high pressure hose reel
- d) Tank-pump-monitor (water)
- e) Pump to tank

9. Delivery Outlets:

There will be 2 Nos. delivery outlets having standard GM instantaneous. Female coupling with screw down type delivery valves with blank caps. It will have twist type lugs made of gun metal.

10. High pressure hose reel:

10.1 One 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 rear of the appliance above the pump. 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.

10.2 The high pressure hose reel will hold not less than 45 m of hose in one length, terminating in High pressure fog/jet trigger type gun by quick connect couplings. The fog gun shall be made of Aluminum alloy or Stainless Steel (SS 304).

10.3 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 for 20 kg/cm² to 40 kg/cm² without affecting discharge pattern. The weight of the gun assembly shall not be more than 3 kg.

11. Water Monitor:

11.1 The Water Monitor and nozzle shall be made of Akron/Alco/AWG/Williams makes only. The monitor shall be made of Pyrolite® of high strength protected against corrosion and anodized to resist to chemical attack of foam concentrates.

11.2 The monitor shall have T handle for vertical and horizontal movement.

11.3 The monitor shall be capable for delivering upto 1000 LPM.

11.4 The monitor shall have vertical and horizontal movement adjustment lockable by knob. The monitor shall be capable of vertical movement of + 90 degree to - 45 degree. The monitor shall be capable of 360 degree horizontal movement.

11.5 The monitor shall have an inlet of 1.5 inches with flange. The monitor shall be mounted on the suitable place at rooftop of the vehicle.

11.6 The monitor dimensions shall not exceed height 338 mm x width 280 mm x depth 250 mm. The weight of monitor shall not exceed 7 kgs.

11.7 The monitor nozzle shall have a quick connect adjustable metering head with pick up rates 1% and 3%. The nozzle shall have an adjustable spring loaded baffle that allows flow setting selection of 350, 500 750 or 1000 LPM with a simple push and turn off the baffle head. The weight of nozzle shall not exceed 5.5 kgs.

12. Pipelines and Valves:

12.1 All pipelines and pipe fittings shall be of Stainless Steel (SS 304) and all valves up to 50 mm size shall be 3 piece design SS 304 ball valves. All valves above 50 mm size shall be standard butterfly valves.

12.2 All piping shall be sized so as to have minimum pressure drop and achieve the required pressure and flow at various locations.

12.3 All piping shall be designed for 10% over the maximum pressure encountered in the pipe.

12.4 The piping shall be flanged for ease of maintenance. However, flange joints shall be kept to minimum.

12.5 All lines shall be hydraulically tested at 1.5 times of the design pressure and pressure shall be held for 2(two) hours. In no case the lines shall be tested below 25 kg/cm².

12.6 All lines shall be suitably supported so as to provide rigidly and avoid vibrations.

12.7 All lines less than 50 mm NB size can be socket welded to matching rating fittings.

12.8 All lines above 50 mm NB size shall be butts welded with full penetration welds.

12.9 All bolts, nuts and washers used shall be of SS-304.

13. 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 in stationary conditions.

14. Control panel: Adequately illuminated control panel shall be provided near the pump. 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 (glycerin filled)
Pressure gauge – 0 to 50 kgf/cm²; for high pressure (glycerin filled)
- c) Compound gauge (glycerin 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 flow 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) Pump to Tank valve
- m) Water level indicator.

15. BODY WORK STOWAGE:

15.1 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 and In-charge 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 Aluminum chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or reverting except the mudguard arches which shall be covered with 1.60 mm Aluminum plates. Trap doors for topping up oil etc wherever necessary shall be provided.



15.2 One roof light should be provided in the driver's cabin and external rear view mirrors should be fitted to the cab.

15.3 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 the 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 quality handles.

15.4 The door handle on outside of side seat shall have a locking arrangement. Other doors shall be lockable from inside. In addition to the doors locks, Aluminium tower bolt shall be provided for all the doors from inside adequate grab shall be provided for easily boarding and alighting from the appliance.

15.5 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.

15.6 The rubber beading used for fitting glasses and windows frame shall be E.P.D.M. rubber.

15.7 The driver seat shall be adjustable type vertically, forward and backward. The officer seat shall be adjustable type. Both the seats shall be rigidly fixed to the flooring by means of nuts and bolts.

15.8 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.

15.9 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.

15.10 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 50mm cushion latex foam rubber upholstered in good quality foam leather of approved shade.

15.11 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.

15.12 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.

15.13 Each cross members shall be secured to the chassis frame by 16 mm diameter 'U' bolts with Aluminium packing block and self locking unit.

15.14 Balata packing of thickness 6 mm shall be provided in between the chassis frame across members.

15.15 The structure/frame work shall be of welded constructions and made from 2 mm thick MS pressed sections and square tubes. The angles and channels used shall be of min. 3 mm thickness. The complete structure material shall be treated for anticorrosion 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 coats of Epoxy paint shall be applied to the completely welded structure. The structures shall be so designed so as to avoid any vibration/rating/performance in the intended usage of the vehicle.

The details of super structure are as follows:

- a. Under frame cross members : 100 x 50x 5 mm (Min.)
- b. Floor longitudinal members : 50 x 50 x 6 mm (Min.)
- i. The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible.
- ii. The interior paneling shall be done from 1.22 mm thick Aluminium sheets & the exterior paneling shall be done from 1.60 mm thick Aluminium sheets.
- iii. The roof on the cabin of the vehicle shall be covered with min 1.60 mm thick Aluminium chequered plates. All the lockers sides & complete rear of the vehicle shall be covered with min. 1.22 mm 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.
- iv. Sufficient numbers of locker 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 equipments given in annexure. One through and through locker shall be provided immediately behind the driver's cab. 2 (Two) Nos. fire extinguisher should be position on both side just near the door with holding/clamp on standing position. 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.
- v. All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cabin. All lockers above chassis floor shall be covered with Aluminium roller shutters. The roller shutter shall be made from extruded Aluminium sections with suitable roller, spring, guide channels, etc. all Aluminium sections used shall be properly anodized.
- vi. The roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire material.
- vii. These roller shutters should open in every position of the vehicle even in rough terrain.



- viii. Guide rails 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.
- ix. Roller shutters shall be made of hollow rectangular shaped Aluminium locks 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.
- x. Suitable storage space shall be provided to store for 2.5 m lengths of suction hoses with couplings at convenient location.
- xi. **SPECIAL PROVISION FOR STOWAGE OF EQUIPMENTS:** For all hose fittings like branch pipe etc. quick release type couplings to be 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.

16. MISCELLANEOUS:

16.1 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.

16.2 Two cat ladders made out of S.S round or square pipe of 25 mm diameter shall be provided.

16.3 2 nos. of 25 mm diameter Aluminium pipe railing with sufficient number of Aluminium double socket brackets shall be provided to the rear body over the deck.

