

केन्द्रीय औद्योगिक सुरक्षा बल
(गृहमंत्रालय)

ब्लॉक नं० 13 सीजीओ कॉम्प्लेक्स
लोधी रोड, नई दिल्ली- 110003

शाखा :- अग्नि शमन

ई-42099 / क्यूआर / टीडी / रिव्यू / फायर इक्वूपमेंट / फायर / 2026-936 दिनांक 30.07.2026

विषय: **FIRE SAFETY RELATED APPLIANCE/EQUIPMENTS के गुणात्मक आवश्यकता/परीक्षण निर्देशों (QRs/TDs) के मसौदे पर विक्रेताओं की टिप्पणियों हेतु आमंत्रण के संबंध में**

आपकों सूचित किया जाता है कि निम्नलिखित अग्नि सुरक्षा उपकरणों के गुणात्मक आवश्यक/परीक्षण निर्देशों (QRs/TDs) के मसौदों पर फर्मों/विक्रेताओं की टिप्पणियां आमंत्रित हैं।

- Crash Fire Tender for Airfield
- Emergency Rescue Tender
- Water Tanker (12 KL Capacity with Fire Fighting Pump)
- Hydraulic Platform (32 mtrs.)
- Water Mist & CAF Extinguisher (09/10 Ltrs. Capacity, Back Pack Type High Pressure)
- Water Mist (02x09/10 Ltrs. Capacity, High-Pressure Type, Motorcycle Mounted)

02. उक्त के संबंध में सभी फर्मों से निवेदन है कि नीचे दिए गए प्रारूप में वे अपनी टिप्पणियां भरकर OEM Certificate सहित भेजें:-

Qualitative Requirements (QRs)	Trial Directives (TDs)	Comments of Firms

04. अतः इस संबंध में आपसे अनुरोध है कि वैबसाइट पर प्रदर्शित होने की तारीख से 15 दिनों के भीतर अपनी टिप्पणियां निम्नलिखित पते पर भेजें।

सहायक महानिरीक्षक/अग्नि
केन्द्रीय औद्योगिक सुरक्षा बल निदेशालय
ब्लॉक 13 सी.जी.ओ कॉम्प्लेक्स, लोधी रोड, नई दिल्ली
ईमेल : aigfire@cisf.gov.in

सहायक महानिरीक्षक/अग्नि
बल मुख्यालय, नई दिल्ली

QUALITATIVE REQUIREMENTS (QRs) OF CRASH FIRE TENDER
(WATER/FOAM) FOR AIR FIELDS AS PER IS: 951: 2003

Sl.	Technical Parameter	Qualitative Requirements
1.	Purpose:	The Water cum Foam Air Field Crash Fire Tender shall be highly specialized for aerodrome rescue and fire fighting purpose. Vehicle shall be capable of reaching to the aircraft crash site as per ICAO standard.
2.	Applicable standards:	Design, construction features, materials, equipment and interpretation of Terminology of specification of Air Field Crash Tender shall be in accordance with: a. Airport Service Manual- Part- I, DOC No. 9137-AN 1899 with latest applicable amendments. b. Indian Standard IS 951:2003 (Functional requirement for Airfield Crash Tender) c. National Fire Protection Code 414 edition 2012 / 1900 edition 2020 d. BS-VI/latest available. e. <u>Chassis: 6x6 chassis.</u> f. The Water cum Foam Air Field Crash Fire Tender shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended.
3.	Basic requirement	a. Capacity of water tank: 6500 Ltrs. b. Capacity of Foam tank 800 Ltrs or 12% of Water Capacity. c. Auxiliary Foam Compatible: DCP (150 Kgs) d. Overall Size should match the vehicle requirement e. Drive: All Wheel Capability (Configuration 6x6) f. Gross Vehicle Weight: Gross Vehicle Weight (weight of fully staffed, loaded and equipped vehicle) shall not exceed maximum permissible limit weight of chassis by manufacturer. g. Centre of Gravity: Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading. h. Tilt Angle/Stability: 28/30 degree on static condition in both ways i. Steering: Right Hand Steering is mandatory. j. Angle of Approach: 30 Degree Min. k. Angle of Departure: 30 Degree Min. l. Inter axle Clearance Angle: 12 degree Min. m. Under axle clearance FA/RA: as per BIS requirement. n. Slide Slope: 20% on both sides. o. Gradability: As per BIS requirement. p. Turning Circle Radius: As per BIS (less than 3 lengths of

		ACFT). q. Fordability: not less than 608 mm. r. Articulation: 300 mm (minimum). s. All electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. t. All mounted fire-fighting equipment, particularly the fire pump, shall be positioned and installed in such a manner that it is easily accessible for inspection, Operation and routine maintenance u. The Crash Fire Tender shall be equipped with Driver Enhanced Vision System (DEVS) in driver's cabin to enable safe and effective operations under low-visibility conditions such as smoke-filled environments, foggy weather and night-time response, thereby assisting the driver in maintaining clear visibility and situational awareness during emergency operations. v. It shall be possible to operate the monitor and the two hand lines at the pump delivery pressure of 10 Kgf/ Cm².
4.	Material selection and treatment	4.1 The super structure of appliance shall be constructed using Zinc treated galvanized tubular steel sections or extruded Aluminium sections of 40 mm × 40 mm × 2 mm thickness, selected to provide adequate strength, long term durability and elasticity for absorbing operational stresses, while ensuring effective corrosion resistance and prevention of rusting. 4.2 i) Timber shall not be used in body construction. ii) The body shall be constructed of materials that provide the lightest weight consistent with the strength necessary for off pavement operation over rough terrain and when exposed to excess heat. The body may be unitized with chassis rigid structure type or it may be flexible mounted on the vehicle chassis. It shall also include front and rear fenders or wheel wells, body panel shall be removable where necessary to provide access to the interior of the vehicle. iii) Access doors shall be provided for those areas of the interior of the vehicle which must be frequently inspected. iv) The working deck of the vehicle shall be adequately reinforced to permit the crew to perform their duties in the turret area, water tank top fill area, foam liquid top fill area and in other areas where access to auxiliary or installed equipment is necessary. v) Hand-rails or bulwarks shall be provided where necessary for the safety and convenience of the crew. Rails

		and stanchions shall be strongly braced and constructed of a material, which is durable and resists corrosion. vi) Steps or ladders shall be provided for access to the top fill area. The lowermost steps(s) may extended below the angle of approach or departure or ground clearance limits if it (they) is (are) designed to swing clear. All other steps shall be rigidly constructed. All steps shall have a non-skid surface, with at least 150 mm toe room. Lowermost step(s) shall not be more than 558 mm above ground level when the vehicle is full laden. Adequate lighting shall be provided to illuminate steps and walkways. vii) A heavy duty front bumper shall be mounted on the vehicle and secured to the frame structure. vii) The appliance is intended for use in tropical conditions with constant high humidity and heat. The use of rubber and similar materials shall be avoided. ix) All parts which forms water ways or come in contact with water shall be of corrosion resisting material. All metal pipelines shall be hot dipped/ galvanized. All metal parts exposed to atmosphere shall be of corrosion resisting material. All metal fasteners shall be galvanized/chrome plated to avoid rusting. 4.3 Paint finish shall be 'Fire Red' in colour as per IS 2932 and shall be resistant to damage from fire fighting agents.
5.	Cabin	i) The cabin shall be Aero dynamically designed and mounted on the forward part of the vehicle. It shall provide seating for 06 persons including driver (two adjustable seats and a long fixed seat for 4 crew member). In addition there shall be instrument panel and equipment as specified without any hindrance to crew. ii) The cabin shall meet the visibility requirements of the wind. Shield shall be of shatter proof safety glass and all other windows shall be constructed of approved safety glass. The cabin shall be provided with wide gutters to prevent foam and water dripping on the wind shield and side windows. There shall be enough space to keep and to enable the crew except driver to put on protective clothing and breathing apparatus (B.A.) set while on way to a call. The doors in the cabin should be operable at 90° for easy ingress and egress of crew. iii) The cabin shall be weather proof and shall be full insulated thermally and acoustically with a fire resistant material. iv) The cabin roof shall be covered with Aluminium chequered sheet in such a way that the entrapment of rain water/foam solution on cabin roof is totally avoided by providing necessary