16.4 A heavy duty towering hook shall be provided and fitted the rear bumper by means of nuts and bolts.

16.5 Quick removable type wire mesh guard made from 25 x 25 mm 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.

17. 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 completed 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 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 90ft heavy duty galvanized wire rope with replaceable self locking celvis hook and shall be mounted on the front bumper of the vehicle with suitable strong supports and a 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 mechanism for ease of operation.

18. ELECTRICAL SYSTEM:

18.1 All the important electrical circuit shall have separate fuses indicated and shall be grouped into a common fuse box located at an accessible position. The wiring shall be single pole with negative earth.

18.2 The suitable size wire shall be selected for different circuits considering the current consumption for that circuit.

18.3 Electrical siren of 1.6 kms 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.

18.4 Two rotating beacon lights with amber lens shall be provided over the top of driver's cabin.

18.5 The other lights, cabin light, locker lights shall be of approved make.

18.6 All the controlling switches of lights on dashboard shall be of approved make.

18.7 Two fog lamps of approved make shall be provided and fitted on front-bumper with controlling switch on dashboard.

18.8 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.

18.9 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.

18.10 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.

18.11 Adjustable spot light shall be mounted in a convenient position to give flood or beam of lights at the rear of driver cabin shall be provided.

19. PAINTING:

19.1 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.

19.2 The complete external and internal Aluminium paneling of driver cum crew cabin and rear body shall be painted with two coats of Zinc Chromate paint.



19.3 The complete exterior of the vehicle shall be painted with two finish coats of "**POST OFFICE RED**" polyurethane paint manufactured by ICI Deluxe/Nerolac/DuPont.

19.4 The internal painting of cabin lockers etc. shall be done with two coats of grey synthetic enamel paint made by ICI Dulux/Nerolac/Dupont.

19.5 The name of the fire services/organization viz., "**ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES**" shall be painted on both sides of vehicle in letter of suitable size in golden yellow paint with black colour shading.

19.6 The "LOGO" of the department shall be painted on both sides of vehicle in natural colours at suitable place. (The logo is at Annexure-A)

20. LADDER WITH GALLOWS: An Aluminium extension ladder of trussed type 10.5 mtrs height shall be provided with the vehicle and mounted on suitable ladder gallows. 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. Gallows clamp must be fitted directly to the chassis so that it is capable of holding Trussed type Ladder.

21. B.A. SET BRACKETS: 2 (two) nos. of Breathing Apparatus (BA) 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 call. Proper padding and harnessing arrangement shall be made in the bracket to avoid damages to the cylinder of the B.A. set.

22. ACCESSORIES: The following accessories shall be provided:

22.1 Fire bell: (Bell Carillon): One gun metal fire bell of 250 mm size confirming to IS 1928 of 1984 shall be mounted externally on the top of crew compartment and shall be operated within the crew compartment by firemen in seating position.

22.2 Six Aluminium hooks for keeping the uniform clothing shall be provided in crew compartment.

23. WIRELESS SET BOX: Box made from 2 mm gauge Aluminium sheet with lid shall be provided just in front of the officer seat with 13 mm wooden plank for fitting the wireless set bracket. The design and mounting shall be shown at the time of fabrication work.

24. WORKMANSHIP & FINISH: The GVW of appliance will not cross the GVW of chassis manufacturers specification with all equipments & 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. The appliance will clearly have the following markings at suitable locations.

- > 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.

25. ACCEPTANCE TESTS: The following acceptance test will be given to the complete satisfaction of the user. The design of vehicle will be such that it will not affect the chassis characteristic as specified by the chassis manufacturer such as speed, turning circle, acceleration, braking distance etc. 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 factory in front of all the Inspecting Officers.

- i. The pump with its all fitments will be subjected to hydrostatic testing on pressure of 21 kgs/cm^2 .
- 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.
- 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 output of 2000 LPM at 7 kg/cm^2 and next one hour will be 1000 LPM at 3.5 kgs/cm^2 .
- 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 standards recommendations for the continuous operation and engine should not show any sign of stresses.
- v. The other test shall be as per detailed performance parameters given for chassis, superstructure and fire fighting system which include monitor output & throw, foam induction & expansion, load, etc. Accessories shall also be subjected to relevant tests as per the specifications indicated above.

26. NOTE

The manufacturer may take note of the following points before submitting the tender documents.

26.1 Vendor shall submit three sets of drawings showing plan, section & elevation along with load distribution diagram with the appliance fully loaded with their offer. All material specification and quantity shall also be supplied along with their offer. Successful vendor shall start the fabrication only after getting the approved drawing. Without these technical bid will not be considered and stand rejected.

26.2 The vehicle shall be inspected in two stages.

a) After completion of basic frame work, water tank ready but not mounted, pump ready but not mounted.

b) Acceptance test as per clause of the specification once the vehicle is ready in all respect.

26.3 The fabricated vehicles shall meet all the regulation with respect to motor vehicle act/RTO regulation enforce and in no case exceeds the manufacturer specification w.r.t. chassis.

26.4 The delivery of the chassis shall be given to the successful vendor from Deptt. of F&ES, Itanagar and the accepted vehicle shall be delivered at the Directorate, Fire & Emergency Services, Itanagar by the vendor.

26.5 The pump shall be coupled to the prime mover of the chassis through a suitable PTO capable of transferring full torque of the engine. A control lever for engaging and disengaging the pump with suitable locking device shall be provided in driver's cabin. The fabricator shall submit proof of purchasing a branch new PTO unit.

26.6 The vendor/fabricator shall provide **after sell service for the period of 3 (three) years for free** from the date of acceptance of the appliance.

27. INSTRUCTION BOOK

An instruction book for guidance of the users containing both operating and maintenance procedure shall be supplied. Full illustrated spare parts catalogue for the pump should also be supplied with the unit.

LIST OF MANDATORY ACCESSORIES

Sl.No.	ITEM	QUANTITY
1.	100 mm rubber suction hose in 2.5 mtrs length with 100 mm suction hose GM couplings as per IS: 3549-1983.	4 nos.
2.	Suction collecting head – 100 mm suction inlet, GM 2 way as per IS: 904 1983.	1 no.
3.	Basket strainer	1 no.
4.	Suction strainer for 100 mm suction hose – brass as per IS: 907: 1984	1 no.
5.	Suction wrenches for 100 mm suction hose couplings as per IS: 4643: 1984.	2 nos.
6.	Combined key for hydrant cover and lower valve as per IS: 910: 1980.	2 nos.
7.	Branch with revolving head, GM, 63 mm size as per IS: 906: 1988.	1 no.
8.	Torch electric with 4 cell water proof.	2 nos.
9.	Foam branch – FB5X type with pick up tube, GM as per IS: 2097: 1983.	2 nos.
10.	Rubber gloves as per IS 4770 – 1991 for 5000 volts	4 pairs
11.	Firemen Axe as per IS: 926	6 nos.
12.	Crow bar of 6 ft long 25mm dia as per IS: 704: 1968	2 nos.
13.	Jack hydraulic for 20 ton capacity with handle	1 no.
14.	Oil feeder standard capacity	1 no.
15.	Tool kit(fixed spanners, ring spanners, screw drivers & pliers insulated.5-ajustable wrench, ½ kg hammer, plus	1 no. each
16.	Branch pipe GM 63mm male inlet as per IS: 903: 1993	1 no.
17.	Hose clamp as per IS standard	4 nos.
18.	Bolt cutter – 600mm long	1 no.
19.	Hook ceiling (preventer) with 6 feet Long SS handle	3nos.
20.	Tyre lever	1 no.

21.	Petrol chain saw machine, 600mm guide bar length with spare chain either of Honda or Hitachi or Bosch Company with powerful 1900 watts(=minimum) motor.	1 no.
22.	Hose ramp (rubber) as per IS standard 20 ton capacity suitable for 2 lines	4 nos.
23.	Delivery hose 63mm dia confirming to IS 636- 1988 type A in 30 mtrs length with SS male and female couplings. The hose and the couplings should be ISI marked	10 nos.
24.	B.A. Set as per BIS standards	2 nos.
25.	Light weight hand control branch pipe with rotate male coupling for water jet, spray and shut off	02 nos.



(Sujit Chakraborty) APPS
Assistant Director
HQ(F&ES) Itanagar



(K.T. Gambo)SO
Officer In-charge
Fire Station Itanagar



(P.C. Roy)SO
Officer In-charge
Fire Station Seppa

Annexure-A



TECHNICAL SPECIFICATION FOR FABRICATION OF MEDIUM FIRE TENDER ON 407 MODEL CABIN CHASSIS FOR ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES GENERAL REQUIREMENTS

1. Scope of Supply: This specification covers design, materials construction features, manufacturing, inspection & testing at our/vender's works, suitable painting & performance testing requirements, workmanship & finish, accessories & equipment of Fire tender as per **IS 950** for fire service use.

2. Vehicle Chassis: The chassis carrying on fabrication work of Fire Tender will be of 407. The chassis will be equipped with power assisted steering. The Arunachal Pradesh Fire & Emergency Services shall supply the chassis for fabrication.

3. General Requirements:

The Fire Tender will be designed & manufactured as per BIS/ISI & sound engineering practice. All the equipments & accessories will be fixed on the appliance in a compact & neat manner & will be so placed that each part is easily & readily accessible for use & maintenance. The vehicle will incorporate a Fire Pump having water discharge capacity of at least 1350 LPM at 7 Kg/cm² and 250 LPM at 40 kg/cm², a water tank of 1500 Ltrs. capacity made of SS304 drag hook or eye of adequate strength & design will be provided at the rear & front of chassis.

The Fire tender will be fabricated in a manner so as to confirm to the following characteristics:

- a. GVW will not be less than GVW of chassis mfr. Specification with all equipment & crew.
- b. Maximum speed on level road fully laden will be 60 Km/hr.
- c. Acceleration from a standing start through the gears (fully laden) will be 40 Km/hr in 55 sec
- d. The appliance will be capable of being started from rest on a gradient of 1 to 4.
- e. When traveling at 40 km/hr on a level dry surface the foot brake will be capable of stopping the vehicle within a distance of 15 mtrs. from the point at which brake is applied. The hand brake will be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
- f. The appliance will have following overall dimensions.

4. MATERIAL SELECTION AND TREATMENT

The choice of material to be used in construction of the appliance shall be made with a view to combine lightness with strength and durability.

4.1 The timber shall not be used for body construction.

4.2 All parts which form water ways shall be of corrosion resistance material or suitable treated with corrosion resistance compound. All metal pipeline shall be dipped galvanized after completing fabrication of pipe line inclusive flanges/joints. All metal parts exposed to atmosphere shall either be corrosion revisiting material or treated

suitably to resist corrosion. Pipe used shall at least be of medium duty and shall stand two times of the maximum working pressure.

5. Pump and Primer:

5.1 The pump shall be Godiva/Hale/Magirus/Rosenbaur/Firefly makes only and shall be a combined high-low (multi) pressure rear mounted pump with output capacity of 1350 LPM at 7 kg/cm. The fire pump should be certified with EN 1028 standard.

5.1 The vehicle fabricator or pump manufacturer should have such testing facility as per EN 1028 at their own premises.

5.2 The low pressure section should be of single stage centrifugal pump.

5.3 The pump shall be capable of delivering not less than 1350 LPM at 7 kg/cm² at suction lift of 3 mtrs.

5.4 The pump should generate maximum outlet pressure of 17 kg/cm² in low pressure.

5.5 The pump shall be having one suction inlet of 75 mm having round threads confirming to IS 902-1974 and two nos. of 63 mm delivery outlets having screw down type valves fitted with instantaneous couplings as per IS:903/1993. The delivery valve screw will have no gland.

5.6 The pump shall be capable of deep lifting upto 7 mtrs. in 30 sec. at NTP condition.

5.7 The pump shall be made of gun metal. The suction tube, primer body, impeller, volute body, central manifold, bypass connector, filter body shall be made of Gun Metal. The pump shaft, cover plate and high pressure impeller shall be stainless steel. The pump housing shall have provision to connect to internal cooling system.

5.8 The pump priming shall be fully automatic in operation and shall not require any operation whatever on the pump operator other than throttling the engine to the required RPM. The pump shall prime from rear side of low pressure impeller by utilizing internal passages.

6. Pump Test:

6.1 The pump shall run dry for a period of minimum two minutes at 1500 RPM to check the integrity of mechanical carbon seal. After the test there shall not be any leakage of water through carbon seal.

6.2 The pump performance test will be carried out by running the pump at constant RPM at 2600 and measuring the discharge at various pressures.



6.3 The pump will be subjected to Endurance Test for a period of 4(four) hrs. continuous running. The first three hours the pump shall deliver rated output of 1350LPM at 7 Kgs/cm² and next one hour will be 300 LPM at 3.5 Kgs/cm².

6.4 During the endurance test the water shall not be replenished in all the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standards recommendations for the continuous operation and engine should not show any sign of temperature increase.

7. **Power Take Off:** The P.T.O. shall be Hale/Godiva/Firefly makes only and shall be Heavy Duty Power Take Off(PTO) unit shall have a torque rating of **21000 Nm** maximum and weight of the assembly shall not exceed **80 kgs** with its flanges fitted. The P.T.O shall have suitable ratio so as to achieve the specified duty point of the pump. The main gear box housing shall be of fine grain alloy cast iron with a tensile strength of **30,000 PSI** for durability. Gears shall be electric furnace chrome nickel steel, bores ground to size and teeth integrated and hardened for smooth performance, long life and high load capacity. Accurately cut spur design to eliminate potential end thrust. The drive shaft shall be of heat treated chrome nickel steel, 2, 3/4 inches in diameter to withstand full engine torque in road and PTO operating conditions.

8. Water Tank:

8.1 The capacity shall be 1500 litres. The tank body and baffles shall be of minimum 3 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.