		gutters for draining
6. Brakes		i) The braking system shall feature service, emergency and parking brake system. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. ii) Service brakes shall be of all wheel type with split circuits so that failure of one circuit shall not cause total service brake failure and shall be able to hold fully loaded vehicle on a 50 percent grade. iii) The services brakes shall stop the vehicle within 10.7 m from 32 kmph and within 40 m from 64 kmph on a dry hard appropriately roadway level, free from loose material and sufficiently wide roadway without any part of vehicle leaving roadway. iv) The service brakes shall provide one power assisted stop with the vehicle engine inoperative or the stopping distances specified above for each vehicle class. v) An emergency brakes system shall be provided which is applied and released by the driver from the cabin and is capable for modulation by means of the service brake control. i) The parking brake shall be capable of holding the fully loaded vehicle on a 20 percent grade without air or hydraulic assistance.
7. Engine:		a) Engine: Turbo charged air _cooled 4 cycle 25T (minimum) Diesel Engine, Bharat Stage VI or latest version emission ratio compliant or latest equivalent chassis. b) Engine Output: sufficient to perform output requirement specified herein should not less than 360 BHP @2100 rpm (min). c) Acceleration: 0-80Km/hr in 40 seconds. The acceleration time shall be achieved on ambient temperature varying from 0-50°C and at elevation up to 600 M without engine pre-heating. d) Top Speed: 100 to 120 Km/hr. e) Response Time: 120 second for a distance of 2.8 Km with three 90 degree turn. f) Cooling System: To avoid overheating of engine under tropical condition. g) Fuel tank Capacity: As per OEM/ for minimum 5h continuous operation. h) Engine starting System: 24 volts and minimum 30 Amperes. i) Positive Operation of Radio Equipment: By way of radio separation of electrical system. j) Recharging of Battery: Both in battery charger while mobile

		and AC receptacle on ground. k) Exhaust: To be located far away from pump operating position. l) Service Brake: All wheel type with split circuit. m) Towing eye/hook: 2 at front and 2 at rear n) Power take off: Engine department. Power to be operated by vehicle engine through suitable power- take off. o) Transmission: Manual and automatic transmission (Both). p) Steering: Ram-assisted power steering system. A steering mechanism shall be so designed as to permit manual steering sufficient to bring the vehicle to a safe stop in the event of failure of power assistance. The power steering shall have sufficient capacity so that more than 7kg pull is required on the steering wheel in order to turn the steering wheel from lock to lock with engine running. q) Wheels: single wheel type r) Tyres: with tubes or tubeless s) Crew cabin: driver +5 t) Access doors: easy accessible to engine, pump, foam proportional system, battery storage, fluid reservoir u) Extension Ladder: Alloy aluminium extension ladder (10.5 m) light alloy Truss type - 1 No. v) Ground sweep/under truck nozzle: 6 (3 in front of front axle+1 behind the front axle+1 in front of 1st rear axle +1 in between the rear axle) with foam solution discharge to protect under side of the vehicle. The throw of the nozzle shall be 6M.
8.	Water Tank	a. Capacity: 6500 ltrs b. Filling: self-refilling from pump c. Water tank shall have rated capacity as per class and the tank outlets shall be arranged in such a way that 85 percent of rated capacity can be used if the vehicle is standing on: 20 percent side slop, and 30 percent ascending/descending slope. d. Tank shall be made of stainless steel of grade 304 as per IS 6603, with suitable longitudinal and traverse baffles, which shall permit easy access for internal inspection. The tank shall withstand hydrostatic pressure of 0.3kg/cm². The sheet thickness shall be as follows:- - Bottom : 5mm - Sides/front/Rear/Top : 4mm

		iii. Baffles : 3mm e. Tank shall be provided with hinged lid, a top filling hole with filter of 450 mm size and drain hole of not less than 63mm dia with a quick action spherical type valve at the bottom. The manhole shall be quick opening type and shall be clearly marked "Water`" f. Baffle plates: longitudinal and transversal are required. g. Over -flow piping 100 mm dia minimum shall be arranged in such a way that it release pressure on overfilling without wasting water during vehicles manoeuvres. h. Tank filling connection: 04 water filling connection in standard 63 mm instantaneous coupling, two on left and another two on right with strainers and non-return valve. i. The water tank shall be separate from crew compartment, chassis, engine and easily removable, and shall be mounted on chassis in a manner that the torsional strains during movement are minimum. j. A direct filling connection shall also be provided to fill the tank from open source of supply and shall be of sizes, so as to fill the tank in 2 min at 5 kg/cm² pressure. k. Arrangement of lifting the tank without damage should be provided for repair and maintenance, etc.
9.	Foam system:	a. Material of tank: Tank shall be made of stainless steel of grade 304 as per IS 6603. The tank with its fitment shall be able to withstand hydrostatic pressure of 0.3 kg/cm² b. Capacity of Tank 800 Ltrs or 12% of water capacity. The sheet thickness Shall be as follows: Bottom- 5mm, Sides/front/Rear/Top -4mm and Baffles -3mm c. The tank shall be separated and distinct from the body flexibly mounted on chassis to receive minimum torsion forces during vehicles movements and easily removable as a unit and should be suitably baffled to prevent surging. d. The manhole of the tank of 450 mm diameter shall be used for foam filling and shall be clearly marked FOAM`. Means shall be provided for automatic venting of the foam compound tank when foam is being produced or tank is filled. e. The foam compound tube shall be positioned in such a manner that foreign matter or sludge shall not pass into the compound lines. The tube shall be fitted with gauze strainer of corrosion resistant material. f. Drain hole at the bottom of sump and a liquid induction connection shall be provided in the tank.

		g. Spillage/surging/frothing: not allowed during accelerating/braking/ concerning. h. Foam quality standard: AR-AFFF as per IS 4989 (Part IV) specification and foam expansion ratio shall be 1:8 i. Foam production: Uninterrupted during creeping moving. j. ""Foam proportioner" Induction rate 3%, 6% or 8% pre adjustable standard setting. k. Filling hole with a trough on top shall be connected with a pipe reaching at the bottom to avoid aeration in the liquid. l. An external filling connection which can be approached at ground level shall also be provided to receive supply in tank with the help of foam pump. m. All pipelines shall be made of corrosion resistant material and dissimilar material that produces galvanic corrosion should not be used.
10	Pump data	a. The water pump shall be made of bronze/gunmetal and shall be multistage centrifugal type designed for dependable emergency service. The pump shall be CE approved; meet international standards, Comply EN 1028. b. Delivery/Discharge Rates: The pump shall be capable of discharging at a rate equal to or more than the total discharge from monitor and two side lines and shall not be less than 4000 l/min at 8.5 kg/cm² and 3 m static lift, pump shall also be capable of minimum output of 4000 ltrs/min at higher pressure of 10.5 to 12.5 Kg/cm² to suit monitor output for same suction. c. Type: Pump shall be Multi stage and closed impeller (stainless steel) type where impeller is dynamically balanced to reduce the thrust. Mechanical seal, self-adjusting type, shall be provided capable of running dry up to 1 minute without any damage. The pump shaft shall be held in heavy duty ball/roller bearing running in oil bath. The delivery manifold shall also be made of stainless steel. d. The entire pump assembly shall be hydraulically tested at 21.0 bar for at least 5 minutes. e. Pump shall be mid-ship mounted, Pump control panel shall be located on either side of appliance in addition to the one provided in cabin. f. The pump shall be fitted with inbuilt twin piston reciprocating type priming system capable of priming the pump from 7 meters in not more than 36 seconds, when tested with the 140 mm suction hose at NTP conditions and considering the allowances as stated in IS: 950- 2012.