8.2 A tank of required capacity constructed out of MS treated for anti-corrosion shall be suitably mounted on the chassis in a manner keeping in view the proper load distribution on the axles. A full length runner from behind the driver cabin till end of chassis frame shall be provided and made out of MS channel of **100 x 50 x 3.5 mm** suitable fixed to the chassis, frame with 4 mm thick MS plate and bolted to chassis frame wherever holes are available in the chassis and also with 5/8" 'U' bolts and nuts must be Nylock types only.

8.3 The tank shall be suitably baffled with minimum 2 nos. of baffles fitted transversely to prevent surge when the vehicle is breaking, concerning or accelerating.

8.4 The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose.

8.5 The tank shall be mounted on minimum three cross members to 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.

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

8.7 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.

8.8 The tank shall be fitted with a **50 mm** bore overflow pipe. Two 63 mm instantaneous hydrant connection, incorporating a strainer NRV with Gate Valve, 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 diameter butterfly type valve. Drain valve shall be provided at the bottom of the tank.

8.9 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.

8.10 Visual level gauge of the glass/acrylic tube shall be provided at the control panel calibrated $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and full (preferably calibrated in liters).

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

8.12 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
- b) Hydrant-reel
- c) Pump to hose reel
- d) Tank to pump
- e) Pump to tank
- f) Off

9. Delivery Outlets:

There will be 2 Nos. delivery outlets having standard GM instantaneous. Female coupling with screw down type delivery valves with blank caps. It will have twist type lugs made of gun metal.



10. Pipelines and Valves:

10.1 All pipelines and pipe fittings shall be of Stainless Steel (SS 304) and all valves up to 50 mm size shall be 3 piece design SS 304 ball valves. All valves above 50 mm size shall be standard butterfly valves.

10.2 All piping shall be sized so as to have minimum pressure drop and achieve the required pressure and flow at various locations.

10.3 All piping shall be designed for 10% over the maximum pressure encountered in the pipe.

10.4 The piping shall be flanged for ease of maintenance. However, flange joints shall be kept to minimum.

10.5 All lines shall be hydraulically tested at 1.5 times of the design pressure and pressure shall be held for 2(two) hours. In no case the lines shall be tested below 25 kg/cm².

10.6 All lines shall be suitably supported so as to provide rigidly and avoid vibrations.

10.7 All lines less than 50 mm NB size can be socket welded to matching rating fittings.

10.8 All lines above 50 mm NB size shall be butts welded with full penetration welds.

10.9 All bolts, nuts and washers used shall be of SS-304.

11. 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 in stationary conditions.

12. Control panel: Adequately illuminated control panel shall be provided near the pump. 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 (glycerin filled)
Pressure gauge – 0 to 50 kgf/cm²; for high pressure (glycerin filled)
- c) Compound gauge (glycerin 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 flow lamp for lubricating system.
- f) Cooling water circuit control.
- g) Water tank valve.
- h) Delivery valves.
- i) Suction inlet.
- j) Hose reel valves.
- k) Pump to Tank valve
- n) Water level indicator.

13. BODY WORK STOWAGE:

13.1 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 4 (four) crew members. The cab floor should be covered with 3 mm thick Aluminum chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or reverting except the mudguard arches which shall be covered with 1.60 mm Aluminum plates. Trap doors for topping up oil etc wherever necessary shall be provided.

13.2 One roof light should be provided in the driver's cabin and external rear view mirrors should be fitted to the cab.

13.3 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 the 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 quality handles.

13.4 The door handle on outside of side seat shall have a locking arrangement. Other doors shall be lockable from inside. In addition to the doors locks, Aluminium tower bolt shall be provided for all the doors from inside adequate grab shall be provided for easily boarding and alighting from the appliance.

13.5 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.

13.6 The rubber beading used for fitting glasses and windows frame shall be E.P.D.M. rubber.

13.7 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.

13.8 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.

13.9 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.

13.10 The crew seat shall be rigidly fixed to floor by means of nuts and bolts, running full width of the vehicle suitable for sitting four firemen, covered with 75 mm x 50mm cushion latex foam rubber upholstered in good quality foam leather of approved shade.

13.11 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 3.5 mm size.

13.12 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.

13.13 Each cross members shall be secured to the chassis frame by 16 mm diameter 'U' bolts with Aluminium packing block and self locking unit.

13.14 Balata packing of thickness **6 mm** shall be provided in between the chassis frame across members.

13.15 The structure/frame work shall be of welded constructions and made from 2 mm thick MS pressed sections and square tubes. The angles and channels used shall be of min. 3 mm thickness. The complete structure material shall be treated for anticorrosion 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 coats of Epoxy paint shall be applied to the completely welded structure. The structures shall be so designed so as to avoid any vibration/rating/performance in the intended usage of the vehicle.

The details of super structure are as follows:

a.	Under frame cross members	:	100 x 50x 5 mm (Min.)
b.	Floor longitudinal members	:	50 x 50 x 6 mm (Min.)

i. The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible.

ii. The interior paneling shall be done from 1.22 mm thick Aluminium sheets & the exterior paneling shall be done from 1.60 mm thick Aluminium sheets.

- iii. The roof on the cabin of the vehicle shall be covered with min 1.60 mm thick Aluminium chequered plates. All the lockers sides & complete rear of the vehicle shall be covered with min. 1.22 mm 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.
- iv. Sufficient numbers of locker 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 equipments given in annexure.
- v. All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cabin. All lockers above chassis floor shall be covered with Aluminium roller shutters. The roller shutter shall be made from extruded Aluminium sections with suitable roller, spring, guide channels, etc. all Aluminium sections used shall be properly anodized.
- vi. The roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire material.
- vii. These roller shutters should open in every position of the vehicle even in rough terrain.
- viii. Guide rails 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.
- ix. Roller shutters shall be made of hollow rectangular shaped Aluminium locks 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.
- x. Suitable storage space shall be provided to store for 2.5 m lengths of suction hoses with couplings at convenient location.
- xi. **SPECIAL PROVISION FOR STOWAGE OF EQUIPMENTS:** For all hose fittings like branch pipe etc. quick release type couplings to be 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.

14. MISCELLANEOUS:

14.1 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.

14.2 2 nos. of 25 mm diameter Aluminium pipe railing with sufficient number of Aluminium double socket brackets shall be provided to the rear body over the deck.

14.3 A heavy duty towering hook shall be provided and fitted the rear bumper by means of nuts and bolts.

14.4 Quick removable type wire mesh guard made from 25 x 25 mm 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.

15. ELECTRICAL SYSTEM:

15.1 All the important electrical circuit shall have separate fuses indicated and shall be grouped into a common fuse box located at an accessible position. The wiring shall be single pole with negative earth.

15.2 The suitable size wire shall be selected for different circuits considering the current consumption for that circuit.

15.3 Electrical siren of 1.6 kms 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.

15.4 Two rotating beacon lights with amber lens shall be provided over the top of driver's cabin.

15.5 The other lights, cabin light, locker lights shall be of approved make.

15.6 All the controlling switches of lights on dashboard shall be of approved make.

15.7 Two fog lamps of approved make shall be provided and fitted on front-bumper with controlling switch on dashboard.

15.8 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.

15.9 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.



15.10 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.

15.11 Adjustable spot light shall be mounted in a convenient position to give flood or beam of lights at the rear of driver cabin shall be provided.

16. PAINTING:

16.1 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.

16.2 The complete external and internal Aluminium paneling of driver cum crew cabin and rear body shall be painted with two coats of Zinc Chromate paint.

16.3 The complete exterior of the vehicle shall be painted with two finish coats of **"POST OFFICE RED"** polyurethane paint manufactured by ICI Deluxe/Nerolac/DuPont.

16.4 The internal painting of cabin lockers etc. shall be done with two coats of grey synthetic enamel paint made by ICI Dulux/Nerolac/Dupont.

16.5 The name of the fire services/organization viz., **"ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES"** shall be painted on both sides of vehicle in letter of suitable size in golden yellow paint with black colour shading.

16.6 The **"LOGO"** of the department shall be painted on both sides of vehicle in natural colours at suitable place.(The logo is at Annexure-A)

18. WIRELESS SET BOX: Box made from 2 mm gauge Aluminum sheet with lid shall be provided just in front of the officer seat with 13 mm wooden plank for fitting the wireless set bracket. The design and mounting shall be shown at the time of fabrication work.

19. LADDER GALLOW

Ladder gallows shall be provided for carrying suitable length of aluminum extension ladder. The design shall be such that the ladder can be released without difficulty from reasonable access position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladders when stored.

20. BLINKER LIGHT/FIRE BELL



Blinker lighting shall be fixed on the roof of the cabin with two tone sire with necessary amplifier and operating control shall be fitted in front of officer seat.

20.1 One fire bell of 250 mm dia natural tone carillon shall be mounted externally and capable of being operated within the cabin shall be provided.

21. WORKMANSHIP & FINISH: The GVW of appliance will not cross the GVW of chassis manufacturers specification with all equipments & 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. The appliance will clearly have the following markings at suitable locations.

- > 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.

22. ACCEPTANCE TESTS: The following acceptance test will be given to the complete satisfaction of the user. The design of vehicle will be such that it will not affect the chassis characteristic as specified by the chassis manufacturer such as speed, turning circle, acceleration, braking distance etc. 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 factory in front of all the Inspecting Officers.

- i. The pump with its all fitments will be subjected to hydrostatic testing on pressure of 21 kgs/cm^2 .
- 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.
- 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 output of 2000 LPM at 7 kg/cm^2 and next one hour will be 1000 LPM at 3.5 kgs/cm^2 .
- 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 standards recommendations for the continuous operation and engine should not show any sign of stresses.

v.

The other test shall be as per detailed performance parameters given for chassis, superstructure and fire fighting system which include monitor output & throw, foam induction & expansion, load, etc. Accessories shall also be subjected to relevant tests as per the specifications indicated above.

23. NOTE

The manufacturer may take note of the following points before submitting the tender documents.

23.1 Vendor shall submit three sets of drawings showing plan, section & elevation along with load distribution diagram with the appliance fully loaded with their offer. All material specification and quantity shall also be supplied along with their offer. Successful vendor shall start the fabrication only after getting the approved drawing. Without these technical bid will not be considered and stand rejected.

23.2 The vehicle shall be inspected in two stages.

a) After completion of basic frame work, water tank ready but not mounted, pump ready but not mounted.

b) Acceptance test as per clause of specification once the vehicle is ready in all respect.

23.3 The fabricated vehicles shall meet all the regulation with respect to motor vehicle act/RTO regulation enforce and in no case exceeds the manufacturer specification w.r.t. chassis.

23.4 The delivery of the chassis shall be given to the successful vendor from Deptt. of F&ES, Itanagar and the accepted vehicle shall be delivered at the Directorate, Fire & Emergency Services, Itanagar by the vendor.

23.5 The pump shall be coupled to the prime mover of the chassis through a suitable PTO capable of transferring full torque of the engine. A control lever for engaging and disengaging the pump with suitable locking device shall be provided in driver's cabin. The fabricator shall submit proof of purchasing a branch new PTO unit.

23.6 The vendor/fabricator shall provide **after sell service for the period of 3 (three) years for free** from the date of acceptance of the appliance.


24. INSTRUCTION BOOK


An instruction book for guidance of the users containing both operating and maintenance procedure shall be supplied. Full illustrated spare parts catalogue for the pump should also be supplied with the unit.



LIST OF MANDATORY ACCESSORIES

Sl.No.	ITEM	QUANTITY
1.	100 mm rubber suction hose in 2.5 mtrs length with 75 mm suction hose GM couplings as per IS: 3549-1983.	4 nos.
2.	Suction strainer for 75 mm suction hose – brass as per IS: 907: 1984	1 no.
3.	Basket strainer	1 no.
4.	Suction wrenches for 75 mm suction hose couplings as per IS: 4643: 1984.	2 nos.
5.	Torch electric with 4 cell water proof.	2 nos.
6.	Foam branch – FB5X type with pick up tube, GM as per IS: 2097: 1983.	2 nos.
7.	Rubber gloves as per IS 4770 – 1991 for 5000 volts	4 pairs
8.	Firemen Axe as per IS: 926	6 nos.
9.	Crow bar of 6 ft long 25mm dia as per IS: 704: 1968	2 nos.
10.	Jack hydraulic for 10 ton capacity with handle	1 no.
11.	Oil feeder standard capacity	1 no.
12.	Tool kit(fixed spanners, ring spanners, screw drivers & pliers insulated, Adjustable wrench , plus.	1 no.
13.	Branch pipe GM 63mm male inlet as per IS: 903: 1993	1 no.
14.	Hose clamp as per IS standard	4 nos.
15.	Bolt cutter – 600mm long	1 no.
16.	Hook ceiling (preventer) with six feet Long wooden handle	3 nos.
17.	Tyre lever	1 no.
18.	Delivery hose 63mm dia confirming to IS 636- 1988 type A in 22.5 mtrs length with GM male and female couplings. The hose and the couplings should be ISI marked	4 nos.


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Annexure-A



**TECHNICAL SPECIFICATION FOR FABRICATION OF MEDIUM FIRE
TENDER ON 914 MODEL CABIN CHASSIS FOR ARUNACHAL PRADESH
FIRE & EMERGENCY SERVICES GENERAL REQUIREMENTS**

1. Scope of Supply: This specification covers design, materials construction features, manufacturing, inspection & testing at our/vender's works, suitable painting & performance testing requirements, workmanship & finish, accessories & equipment of Fire tender as per **IS 950** for fire service use.

2. Vehicle Chassis: The chassis carrying on fabrication work of Fire Tender will be of 914. The chassis will be equipped with power assisted steering. The Arunachal Pradesh Fire & Emergency Services shall supply the chassis for fabrication.