		g. The entire priming system shall be constructed in stainless steel and shall be actuated by an electromagnetic clutch immersed in oil bath of pump's bearing housing. Arrangement shall be made to actuate the primer in Manual and AUTO modes. When operating in Manual mode primer should be engaged simply by pressing a single button, only when it is needed. When operating in Auto mode, primer must be internally actuated and must automatically re-engage when pressure is lost. However, in both operating modes the primer shall disengage automatically at a pump discharge pressure of not more than 0.8 bar. h. The primer deactivation shall be controlled directly by a pump pressure sensing device. Priming system driven by any external belts/chain is not acceptable.
11.	Pump drive	a. The pump drive shall permit operation of pump and simultaneous operation of vehicle and shall not be affected by transmission ratio or clutch operation. The design of drive system shall prevent damage and minimize lurching of vehicle during simultaneous operation, and shall be capable of absorbing maximum torque delivered by engine and vehicle, without causing any stalling of engine and fluctuation of pressure. b. The drive shall permit discharge at rated capacity of pump during vehicular speed from 1.6 to 8 kmph in forward as well as reverse gear.
12	Monitor: Roof monitor with suitable control panel	a. Location: Roof of the cabin b. Operation: Electro pneumatic manual control by either driver or crew members. c. Monitor shall be capable of traversing 360⁰ horizontally and elevating not less than 45⁰ from horizontal axis and depression of 15° d. Monitor shall be capable of discharging total rated water tank quantity in more than two to three minutes, and shall have a means provided for deflective pattern of foam dispersal. The dispersal. The discharge rate of monitor shall not be less than 3000L/min with expansion ratio of 1: (8-12). e. Range of throw shall be as follows: Straight stream at 45⁰ elevation not less than 60m Disbursed stream at 15° depression Far point - 18m Width - 6 m Near point - 12m
13	Hand lines	a. Numbers: Two side lines on each side, operable from both cabin and panel. b. Discharge rates: Each side line shall have minimum discharge capacity of 500 ltrs/min at 8.5 kg/cm² pressure on FMB 5X

		branch with an expansion ratio not less than 8 and minimum throw of 25 m when either all foam hand lines are used simultaneously (with monitor not operating) or two of them are used in combination with monitor. c. Control: Pneumatic ball valve type from cabin + additional manual control. d. In addition, one first-aid hose reel connection shall also be provided with 100 m rubber hose, tested at 15 kg/cm², with discharge capacity of 120 l/min.
14	Dry Chemical Powder systems (Supplementary extinguishing agent)	a. No. of cylinders : 2 (One on each side) b. Capacity: 75 Kg each c. Location: Suitably mounted in the storage locker. d. Propellant gas: Dry Nitrogen in cylinder (cylinders shall be CCE approved). e. Discharge Rates: 2.25 Kg/sec. f. DCP type: Foam compatible Dry Chemical Powder. g. Auxiliary agent (dry Powder) hand lines two Nos. for DCP (One on each side) shall have open/close nozzle discharge rate of 1.5 kg/s to 3 kg/s with 8 m range. The nozzle should be made of non-ferrous metal or stainless steel.
15.	Controls in cabin	a. Engine throttle control b. Pressure gauge (25 Kg/cm²) c. Foam tank pressure valve control (Foam tank valve control) d. Monitor operation pneumatic pressure air control e. Auxiliary air control. f. Self defence foam nozzle control g. Engine revolving control-RPM meter h. Engine temperature lubricating oil temperature gauge. i. Engine oil pressure gauge. j. Battery charging meter- Ammeter k. Air pressure gauge for braking system. l. Fuel tank content gauge m. Odometer n. Speedometer o. Engagement indicator (power take off) p. The water tank, foam tank, monitor, sideliners and self-defence nozzle shall be pneumatically controlled ball valves for operations and control from within the cabin.
16.	Additional accessories fitted on	a. Siren: 95 decibel sound output at 100 m ahead and not less than 90⁰ within side at a distance of 100 m, siren shall be

	vehicle	mounted on cabin roof top and shall be fully protected from foam spills, rain water, dust and any damage due to monitor rotation. It shall be battery operated 24V. b. Fog lamp: Two nose on front side c. Reversing light: To assist reversing d. Airfield obstruction marking lamp e. A flashing ray light or light bar on cabin roof top. f. Wind screen wiper g. Search light h. Spot light i. VHF telephone set j. Trafficator k. Trickle battery charger (with quick release plug/socket arrangement, 5m HT cable, 10m LT end high current cable). l. Public Address System. m. External compressed air supply system mounted on rear side n. Any other lighting system as per BIS 951.
17.	Additional accessories (Kit)	a. PVC suction hose 140mm dia 2.5 mtr length-IS 2410, Qty - 4 Nos. b. Suction strainer (foot valve strainer), IS 907, Qty 1 no. c. Suction basket strainer, 3532, Qty 1 No. d. Suction wrenches, IS 4643, Qty 1 No. e. Rubberised hose 63mm and 22.5 mtrs long with GM coupling. IS marked, IS 636, type-B Qty-10 lengths. f. Multipurpose control branch pipe with male Instantaneous coupling, Qty-2 Nos. g. Self-contained portable emergency light working on rechargeable battery, Qty 2 Nos. h. Quick release knife - IS 5486, Qty-6 Nos. i. 16mm diameter made by polypropylene rope length 30 m, Qty- 1 No. j. Portable first aid box, Qty-1 No. k. Foam making branch pipe FMB (10X). Qty - 2 nos. l. 3 layer Fire Proximity suit (aluminized) with helmet (IS-2745), hood, gloves & boots, DIFR Approved, Qty-1 No. m. Rubber hand gloves (20000V resistance) IS:4770, Qty-2 pairs. n. Fireman helmets IS marked (IS:2745)- Qty 6 Nos. o. Fast Battery Charger, Single phase, 12-24V/60 Amps. p. Fireman Axe IS marked (IS:926) insulated for 20000 V-2 Nos. q. Axe Serrated for 20000 V-2 Nos. r. Bolt cutter - 2 Nos. s. Wrench adjustable - 2 Nos. t. Ex-hand search light with charger- 1 No. u. Fire blanket 160x200 cm-2 Nos. v. Multipurpose petrol driven circular saw -1 Nos. w. PVC heavy duty stretcher. x. Portable High pressure water mist extinguisher-10 Ltrs capacity - 1 No. (Technical Specifications enclosed) y. Standard tool kit - 1 No

		z. Compressed Air carbon composite Breathing Apparatus set positive pressure 45 min duration complete with spare cylinders as per EN:137-4 set. (Technical specifications enclosed). aa. Medical First Aid Kit-01 set. bb. Special DCP Fire extinguisher for metal Fire-5 Kgs Cap: 02 Nos. (IS:15683) IS marked.
18.	SPECIAL FEATURES:	a. Automatic lubrication system b. 2x250 high pressure- LED lamp with remote control. c. Rescue Tools: i) Hydraulic Combi Tool-01 No. ii) Self-rescue automatic escape (standard size): 01 No. iii) Shovel, Spades, Pick Axe with handle, Axes Crow Bar 1 Meter long. Hammer-10 Kg. Sledge Hammer 01 No. Each. iv) Long line 100 m size 50mm circumferences v) Rescue saw for laminated glass, metal and wood with charger and replaceable spare blades vi) Hydraulic door opener-01 No vii) Safety Belt full body harness with hook & rope -02Nos viii) Rescue Rams with accessories -01 No. ix) Hydraulic cutter-01 No. x) Hydraulic spreader with pulling chains and adaptors- 01 No. a) External power supply drive end plug for 220V b) Material use of ABS (Acrylic Based Synthetic plastic) for weight reduction of accessories fittings.
19.	Acceptance test:	a. Stability Test: at manufactures works with full load and appropriate usage condition. b. Performance Test: as per BIS at manufactures works with creation of full facilities road test for Acceleration, maximum speed and braking efficiency, articulation check for all axels to verify and ensure structure soundness. Pump test to check rated output at varying pump pressures and to check increase in the temperature of engine oil and lubrication oil. c. Primer Test: to check time required (36 seconds) for vertical lift of 7 m using 140 mm dia suction hose. d. Foam induction/discharge rate confirming to IS specification. e. Expansion rate- 1:(8-12)
20	Manufacture Marking on Metallic Plate	a. Manufacturers name and trademark must be Embossed on the pump casing. b. Year of manufacture c. Pump Capacity (Ltrs/min) and Pump No. d. Water tank/foam tank capacity e. Chassis model and serial No. and suppliers address f. Instructions plate on each control panel for each reference of the driver/operator.
21	General conditions:	a. Supplier should supply 1 set of manuals as follows along with tender b. Operators manual with technical disciplines, layout drawings.

		illustrations, performance, capabilities precaution, maintenance airfield repair instruction on lubrication schedule period, fault finding notes, storage and warnings. c. Parts manual with illustrated details of superstructure/sub. Assemblies, spares for each units, brought out item and sources of supply. d. Repair/maintenance manual fully illustrated repair/overhaul illustration, tolerance for fitting tools and procedures for dismantling and reassembly. e. General arrangement drawings showing layout of equipment, piping. fluid flow control, electrical/structural design. f. Spares parts list (with cost) for 2 years maintenance support. g. Details of tools for maintenance/repairs/overhaul. h. The manufactures shall guarantee the materials, workmanship and operation for a period of 24 months from the receipt of equipment. i. Practical operation training to certain assemblies of specialized nature to be arranged. j. The supplier shall provide a list of customers with details to whom such equipment was supplied during past 3 years.
--	--	--