3. General Requirements:

The Fire Tender will be designed & manufactured as per BIS/ISI & sound engineering practice. All the equipments & accessories will be fixed on the appliance in a compact & neat manner & will be so placed that each part is easily & readily accessible for use & maintenance. The vehicle will incorporate a Fire Pump having water discharge capacity of at least 2250 LPM at 8 Kg/cm² and 250 LPM at 40 kg/cm², a water tank of 3000 Ltrs. capacity made of SS304 drag hook or eye of adequate strength & design will be provided at the rear & front of chassis.

The Fire tender will be fabricated in a manner so as to confirm to the following characteristics:

- a. GVW will not be less than GVW of chassis mfr. Specification with all equipment & crew.
- b. Maximum speed on level road fully laden will be 50 Km/hr.
- c. Acceleration from a standing start through the gears (fully laden) will be 45 Km/hr in 55 sec
- d. The appliance will be capable of being started from rest on a gradient of 1 to 4.
- e. When traveling at 40 km/hr on a level dry surface the foot brake will be capable of stopping the vehicle within a distance of 15 mtrs. from the point at which brake is applied. The hand brake will be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
- f. The appliance will have following overall dimensions.

Wheel base	: Not more than 3955 mm	Turning circle: Not more than 14.5 mtrs
Road clearance:	Not less than 221 mm	Overall width: Not more than 702 ft.

4. MATERIAL SELECTION AND TREATMENT

The choice of material to be used in construction of the appliance shall be made with a view to combine lightness with strength and durability.

4.1 The timber shall not be used for body construction.

4.2 All parts which form water ways shall be of corrosion resistance material or suitable treated with corrosion resistance compound. All metal pipeline shall be dipped galvanized after completing fabrication of pipe line inclusive flanges/joints. All metal parts exposed to atmosphere shall either be corrosion resisting material or treated suitably to resist

corrosion. Pipe used shall at least be of medium duty and shall stand two times of the maximum working pressure.

5. Pump and Primer:

5.1 The pump shall be Godiva/Hale/Magirus/Rosenbaur/Firefly makes only and shall be a combined high-low (multi) pressure rear mounted pump with output capacity of 1800 LPM at 7 kg/cm² and 250 LPM at 40 kg/cm². The fire pump should be certified with EN 1028 standard.

5.1 The vehicle fabricator or pump manufacturer should have such testing facility as per EN 1028 at their own premises.

5.2 The low pressure section should be of single stage centrifugal and the high pressure section should be single stage having re-generative type impeller.

5.3 The pump shall be capable of delivering not less than 2000 LPM at 7 kg/cm² at suction lift of 3 mtrs and high pressure output of 300 LPM at 40 kg/cm².

5.4 The pump should generate maximum outlet pressure of 17 kg/cm² in low pressure mode and 54.5 kg/cm² in high pressure mode respectively.

5.5 The pump shall be having one suction inlet of 100 mm having round threads confirming to IS 902-1974 and two nos. of 63 mm delivery outlets having screw down type valves fitted with instantaneous couplings as per IS:903/1993. The delivery valve screw will have no gland. The high pressure outlet will not be less than 30 mm and minimum two outlets for high pressure hose reel should be provided.

5.6 The pump shall be capable of deep lifting upto 7 mtrs. in 30 sec. at NTP condition.

5.7 The pump shall be made of gun metal. The suction tube, primer body, impeller, volute body, central manifold, bypass connector, filter body shall be made of Gun Metal. The pump shaft, cover plate and high pressure impeller shall be stainless steel. The pump housing shall have provision to connect to internal cooling system.

5.8 The pump priming shall be fully automatic in operation and shall not require any operation whatever on the pump operator other than throttling the engine to the required RPM. The pump shall prime from rear side of low pressure impeller by utilizing internal passages within the high pressure pump body without using any external pipework from suction tube.

6. Pump Test:

6.1 The pump shall run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After the test there shall not be any leakage of water through carbon seal.

6.2 The pump performance test will be carried out by running the pump at constant RPM at 2600 and measuring the discharge at various pressures.

6.3 The pump will be subjected to Endurance Test for a period of 4(four) hrs. continuous running. The first three hours the pump shall deliver rated output of 2000 LPM at 7 Kgs/cm² and next one hour will be 300 LPM at 3.5 Kgs/cm².

6.4 During the endurance test the water shall not be replenished in all the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standards recommendations for the continuous operation and engine should not show any sign of temperature increase.

7. Power Take Off: The P.T.O. shall be Hale/Godiva/Firefly makes only and shall be Heavy Duty Power Take Off(PTO) unit shall have a torque rating of 21000 Nm maximum and weight of the assembly shall not exceed 120 kgs with its flanges fitted. The P.T.O shall have suitable ratio so as to achieve the specified duty point of the pump. The main gear box housing shall be of fine grain alloy cast iron with a tensile strength of 30,000 PSI for durability. Gears shall be electric furnace chrome nickel steel, bores ground to size and teeth integrated and hardened for smooth performance, long life and high load capacity. Accurately cut spur design to eliminate potential end thrust. The drive shaft shall be of heat treated chrome nickel steel, 2, $\frac{3}{4}$ inches in diameter to withstand full engine torque in road and PTO operating conditions.

8. Water Tank:

8.1 The capacity shall be 3500 litres. The tank body and baffles shall be of minimum 5 mm thick MS plates confirming 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.

8.2 A tank of required capacity constructed out of MS treated for anti-corrosion shall be suitably mounted on the chassis in a manner keeping in view the proper load distribution on the axles. A full length runner from behind the driver cabin till end of chassis frame shall be provided and made out of MS channel of 100 x 50 x 5 mm suitable fixed to the chassis, frame with 6 mm thick MS plate and bolted to chassis frame wherever holes are available in the chassis and also with 5/8" 'U' bolts and nuts must be Nylock types only.

8.3 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 breaking, concerning or accelerating.

8.4 The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose.

8.5 The tank shall be mounted on minimum three cross members to 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.

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

8.7 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.

8.8 The tank shall be fitted with a 50 mm bore overflow pipe. Two 63 mm instantaneous hydrant connection, incorporating a strainer NRV with Gate Valve, shall be provided close to the pump control panel for filling the tank through 75 mm bore pipe. Minimum 100 mm

bore pipe line shall be taken from the tank to the suction inlet of the pump incorporating minimum 100 mm internal diameter butterfly type valve. Drain valve shall be provided at the bottom of the tank.

8.9 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.

8.10 Visual level gauge of the glass/acrylic tube shall be provided at the control panel calibrated $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and full (preferably calibrated in liters).

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

8.12 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
- b) Hydrant-reel
- c) Tank-pump-high pressure hose reel
Hydrant-pump-high pressure hose reel
- d) Tank-pump-monitor (water)
- e) Pump to tank

9. Delivery Outlets:

There will be 2 Nos. delivery outlets having standard GM instantaneous. Female coupling with screw down type delivery valves with blank caps. It will have twist type lugs made of gun metal.