**TRIAL DIRECTIVES (TDs) OF CRASH FIRE TENDER
(WATER/FOAM) FOR AIR FIELDS AS PER IS: 951: 2003**

Sl.	Technical Parameter	Qualitative Requirements	Trial Directives for BOOs
1.	Purpose:	The Water cum Foam Air Field Crash Fire Tender shall be highly specialized for aerodrome rescue and fire fighting purpose. Vehicle shall be capable of reaching to the aircraft crash site as per ICAO standard.	It shall be ensured that the vehicle is suitable for Aerodrome Rescue and fire fighting as per QRs and ICAO standard.
2.	Applicable standards:	Design, construction features, materials, equipment and interpretation of Terminology of specification of Air Field Crash Tender shall be in accordance with: a. Airport Service Manual- Part- I, DOC No. 9137-AN 1899 with latest applicable amendments. b. Indian Standard IS 951:2003 (Functional requirement for Airfield Crash Tender) c. National Fire Protection Code 414 edition 2012 / 1900 edition 2020 d. BS-VI/latest available. e. <u>Chassis: 6x6 chassis.</u> f. The Water cum Foam Air Field Crash Fire Tender shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended.	The vehicle shall meet the requirement as per relevant standards and QRs.
3.	Basic requirement	a. Capacity of water tank: 6500 Ltrs. b. Capacity of Foam tank 800 Ltrs or 12% of Water Capacity. c. Auxiliary Foam Compatible: DCP (150 Kgs) d. Overall Size should match the vehicle requirement e. Drive: All Wheel Capability (Configuration 6x6) f. Gross Vehicle Weight: Gross Vehicle Weight (weight of fully staffed, loaded and equipped vehicle) shall not exceed maximum permissible limit weight of chassis by manufacturer. g. Centre of Gravity: Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading. h. Tilt Angle/Stability: 28/30 degree on static	The vehicle shall be checked physically and should meet the requirement as per relevant standards and QRs.

		condition in both ways i. Steering: Right Hand Steering is mandatory. j. Angle of Approach: 30 Degree Min. k. Angle of Departure: 30 Degree Min. l. Inter axle Clearance Angle: 12 degree Min. m. Under axle clearance FA/RA: as per BIS requirement. n. Slide Slope: 20% on both sides. o. Gradability: As per BIS requirement. p. Turning Circle Radius: As per BIS (less than 3 lengths of ACFT). q. Fordability: not less than 608 mm. r. Articulation: 300 mm (minimum). s. All electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. t. All mounted fire-fighting equipment, particularly the fire pump, shall be positioned and installed in such a manner that it is easily accessible for inspection, Operation and routine maintenance u. The Crash Fire Tender shall be equipped with Driver Enhanced Vision System (DEVS) in driver's cabin to enable safe and effective operations under low-visibility conditions such as smoke-filled environments, foggy weather and night-time response, thereby assisting the driver in maintaining clear visibility and situational awareness during emergency operations. v. It shall be possible to operate the monitor and the two hand lines at the pump delivery pressure of 10 Kgf/ Cm².	
4.	Material selection and treatment	4.1 The super structure of appliance shall be constructed using Zinc treated galvanized tubular steel sections or extruded Aluminium sections of 40 mm × 40 mm × 2 mm thickness, selected to provide adequate strength, long term durability and elasticity for absorbing operational stresses, while ensuring effective corrosion resistance and prevention of rusting. 4.2 i) Timber shall not be used in body construction. ii) The body shall be constructed of materials	Shall be checked physically and should meet the requirement as per relevant standards and QRs. Necessary material of construction certificates from the manufacturer and per QRs shall also be checked and

		that provide the lightest weight consistent with the strength necessary for off pavement operation over rough terrain and when exposed to excess heat. The body may be unitized with chassis rigid structure type or it may be flexible mounted on the vehicle chassis. It shall also include front and rear fenders or wheel wells, body panel shall be removable where necessary to provide access to the interior of the vehicle. iii) Access doors shall be provided for those areas of the interior of the vehicle which must be frequently inspected. iv) The working deck of the vehicle shall be adequately reinforced to permit the crew to perform their duties in the turret area, water tank top fill area, foam liquid top fill area and in other areas where access to auxiliary or installed equipment is necessary. v) Hand-rails or bulwarks shall be provided where necessary for the safety and convenience of the crew. Rails and stanchions shall be strongly braced and constructed of a material, which is durable and resists corrosion. vi) Steps or ladders shall be provided for access to the top fill area. The lowermost steps(s) may extended below the angle of approach or departure or ground clearance limits if it (they) is (are) designed to swing clear. All other steps shall be rigidly constructed. All steps shall have a non-skid surface, with at least 150 mm toe room. Lowermost step(s) shall not be more than 558 mm above ground level when the vehicle is full laden. Adequate lighting shall be provided to illuminate steps and walkways. vii) A heavy duty front bumper shall be mounted on the vehicle and secured to the frame structure. vii) The appliance is intended for use in tropical conditions with constant high humidity and heat. The use of rubber and similar materials shall be avoided. ix) All parts which forms water ways or come	verified.
--	--	--	-----------

		in contact with water shall be of corrosion resisting material. All metal pipelines shall be hot dipped/ galvanized. All metal parts exposed to atmosphere shall be of corrosion resisting material. All metal fasteners shall be galvanized/chrome plated to avoid rusting. 4.3 Paint finish shall be 'Fire Red' in colour as per IS 2932 and shall be resistant to damage from fire fighting agents.	
5. Cabin		i) The cabin shall be Aero dynamically designed and mounted on the forward part of the vehicle. It shall provide seating for 06 persons including driver (two adjustable seats and a long fixed seat for 4 crew member). In addition there shall be instrument panel and equipment as specified without any hindrance to crew. ii) The cabin shall meet the visibility requirements of the wind. Shield shall be of shatter proof safety glass and all other windows shall be constructed of approved safety glass. The cabin shall be provided with wide gutters to prevent foam and water dripping on the wind shield and side windows. There shall be enough space to keep and to enable the crew except driver to put on protective clothing and breathing apparatus (B.A.) set while on way to a call. The doors in the cabin should be operable at 90° for easy ingress and egress of crew. iii) The cabin shall be weather proof and shall be full insulated thermally and acoustically with a fire resistant material. iv) The cabin roof shall be covered with Aluminium chequered sheet in such a way that the entrapment of rain water/foam solution on cabin roof is totally avoided by providing necessary gutters for draining	Shall be checked physically and should meet the requirement as per relevant standards and QRs.
6. Brakes		i) The braking system shall feature service, emergency and parking brake system. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. ii) Service brakes shall be of all wheel type with split circuits so that failure of one circuit shall not cause total service brake failure and shall be able to hold fully loaded vehicle on a 50 percent grade. iii) The services brakes shall stop the vehicle within	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.

		10.7 m from 32 kmph and within 40 m from 64 kmph on a dry hard appropriately roadway level, free from loose material and sufficiently wide roadway without any part of vehicle leaving roadway. iv) The service brakes shall provide one power assisted stop with the vehicle engine inoperative or the stopping distances specified above for each vehicle class. v) An emergency brakes system shall be provided which is applied and released by the driver from the cabin and is capable for modulation by means of the service brake control. i) The parking brake shall be capable of holding the fully loaded vehicle on a 20 percent grade without air or hydraulic assistance.	
7.	Engine:	a) Engine: Turbo charged air _cooled 4 cycle 25T (minimum) Diesel Engine, Bharat Stage VI or latest version emission ratio compliant or latest equivalent chassis. b) Engine Output: sufficient to perform output requirement specified herein should not less than 360 BHP @2100 rpm (min). c) Acceleration: 0-80Km/hr in 40 seconds. The acceleration time shall be achieved on ambient temperature varying from 0-50°C and at elevation up to 600 M without engine pre-heating. d) Top Speed: 100 to 120 Km/hr. e) Response Time: 120 second for a distance of 2.8 Km with three 90 degree turn. f) Cooling System: To avoid overheating of engine under tropical condition. g) Fuel tank Capacity: As per OEM/ for minimum 5h continuous operation. h) Engine starting System: 24 volts and minimum 30 Amperes. i) Positive Operation of Radio Equipment: By way of radio separation of electrical system. j) Recharging of Battery: Both in battery charger while mobile and AC receptacle on ground. k) Exhaust: To be located far away from pump operating position.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from Manufacturer as per QRs shall also be checked and verified.

		l) Service Brake: All wheel type with split circuit. m) Towing eye/hook: 2 at front and 2 at rear n) Power take off: Engine department. Power to be operated by vehicle engine through suitable power- take off. o) Transmission: Manual and automatic transmission (Both). p) Steering: Ram-assisted power steering system. A steering mechanism shall be so designed as to permit manual steering sufficient to bring the vehicle to as safe stop in the event of failure of power assistance. The power steering shall have sufficient capacity so that more than 7kg pull is required on the steering wheel in order to turn the steering wheel from lock to lock with engine running. q) Wheels: single wheel type r) Tyres: with tubes or tubeless s) Crew cabin: driver +5 t) Access doors: easy accessible to engine, pump, foam proportional system, battery storage, fluid reservoir u) Extension Ladder: Alloy aluminium extension ladder (10.5 m) light alloy Truss type - 1 No. v) Ground sweep/under truck nozzle: 6 (3 in front of front axle+1 behind the front axle+1 in front of 1st rear axle +1 in between the rear axle) with foam solution discharge to protect under side of the vehicle. The throw of the nozzle shall be 6M.	
8.	Water Tank	a. Capacity: 6500 ltrs b. Filling: self-refilling from pump c. Water tank shall have rated capacity as per class and the tank outlets shall be arranged in such a way that 85 percent of rated capacity can be used if the vehicle is standing on: i) 20 percent side slop, and ii) 30 percent ascending/descending slope. d. Tank shall be made of stainless steel of grade 304 as per IS 6603, with suitable longitudinal and traverse baffles, which shall permit easy access for internal inspection. The tank shall withstand	Shall be checked physically & tested and verified by certificates. Should meet the requirement as per relevant standards and QRs.

		hydrostatic pressure of 0.3kg/cm^2. The sheet thickness shall be as follows;- i. Bottom : 5mm ii. Sides/front/Rear/Top : 4mm iii. Baffles : 3mm e. Tank shall be provided with hinged lid, a top filling hole with filter of 450 mm size and drain hole of not less than 63mm dia with a quick action spherical type valve at the bottom. The manhole shall be quick opening type and shall be clearly marked "Water" f. Baffle plates: longitudinal and transversal are required. g. Over -flow piping 100 mm dia minimum shall be arranged in such a way that it release pressure on overfilling without wasting water during vehicles manoeuvres. h. Tank filling connection: 04 water filling connection in standard 63 mm instantaneous coupling, two on left and another two on right with strainers and non-return valve. i. The water tank shall be separate from crew compartment, chassis, engine and easily removable, and shall be mounted on chassis in a manner that the torsional strains during movement are minimum. j. A direct filling connection shall also be provided to fill the tank from open source of supply and shall be of sizes, so as to fill the tank in 2 min at 5kg/cm^2 pressure. k. Arrangement of lifting the tank without damage should be provided for repair and maintenance, etc.	
9.	Foam system:	a. Material of tank: Tank shall be made of stainless steel of grade 304 as per IS 6603. The tank with its fitment shall be able to withstand hydrostatic pressure of 0.3kg/cm^2 b. Capacity of Tank 800 Ltrs or 12% of water capacity. The sheet thickness Shall be as follows: Bottom- 5mm, Sides/front/Rear/Top - 4mm and Baffles -3mm c. The tank shall be separated and distinct from the body flexibly mounted on chassis to receive minimum torsion forces during vehicles movements and easily removable as a unit and	Shall be checked physically & tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs wherever necessary shall also be checked and verified.

		should be suitably baffled to prevent surging. d. The manhole of the tank of 450 mm diameter shall be used for foam filling and shall be clearly marked FOAM'. Means shall be provided for automatic venting of the foam compound tank when foam is being produced or tank is filled. e. The foam compound tube shall be positioned in such a manner that foreign matter or sludge shall not pass into the compound lines. The tube shall be fitted with gauze strainer of corrosion resistant material. f. Drain hole at the bottom of sump and a liquid induction connection shall be provided in the tank. g. Spillage/surging/frothing: not allowed during accelerating/braking/ concerning. h. Foam quality standard: AR-AFFF as per IS 4989 (Part IV) specification and foam expansion ratio shall be 1:8 i. Foam production: Uninterrupted during creeping moving. j. ""Foam proportioner" Induction rate 3%, 6% or 8% pre adjustable standard setting. k. Filling hole with a trough on top shall be connected with a pipe reaching at the bottom to avoid aeration in the liquid. l. An external filling connection which can be approached at ground level shall also be provided to receive supply in tank with the help of foam pump. m. All pipelines shall be made of corrosion resistant material and dissimilar material that produces galvanic corrosion should not be used.	
10	Pump data	a. The water pump shall be made of bronze/gunmetal and shall be multistage centrifugal type designed for dependable emergency service. The pump shall be CE approved; meet international standards, Comply EN 1028. b. Delivery/Discharge Rates: The pump shall be capable of discharging at a rate equal to or more than the total discharge from monitor and two	It shall be checked physically & tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as

		side lines and shall not be less than 4000 l/min at 8.5 kg/cm² and 3 m static lift, pump shall also be capable of minimum output of 4000 ltrs/min at higher pressure of 10.5 to 12.5 Kg/cm² to suit monitor output for same suction. c. Type: Pump shall be Multi stage and closed impeller (stainless steel) type where impeller is dynamically balanced to reduce the thrust. Mechanical seal, self-adjusting type, shall be provided capable of running dry up to 1 minute without any damage. The pump shaft shall be held in heavy duty ball/roller bearing running in oil bath. The delivery manifold shall also be made of stainless steel. d. The entire pump assembly shall be hydraulically tested at 21.0 bar for at least 5 minutes. e. Pump shall be mid-ship mounted, Pump control panel shall be located on either side of appliance in addition to the one provided in cabin. f. The pump shall be fitted with inbuilt twin piston reciprocating type priming system capable of priming the pump from 7 meters in not more than 36 seconds, when tested with the 140 mm suction hose at NTP conditions and considering the allowances as stated in IS: 950- 2012. g. The entire priming system shall be constructed in stainless steel and shall be actuated by an electromagnetic clutch immersed in oil bath of pump's bearing housing. Arrangement shall be made to actuate the primer in Manual and AUTO modes. When operating in Manual mode primer should be engaged simply by pressing a single button, only when it is needed. When operating in Auto mode, primer must be internally actuated and must automatically re-engage when pressure is lost. However, in both operating modes the primer shall disengage automatically at a pump discharge pressure of not more than 0.8 bar. h. The primer deactivation shall be controlled directly by a pump pressure sensing device. Priming system driven by any external belts/chain is not acceptable.	per QRs, wherever necessary, shall also be checked and verified.
11.	Pump drive	a. The pump drive shall permit operation of pump and simultaneous operation of vehicle and shall not be affected by transmission ratio	It shall be checked physically, tested and should meet the

		or clutch operation. The design of drive system shall prevent damage and minimize lurching of vehicle during simultaneous operation, and shall be capable of absorbing maximum torque delivered by engine and vehicle, without causing any stalling of engine and fluctuation of pressure. b. The drive shall permit discharge at rated capacity of pump during vehicular speed from 1.6 to 8 kmph in forward as well as reverse gear.	requirement as per relevant standards and QRs.
12	Monitor: Roof monitor with suitable control panel	a. Location: Roof of the cabin b. Operation: Electro pneumatic manual control by either driver or crew members. c. Monitor shall be capable of traversing 360° horizontally and elevating not less than 45° from horizontal axis and depression of 15° d. Monitor shall be capable of discharging total rated water tank quantity in more than two to three minutes, and shall have a means provided for deflective pattern of foam dispersal. The dispersal. The discharge rate of monitor shall not be less than 3000L/min with expansion ratio of 1: (8-12). e. Range of throw shall be as follows: Straight stream at 45° elevation not less than 60m Disbursed stream at 15° depression Far point - 18m Width - 6 m Near point - 12m	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.
13	Hand lines	a. Numbers: Two side lines on each side, operable from both cabin and panel. b. Discharge rates: Each side line shall have minimum discharge capacity of 500 ltrs/min at 8.5 kg/cm^2 pressure on FMB 5X branch with an expansion ratio not less than 8 and minimum throw of 25 m when either all foam hand lines are used simultaneously (with monitor not operating) or two of them are used in combination with monitor. c. Control: Pneumatic ball valve type from cabin + additional manual control. d. In addition, one first-aid hose reel connection shall also be provided with 100 m rubber hose, tested at 15 kg/cm^2, with discharge capacity of	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.