10. High pressure hose reel:

10.1 One 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 rear of the appliance above the pump. 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.

10.2 The high pressure hose reel will hold not less than 45 m of hose in one length, terminating in High pressure fog/jet trigger type gun by quick connect couplings. The fog gun shall be made of Aluminum alloy or Stainless Steel (SS 304). One motor should be provided for housing the hose reel.

10.3 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 for 20 kg/cm² to 40 kg/cm² without affecting discharge pattern. The weight of the gun assembly shall not be more than 3 kg.

11. Water Monitor:

11.1 The Water Monitor and nozzle shall be made of Akron/Alco/AWG/Williams makes only. The monitor shall be made of Pyrolite® of high strength protected against corrosion and anodized to resist to chemical attack of foam concentrates.

11.2 The monitor shall have T handle for vertical and horizontal movement.

11.3 The monitor shall be capable for delivering upto 1000 LPM.

11.4 The monitor shall have vertical and horizontal movement adjustment lockable by knob. The monitor shall be capable of vertical movement of + 90 degree to - 45 degree. The monitor shall be capable of 360 degree horizontal movement.

11.5 The monitor shall have an inlet of 1.5 inches with flange. The monitor shall be mounted on the suitable place at rooftop of the vehicle.

11.6 The monitor dimensions shall not exceed height 338 mm x width 280 mm x depth 250 mm. The weight of monitor shall not exceed 7 kgs.

11.7 The monitor nozzle shall have a quick connect adjustable metering head with pick up rates 1% and 3%. The nozzle shall have an adjustable spring loaded baffle that allows flow setting selection of 350, 500 750 or 1000 LPM with a simple push and turn off the baffle head. The weight of nozzle shall not exceed 5.5 kgs.

12. Pipelines and Valves:

12.1 All pipelines and pipe fittings shall be of Stainless Steel (SS 304) and all valves up to 50 mm size shall be 3 piece design SS 304 ball valves. All valves above 50 mm size shall be standard butterfly valves.

12.2 All piping shall be sized so as to have minimum pressure drop and achieve the required pressure and flow at various locations.

12.3 All piping shall be designed for 10% over the maximum pressure encountered in the pipe.

12.4 The piping shall be flanged for ease of maintenance. However, flange joints shall be kept to minimum.

12.5 All lines shall be hydraulically tested at 1.5 times of the design pressure and pressure shall be held for 2(two) hours. In no case the lines shall be tested below 25 kg/cm².

12.6 All lines shall be suitably supported so as to provide rigidly and avoid vibrations.

12.7 All lines less than 50 mm NB size can be socket welded to matching rating fittings.

12.8 All lines above 50 mm NB size shall be butts welded with full penetration welds.

12.9 All bolts, nuts and washers used shall be of SS-304.

13. 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 in stationary conditions.

14. Control panel: Adequately illuminated control panel shall be provided near the pump. 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 (glycerin filled)
Pressure gauge – 0 to 50 kgf/cm²; for high pressure (glycerin filled)
- c) Compound gauge (glycerin 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 flow 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) Pump to Tank valve
- m) Water level indicator.

15. BODY WORK STOWAGE:

15.1 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 Aluminum chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or reverting except the mudguard arches which shall be covered with 1.60 mm Aluminum plates. Trap doors for topping up oil etc wherever necessary shall be provided.

15.2 One roof light should be provided in the driver's cabin and external rear view mirrors should be fitted to the cab.

15.3 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 the 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 quality handles.

15.4 The door handle on outside of side seat shall have a locking arrangement. Other doors shall be lockable from inside. In addition to the doors locks, Aluminium tower bolt shall be provided for all the doors from inside adequate grab shall be provided for easily boarding and alighting from the appliance.

15.5 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.

15.6 The rubber beading used for fitting glasses and windows frame shall be E.P.D.M. rubber.

15.7 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.

15.8 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.

15.9 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.

15.10 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 50mm cushion latex foam rubber upholstered in good quality foam leather of approved shade.

15.11 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.

15.12 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.

15.13 Each cross members shall be secured to the chassis frame by 16 mm diameter 'U' bolts with Aluminium packing block and self locking unit.

15.14 Balata packing of thickness 6 mm shall be provided in between the chassis frame across members.

15.15 The structure/frame work shall be of welded constructions and made from 2 mm thick MS pressed sections and square tubes. The angles and channels used shall be of min. 3 mm thickness. The complete structure material shall be treated for anticorrosion 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 coats of Epoxy paint shall be applied to the completely welded structure. The structures shall be so designed so as to avoid any vibration/rating/performance in the intended usage of the vehicle.

The details of super structure are as follows:

- a. Under frame cross members : 100 x 50x 5 mm (Min.)
 - b. Floor longitudinal members : 50 x 50 x 6 mm (Min.)
-
- i. The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible.
 - ii. The interior paneling shall be done from 1.22 mm thick Aluminium sheets & the exterior paneling shall be done from 1.60 mm thick Aluminium sheets.
 - iii. The roof on the cabin of the vehicle shall be covered with min 1.60 mm thick Aluminium chequered plates. All the lockers sides & complete rear of the vehicle shall be covered with min. 1.22 mm 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.
 - iv. Sufficient numbers of locker 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 equipments given in annexure. One through and through locker shall be provided immediately behind the driver's cab. 2 (Two) Nos. fire extinguisher should be position on both side just near the door with holding/clamp on standing position. 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.
 - v. All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cabin. All lockers above chassis floor shall be covered with Aluminium roller shutters. The roller shutter shall be made from extruded Aluminium sections with suitable roller, spring, guide channels, etc. all Aluminium sections used shall be properly anodized.
 - vi. The roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire material.
 - vii. These roller shutters should open in every position of the vehicle even in rough terrain.



- viii. Guide rails 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.
- ix. Roller shutters shall be made of hollow rectangular shaped Aluminium locks 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.
- x. Suitable storage space shall be provided to store for 2.5 m lengths of suction hoses with couplings at convenient location.
- xi. **SPECIAL PROVISION FOR STOWAGE OF EQUIPMENTS:** For all hose fittings like branch pipe etc. quick release type couplings to be 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.

16. MISCELLANEOUS:

16.1 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.

16.2 Two cat ladders made out of S.S round or square pipe of 25 mm diameter shall be provided.

16.3 2 nos. of 25 mm diameter Aluminium pipe railing with sufficient number of Aluminium double socket brackets shall be provided to the rear body over the deck.

16.4 A heavy duty towering hook shall be provided and fitted the rear bumper by means of nuts and bolts.

16.5 Quick removable type wire mesh guard made from 25 x 25 mm 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.

17. ELECTRICAL SYSTEM:

17.1 All the important electrical circuit shall have separate fuses indicated and shall be grouped into a common fuse box located at an accessible position. The wiring shall be single pole with negative earth.

17.2 The suitable size wire shall be selected for different circuits considering the current consumption for that circuit.