		120 l/min.	
14	Dry Chemical Powder systems (Supplementary extinguishing agent)	a. No. of cylinders : 2 (One on each side) b. Capacity: 75 Kg each c. Location: Suitably mounted in the storage locker. d. Propellant gas: Dry Nitrogen in cylinder (cylinders shall be CCE approved). e. Discharge Rates: 2.25 Kg/sec. f. DCP type: Foam compatible Dry Chemical Powder. g. Auxiliary agent (dry Powder) hand lines two Nos. for DCP (One on each side) shall have open/close nozzle discharge rate of 1.5 kg/s to 3 kg/s with 8 m range. The nozzle should be made of non-ferrous metal or stainless steel.	It shall be checked physically tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
15.	Controls in cabin	a. Engine throttle control b. Pressure gauge (25 Kg/cm²) c. Foam tank pressure valve control (Foam tank valve control) d. Monitor operation pneumatic pressure air control e. Auxiliary air control. f. Self defence foam nozzle control g. Engine revolving control-RPM meter h. Engine temperature lubricating oil temperature gauge. i. Engine oil pressure gauge. j. Battery charging meter- Ammeter k. Air pressure gauge for braking system. l. Fuel tank content gauge m. Odometer n. Speedometer o. Engagement indicator (power take off) p. The water tank, foam tank, monitor, sideliners and self-defence nozzle shall be pneumatically controlled ball valves for operations and control from within the cabin.	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.
16.	Additional accessories fitted on vehicle	a. Siren: 95 decibel sound output at 100 m ahead and not less than 90° within side at a distance of 100 m, siren shall be mounted on cabin roof top and shall be fully protected from foam spills,	It shall be checked physically, tested and should meet the requirement as per

		rain water, dust and any damage due to monitor rotation. It shall be battery operated 24V. b. Fog lamp: Two nose on front side c. Reversing light: To assist reversing d. Airfield obstruction marking lamp e. A flashing ray light or light bar on cabin roof top. f. Wind screen wiper g. Search light h. Spot light i. VHF telephone set j. Trafficator k. Trickle battery charger (with quick release plug/socket arrangement, 5m HT cable, 10m LT end high current cable). l. Public Address System. m. External compressed air supply system mounted on rear side n. Any other lighting system as per BIS 951.	relevant standards and QRs.
17.	Additional accessories (Kit)	a. PVC suction hose 140mm dia 2.5 mtr length-IS 2410, Qty - 4 Nos. b. Suction strainer (foot valve strainer), IS 907, Qty 1 no. c. Suction basket strainer, 3532, Qty 1 No. d. Suction wrenches, IS 4643, Qty 1 No. e. Rubberised hose 63mm and 22.5 mtrs long with GM coupling. IS marked, IS 636, type-B Qty-10 lengths. f. Multipurpose control branch pipe with male Instantaneous coupling, Qty-2 Nos. g. Self-contained portable emergency light working on rechargeable battery, Qty 2 Nos. h. Quick release knife - IS 5486, Qty-6 Nos. i. 16mm diameter made by polypropylene rope length 30 m, Qty- 1 No. j. Portable first aid box, Qty-1 No. k. Foam making branch pipe FMB (10X). Qty - 2 nos. l. 3 layer Fire Proximity suit (aluminized) with helmet (IS-2745), hood, gloves & boots, DIFR Approved, Qty-1 No. m. Rubber hand gloves (20000V resistance) IS:4770, Qty-2 pairs. n. Fireman helmets IS marked (IS:2745)- Qty 6 Nos. o. Fast Battery Charger, Single phase, 12-24V/60 Amps. p. Fireman Axe IS marked (IS:926) insulated for 20000 V-2 Nos.	It shall be checked physically tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.

		q. Axe Serrated for 20000 V-2 Nos. r. Bolt cutter - 2 Nos. s. Wrench adjustable - 2 Nos. t. Ex-hand search light with charger- 1 No. u. Fire blanket 160x200 cm-2 Nos. v. Multipurpose petrol driven circular saw -1 Nos. w. PVC heavy duty stretcher. x. Portable High pressure water mist extinguisher- 10 Ltrs capacity - 1 No. (Technical Specifications enclosed) y. Standard tool kit - 1 No z. Compressed Air carbon composite Breathing Apparatus set positive pressure 45 min duration complete with spare cylinders as per EN:137-4 set. (Technical specifications enclosed). aa. Medical First Aid Kit-01 set. bb. Special DCP Fire extinguisher for metal Fire-5 Kgs Cap: 02 Nos. (IS:15683) IS marked.	
18.	SPECIAL FEATURES:	a. Automatic lubrication system b. 2x250 high pressure- LED lamp with remote control. c. Rescue Tools: i) Hydraulic Combi Tool-01 No. ii) Self-rescue automatic escape (standard size): 01 No. iii) Shovel, Spades, Pick Axe with handle, Axes Crow Bar 1 Meter long. Hammer-10 Kg. Sledge Hammer 01 No. Each. iv) Long line 100 m size 50mm circumferences v) Rescue saw for laminated glass, metal and wood with charger and replaceable spare blades vi) Hydraulic door opener-01 No vii) Safety Belt full body harness with hook & rope - 02Nos viii) Rescue Rams with accessories -01 No. ix) Hydraulic cutter-01 No. x) Hydraulic spreader with pulling chains and adaptors- 01 No. a) External power supply drive end plug for 220V b) Material use of ABS (Acrylic Based Synthetic plastic) for weight reduction of accessories fittings.	It shall be checked physically tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified
19.	Acceptance test:	a. Stability Test: at manufactures works with full load and appropriate usage condition. b. Performance Test: as per BIS at manufactures works with creation of full facilities road test for Acceleration, maximum speed and braking efficiency, articulation check for all axels to	It shall be checked physically tested and should meet the requirement as per relevant standards and QRs.

		verify and ensure structure soundness. Pump test to check rated output at varying pump pressures and to check increase in the temperature of engine oil and lubrication oil. c. Primer Test: to check time required (36 seconds) for vertical lift of 7 m using 140 mm dia suction hose. d. Foam induction/discharge rate confirming to IS specification. e. Expansion rate- 1:(8-12)	Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
20	Manufacture Marking on Metallic Plate	a. Manufacturers name and trademark must be Embossed on the pump casing. b. Year of manufacture c. Pump Capacity (Ltrs/min) and Pump No. d. Water tank/foam tank capacity e. Chassis model and serial No. and suppliers address f. Instructions plate on each control panel for each reference of the driver/operator.	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.
21	General conditions:	a. Supplier should supply 1 set of manuals as follows along with tender b. Operators manual with technical disciplines, layout drawings. illustrations, performance, capabilities precaution, maintenance airfield repair instruction on lubrication schedule period, fault finding notes, storage and warnings. c. Parts manual with illustrated details of superstructure/sub. Assemblies, spares for each units, brought out item and sources of supply. d. Repair/maintenance manual fully illustrated repair/overhaul illustration, tolerance for fitting tools and procedures for dismantling and reassembly. e. General arrangement drawings showing layout of equipment, piping. fluid flow control, electrical/structural design. f. Spares parts list (with cost) for 2 years maintenance support. g. Details of tools for maintenance/repairs/overhaul. h. The manufactures shall guarantee the materials, workmanship and operation for a period of 24 months from the receipt of equipment. i. Practical operation training to certain assemblies of specialized nature to be arranged. j. The supplier shall provide a list of customers with details to whom such equipment was supplied during past 3 years.	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.

QUALITATIVE REQUIREMENTS (QRs) OF EMERGENCY RESCUE TENDER AS PER BIS : 949-2012

SL	Technical Parameter	Qualitative requirements (QRs)
1	Purpose	The Multifunctional Emergency Rescue Tender shall be designed specifically for the purpose of use at fires which requires special equipment, rescue and other special service calls such as: 1.1 Large special fires in Cities, Towns and in industries requiring the use of Breathing Apparatus, special equipment, illumination equipment etc. 1.2 Lift, goods transport, railway or machine accidents for which special equipment are required. Major leakages of toxic or dangerous Liquids or gases. 1.3 To fulfill the above duties, the Rescue Tender shall be comprehensively equipped with an electric generator, lifting, cutting, breaking, pulling, pushing gears, oxy-acetylene cutting equipment, portable electrical tools, hydraulic rescue tools, lighting equipment and power driven winch. 1.4 The Rescue Tender shall be fast on road and easily maneuverable in crowded streets and normal sharp corners. The overall dimensions shall not exceed the limit specified herein.
02	General requirements	Design construction features, materials and equipment and interpretation of Terminology of specification of Emergency Rescue tender shall be in accordance with IS: 949-2012 (Reaffirmed 2017) with latest revision. 2.1 The appliance shall be designed to carry the equipment listed in Annex "A". The equipment shall be arranged on a manner to allow the crew members to get ready in vehicle itself. 2.2 The appliance shall be suitable geared to provide a road speed of 70 km/h on a level ground. The acceleration shall be such that with a warm running engine, the fully laden appliance shall attain a speed of 64 km/h in 55 sec. from a standing start, through the gears. 2.2.1 The appliance shall also be capable of being started from rest up a gradient of 1 in 4 when laden.
3	Material selections and treatment	3.1 The choice of materials to be used in the construction of the appliance super structure shall be Zinc-treated galvanized steel or extruded Aluminium to provide adequate strength, long-term durability and elasticity for absorbing operational stresses, while ensuring effective corrosion resistance and prevention of rusting. 3.2 Timber shall not be used in the body construction 3.3 The appliance shall be required for use in conditions with constant high humidity and heat. This shall be given full consideration while selecting the

		materials 3.4 All metal parts exposed to atmosphere shall be of corrosion resisting material. 3.5 Ferrous metal shall not be used for nickel or chromium plated fittings and the plating of all such fittings shall be of extra heavy quality.
4	Designs and Construction	4.1 The chassis shall be of 4x2, 16T, 130 BHP (minimum), turbo charged air cooled, diesel engine, cowl chassis, Bharat stage -VI/ latest version or latest equivalent chassis. The Emergency Rescue Tender shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended.
4.2	Engine	The engine (oil fuel type) shall have sufficient cylinders based on finalization of Chassis. The engine shall be fitted with quick starting system. The engine shall be capable of driving the fully laden appliance at speed from starting without any preliminary running period, even under abnormally cold atmospheric conditions. The operating temperature of the engine cooling water shall be thermostatically controlled.
4.3	Fuel System	4.3.1 The fuel tank shall have a minimum capacity of 140 L/OEM. A fuel tank contents gauge shall be fitted on the instrument panel in the driving compartment. 4.3.2 The filling orifice shall be of ample size, and shall be accessible position. The cap shall be clearly marked to show that it is for fuel.
4.4	Electrical System	4.4.1 A heavy-duty alternator/generator shall be fitted to the engine to supply the vehicle 12 or 24 V DC electrical system. The alternator/generator shall be fitted with the necessary control unit. 4.4.2 A trickle charger shall be fitted in the cab and it shall be fitted with socket for connection to 230 V AC electrical systems. A red pilot lamp, to indicate when the battery is being charged from an external supply shall be provided. 4.4.3 All-important electrical circuits shall have separate fuses suitably indicated and grouped into a common fuse box, which shall be located in an accessible position. Provision shall be made to carry spare fuses in this box. 4.4.4 In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing.
4.5	Alternator Unit	4.5.1 A 230 V, 50-cycle alternator with its independent engine shall be provided. 4.5.2 The alternator shall be screen protected, continuously rated, self-regulating, self-excited, class 'E' insulation type, having an output of not less than 5 KVA at 0.8 power factor, (4 kW) 220 V Three phase, 50 cycles. 4.5.3 The alternator shall be equipped with a direct-coupled flange mounted exciter, which shall automatically keep the alternator voltage constant and provide an approximately straight-line voltage characteristic within 5 percent at all loads, and at any pre-set factor between 0.8 and unity. 4.5.4 Two cable reels each with 30 m of cable shall be provided. The cable shall be a 3-core duty flexible cords 250 V grade having a conductor of cross-section 4 mm (128/0.20 mm) conforming to IS 9968-1: 1988 AMD 3

		2016 or IS 694: 2010 Reaffirmed 2015. 4.5.5 Controls shall be mounted near the generator and shall consist of the following: a) Three sockets (plugs) and switches with 3 phase connections b) Four sockets (plugs) & switches (MCB's) with single phase connections of min. 20 AMP capacity c) Four sockets (plugs) & switches (MCB's) with single phase connections of min. 10 AMP capacity d) RPM Meter digital - 1 No e) KW meter-1 No f) Ampere meter separate for each phase-Total-3Nos. g) Frequency meter - 1 No h) 32 Amps TPN MCB - 1 No i) Hand throttle control; j) Engine cooling water temperature gauge (if water cooled);
4.6	Work	4.6.1 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. a) The rear portion of the compartment of driver's cabin should have one removable seat for full width of cab for 4 (four) crew members b) The cab floor should be covered with 3 mm thick Aluminium chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or riveting. c) Trap doors for topping up oil etc wherever necessary shall be provided. d) One roof light should be provided in the driver's cabin dwell vision and external rear view mirrors should be fitted to the cab. e) The driver cum crew cabin shall be provided with full four doors, one for driver, and one for officer and two at the crew compartment. f) The doors shall be generously sized for easy embarking /disembarking of crewmembers. All the doors shall be fitted on the super structural members, each hung upon three invisible coach type M.S. stout hinges and fitted with best quality handles. The door handle on outside of driver seat shall have a locking arrangement. Other doors shall be lockable from inside. g) Aluminium tower bolt of 8" shall be provided for all the doors from inside Adequate grab rails shall be provided for easily boarding and alighting from the appliance. h) The windscreen glass shall be provided in the two valves and shall be flat in shape. Each glass shall be fitted in E.P.D.M. rubber beading. The glasses shall be 5 mm thick toughened safety glass. i) The rubber beading used for fitting glasses and window frame shall be E.P.D.M. rubber.
4.6.2	Seats	a) The driver seat shall be adjustable type vertically, forward and backward. The officer seat shall be fixed type. Both the seats shall be rigidly fixed to the flooring by means of nuts and bolts. The seat cushion shall be of latex foam rubber 75 mm thick upholstered in good quality foam leather cloth. b) The back seat shall be of latex foam rubber 50 mm thick upholstered in good quality foam leather cloth. c) 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 fire-fighters, covered with 75 mm x 50 mm cushion latex foam rubber upholstered in good quality foam leather of approved shade. d) Below the crew seat, two lockers shall be provided, one for storage of

		batteries and another for keeping accessories. The extra length of battery cable shall be provided if required. e) The super structure of the cabin shall be constructed out of 14-gauge M.S. 45 x 45 x 20 mm-pressed "TOP HAT" sections. The super structure shall be strengthened specifically on the members with the lockers doors frames are to be fitted and the other members by providing brackets and gussets of 14-gauge M.S. plate securely welded. The details of super structure are as follows: i. Under frame cross members: 100 x 50 x 5 mm ii. Floor longitudinal members: 50 x 50 x 6 mm iii Vertical members on even side: 45 x 45 x 20 mm iv. Skirt member: 45 x 45 x 20 mm V. Waist member: 45 x 45 x 20 mm vi. Top deck longitudinal: 45 x 45 x 20 mm f) The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. g) The structure/frame work shall be of welded constructions and made from 2 mm thick MS pressed sections and square tubes. h) The Angles and channels used in the appliance structure shall be of minimum 3 mm thickness and the entire material shall be Zinc treated galvanized to ensure anti-corrosion protection and long term durability. i) The plating thickness shall not be less than 20 microns. Two coats of Epoxy paint shall be applied to the completely welded structure. j) The structure shall be so designed to avoid any vibration/ratting / deformation in the intended usage of the vehicle. k) 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.
4.6.3	Cable Winch	a) An electrically operated cable winch of 6-ton capacity should be provided. b) The winch unit should be complete with minimum 5.5 HP 12v DC series wound electric reversible motor for increased pulling power, rope drum, and 90 ft heavy duty galvanized EIPS wire rope with replaceable self-locking clevis hook and shall be mounted on the front bumper of the vehicle with suitable strong supports.
4.6.4	Telescopic Light Mast:	a) A compact, low profile, roof mounted lighting system, fitted with 4 X 200 watts LED lights, vertically elevated pneumatically up to 15 feet (4.6m) shall be installed on the roof of the vehicle. b) Lighting shall be provided by a 12V or 24V DC with Remote Control, directional lighting system, with rotation & tilt lamps to provide total coverage. c) The remote control unit shall allow a person to operate all the functions of the light mast & accurately aim for complete directional positioning. In addition Auto-show, a one button command, automatically retracts, turnout the lights and stows the entire system to the compact transport position shall also be included in the remote controller. d) The complete unit should comprise of handheld remote control with cable, rotation & tilt positioned, mounting frame with built in tilt system.
4.6.5	Miscellaneous	a) A suitable bumper shall be provided at the rear rigidly fixed to the super structural members by means of nuts and bolts, fabricated from 100 x 50 x 5 mm M.S. channel. b) Two Cat ladders made out of Stainless steel round or square pipe of 1" dia shall be provided c) Two nos. of 1" dia Aluminium pipe railing with sufficient number of Aluminium double socket brackets shall be provided to the rear body over the deck.