17.3 Electrical siren of 1.6 kms 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.

17.4 Two rotating beacon lights with amber lens shall be provided over the top of driver's cabin.

17.5 The other lights, cabin light, locker lights shall be of approved make.

17.6 All the controlling switches of lights on dashboard shall be of approved make.

17.7 Two fog lamps of approved make shall be provided and fitted on front-bumper with controlling switch on dashboard.

17.8 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.

17.9 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.

17.10 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.

17.11 Adjustable spot light shall be mounted in a convenient position to give flood or beam of lights at the rear of driver cabin shall be provided.

18. PAINTING:

18.1 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.

18.2 The complete external and internal Aluminium paneling of driver cum crew cabin and rear body shall be painted with two coats of Zinc Chromate paint.

18.3 The complete exterior of the vehicle shall be painted with two finish coats of **"POST OFFICE RED"** polyurethane paint manufactured by ICI Deluxe/Nerolac/DuPont.

18.4 The internal painting of cabin lockers etc. shall be done with two coats of grey synthetic enamel paint made by ICI Dulux/Nerolac/Dupont.

18.5 The name of the fire services/organization viz., **"ARUNACHAL PRADESH FIRE & EMERGENCY SERVICES"** shall be painted on both sides of vehicle in letter of suitable size in golden yellow paint with black colour shading.

18.6 The "LOGO" of the department shall be painted on both sides of vehicle in natural colours at suitable place. (The logo is at Annexure-A)

19. LADDER WITH GALLOWS: An Aluminium extension ladder of trussed type 7.5 mtrs height shall be provided with the vehicle and mounted on suitable ladder gallows. 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. Gallows clamp must be fitted directly to the chassis so that it is capable of holding Trussed type Ladder.

20. ACCESSORIES: The following accessories shall be provided:

20.1 Fire bell: (Bell Carillon): One gun metal fire bell of 250 mm size confirming to IS 1928 of 1984 shall be mounted externally on the top of crew compartment and shall be operated within the crew compartment by firemen in seating position.

20.2 Six Aluminium hooks for keeping the uniform clothing shall be provided in crew compartment.

21. WIRELESS SET BOX: Box made from 2 mm gauge Aluminium sheet with lid shall be provided just in front of the officer seat with 13 mm wooden plank for fitting the wireless set bracket. The design and mounting shall be shown at the time of fabrication work.

22. WORKMANSHIP & FINISH: The GVW of appliance will not cross the GVW of chassis manufacturers specification with all equipments & 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. The appliance will clearly have the following markings at suitable locations.

- > 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.

23. ACCEPTANCE TESTS: The following acceptance test will be given to the complete satisfaction of the user. The design of vehicle will be such that it will not affect the chassis characteristic as specified by the chassis manufacturer such as speed, turning circle, acceleration, braking distance etc. 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 factory in front of all the Inspecting Officers.

- i. The pump with its all fitments will be subjected to hydrostatic testing on pressure of 21 kgs/cm^2 .
- 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.

- 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 output of 2000 LPM at 7 kg/cm² and next one hour will be 1000 LPM at 3.5 kgs/cm².
- 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 standards recommendations for the continuous operation and engine should not show any sign of stresses.
- v. The other test shall be as per detailed performance parameters given for chassis, superstructure and fire fighting system which include monitor output & throw, foam induction & expansion, load, etc. Accessories shall also be subjected to relevant tests as per the specifications indicated above.

24. NOTE

The manufacturer may take note of the following points before submitting the tender documents.

26.1 Vendor shall submit three sets of drawings showing plan, section & elevation along with load distribution diagram with the appliance fully loaded with their offer. All material specification and quantity shall also be supplied along with their offer. Successful vendor shall start the fabrication only after getting the approved drawing. Without these technical bid will not be considered and stand rejected.

26.2 The vehicle shall be inspected in two stages.

a) After completion of basic frame work, water tank ready but not mounted, pump ready but not mounted.

b) Acceptance test as per clause of specification once the vehicle is ready in all respect.

26.3 The fabricated vehicles shall meet all the regulation with respect to motor vehicle act/RTO regulation enforce and in no case exceeds the manufacturer specification w.r.t. chassis.

26.4 The delivery of the chassis shall be given to the successful vendor from Deptt. of F&ES, Itanagar and the accepted vehicle shall be delivered at the Directorate, Fire & Emergency Services, Itanagar by the vendor.

26.5 The pump shall be coupled to the prime mover of the chassis through a suitable PTO capable of transferring full torque of the engine. A control lever for engaging and disengaging the pump with suitable locking device shall be provided in driver's cabin. The fabricator shall submit proof of purchasing a branch new PTO unit.


26.6 The vendor/fabricator shall provide **after sell service for the period of 3 (three) years for free** from the date of acceptance of the appliance.


27. INSTRUCTION BOOK

An instruction book for guidance of the users containing both operating and maintenance procedure shall be supplied. Full illustrated spare parts catalogue for the pump should also be supplied with the unit.

LIST OF MANDATORY ACCESSORIES

Sl.No.	ITEM	QUANTITY
1.	100 mm rubber suction hose in 2.5 mtrs length with 100 mm suction hose GM couplings as per IS: 3549-1983.	4 nos.
2.	Suction collecting head – 100 mm suction inlet, GM 2 way as per IS: 904 1983.	1 no.
3.	Basket strainer	1 no.
4.	Suction strainer for 100 mm suction hose – brass as per IS: 907: 1984	1 no.
5.	Suction wrenches for 100 mm suction hose couplings as per IS: 4643: 1984.	2 nos.
6.	Combined key for hydrant cover and lower valve as per IS: 910: 1980.	2 nos.
7.	Branch with revolving head, GM, 63 mm size as per IS: 906: 1988.	1 no.
8.	Torch electric with 4 cell water proof.	2 nos.
9.	Foam branch – FB5X type with pick up tube, GM as per IS: 2097: 1983.	2 nos.
10.	Rubber gloves as per IS 4770 – 1991 for 5000 volts	4 pairs
11.	Firemen Axe as per IS: 926	6 nos.
12.	Crow bar of 6 ft long 25mm dia as per IS: 704: 1968	2 nos.
13.	Jack hydraulic for 20 ton capacity with handle	1 no.
14.	Oil feeder standard capacity	1 no.
15.	Tool kit(fixed spanners, ring spanners, screw drivers & pliers insulated, Adjustable wrench , plus.	1 no.
16.	Branch pipe GM 63mm male inlet as per IS: 903: 1993	1 no.
17.	Hose clamp as per IS standard	4 nos.
18.	Bolt cutter – 600mm long	1 no.
19.	Hook ceiling (preventer) with 6 feet. Long wooden handle	3nos.
20.	Tyre lever	1 no.
21.	Light weight hand control branch pipe with rotate male coupling for water jet, spray and shot off	02 nos.
22.	Delivery hose 63mm dia confirming to IS 636- 1988 type A in 30 mtrs length with SS male and female couplings. The hose and the couplings should be ISI marked	6 nos.


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