		d) A heavy-duty towing hook shall be provided and fitted with the rear bumper by means of nuts and bolts; e) Quick removable type wire mesh guard made from 1" X1" size MS wire mesh of 16 SWG covered in MS angle frame shall be provided to all the glasses of driver-cum-crew cabin. f) An illuminated 'FIRE AND RESCUE' sign shall also be fitted to the outer centre front of the cab. g) The bodywork shall be designed to enclose as much as possible of the appliance without interfering with necessary accessibility but at the same time, shall have clean lines.
4.6.6	Lockers:	a) The lockers shall be provided for storage of all equipment listed in the Annexure. The lockers will have drawers as per the latest International Standards i.e. roll in-roll out type with opening in tapered position giving very easy & immediate access to all equipment. b) All equipment should be stowed very scientifically & systematically in the drawers & each piece of equipment shall have its designated location so that at the time of EMERGENCY the required equipment can be very easily located & removed for use. c) Location of equipment (labels) shall be provided on each drawer for immediate identification. d) All the equipment shall be properly clamped and strapped in the drawers to prevent shifting of the equipment while the vehicle is in motion. e) The drawer sides shall be constructed from aluminium angles of minimum 100mm X 4mm thickness and the bottom floor of the drawers shall be made from 3 mm thick aluminium sheets and then covered with good quality neoprene rubber sheets. f) The drawers should have self-locking system to prevent accidental opening while the vehicle is in motion. The bottom edges of the drawers shall be covered with SS 304 angles of min 2 mm thickness. g) The ROLL IN-ROLL OUT drawers shall be made according to the required size of the equipment that is to be stowed. h) The lockers shall be covered with Push-Pull type Aluminium Roller Shutters only for faster & smoother rescue operation at the time of emergency. i) The roller shutters shall be made from extruded Aluminium sections with suitable roller, spring, guide channels etc. All Aluminium sections used shall be properly anodized. j) The Roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire fighting material. k) These roller shutters should open in every position of the vehicle even in rough terrain. Guide rails shall support the shutters over entire length on both sides to make them absolutely torsion free. l) The opening of the roller shutters shall be done by means of a lift bar provided. m) This should be of the self-locking type so that while the vehicle is moving, the shutters do not open accidentally during movement of vehicle. n) Roller shutters shall be made of hollow rectangular shaped Aluminium links which shall be inter connected with rubber /plastic/ PVC profiles sealing the roller shutter watertight when closed. o) These roller shutters should be durable, maintenance free, weather and corrosion resistant. p) All lockers shall be fitted with internal lighting which shall be capable of

		being automatically switched 'ON' and 'OFF' by the opening and closing of the roller shutters. q) A master switch for isolating the locker lighting circuit shall also be provided.
4.6.7	Access to the roof of the vehicle.	Grab-rails and non-slip steps be provided wherever necessary. A ladder made out of S.S. round or square pipe of 1" dia shall be provided at the rear of the appliance to provide easy access to the roof of the vehicle.
4.6.8	Trussed type extension ladder	A 10.5m Aluminium Trussed Type extension ladder as per IS 4571: 1977 shall be mounted on suitable gallows fitted with rollers and designed to facilitate easy and quick removal of the ladder from the rear of the appliance.
4.6.9	Stretcher- Ladders	In addition, two stretcher-ladders shall be mounted separately on the appliance in such a way that they shall be removed easily, quickly and independently, when required. Specification of the stretcher-ladders shall be as follows: a) Stretcher ladder- Main ladder section shall be manufactured from Aluminium alloy and shall have following requirements: b) Overall length not less than 2.0 m c) Overall width not less than 600 mm d) Centre of rungs 210 mm approximately
4.7	Stability	The stability of the appliance shall be such that when under fully equipped and loaded conditions (but excluding crew). If the surface on which the appliance stands is tilted to either side, the point at which overturning occurs is not passed at an angle of $27\frac{1}{2}^{\circ}$ from the horizontal.
5	Workmanship and finish	5.1 The standard of workmanship and finish of all mechanical and other parts shall be such that the parts normally required to be replaced, can be supplied and will fit-in correctly. 5.2 The complete exterior of the vehicle shall be painted with two finish coat fire-red colour conforming to shade No. 536 of IS 5. The paint shall conform to IS 2932. The Automobile paint (ICI/Dulux/ DuPont etc.) shall only be used. 5.3 The driving compartment, crew's compartment, inside the vehicle and inside lockers shall be painted cream. Lockers shall be finished in shadow board painting or replica of items to show the position of each piece of equipment. 5.4 All other parts except engine shall be painted black. 5.5 Necessary anti-corrosion and priming coats shall be applied before painting. 5.6 Painting and phosphate of the chassis shall be carried out to withstand the climatic conditions in the tropics. 5.7 The words "Central Industrial Security Force, Fire Service Training Institute." In Hindi& English shall be painted on both sides of vehicle with monogram on the Body of Rescue Tender in a suitable size letters in Golden Yellow paint with Black colour shading. NOTE: The name of "Central Industrial Security Force, Fire Service Training Institute." is given as example; the names of respective organization will be incorporated accordingly.
6	Instruction Book	Instruction Book Instruction book(s) for the guidance of the user, including both operating and normal maintenance procedures, shall be provided. The book(s) shall include an itemized and illustrated spare parts list, giving reference to all the wearing parts.
7	Accessories	The following accessories shall be provided in addition to these normally fitted on the chassis: a) One 250 mm diameter bell shall be mounted externally. It can be operated from inside the driving/crew compartment; b) Fog lamps- two, low mounted in front of appliance;

		c) Reversing light- one, suitable situated to assist reversing; d) LED Light bar min. 1200 mm wide with Aluminium Housing and max. 90 mm height with Blue and Red lighting shall be provided on top of the fire vehicle. e) Revolving beacon light- Two, of blue colour and shall be capable of throwing revolving beams of light round 360° with beams inclined upward, horizontally and downward. These shall be mounted on the cab-roof and second on roof at rear and shall be operated from the vehicle battery; f) Wind screen wipers (electrically operated) - of approved design -two; g) Tools- All tools required for normal routine maintenance of the appliance, which are not included in the kit for the chassis; h) Search light-two, adjustable to give flood or beam light and shall be mounted in convenient position on the appliance but at the same time, shall be capable of being readily removed and mounted on tripods away from the appliance. These shall each be supplied complete with tripod and not less than 30 m of TRS cable on reel mounted on the appliance; i) Spot light- two, adjustable and shall be mounted in convenient position on the roof of the appliance; and j) One, 12 volts battery operated siren shall be mounted in a convenient position.
8.	Marking	Each appliance shall be clearly and permanently marked with the following information: a) Manufacturer's name or trade-mark, if any; and b) Year of manufacture.
9.	Equipment for Emergency Rescue Tender:-	List of mandatory equipment for users is enclosed. However the list is not exhaustive, new inventions can also be added according to user requirements.

a) List of Mandatory equipment of reputed company make and confirming to relevant BIS or EN standard for users:-

SL	DESCRIPTIONS	QTY	UNIT
1	Compressed Air Carbon Composite Breathing Apparatus set positive pressure 45 min duration complete with 4 spare cylinder as per EN-137 or IS 10245 (Part 2):2023	4	Sets
2	Portable smoke exhauster/ ventilator should be light weight with weight less than 45 kgs., compact having fan size 16" with minimum 10 blades capable of airflow output of minimum 40,000 cu. M/ hr with minimum 5 h.p. petrol engine. Ventilator set should be supplied complete with collapsible duct (5 m), 10 deg tilt accessory and water mist adaptor.	1	Set
3	Pulling & Lifting Machine, lifting or Pulling 5 tons complete with wire rope & hook	1	Sets
4	Chain saw wood cutting (electrical) single phase AC/DC Voltage 220-250, guide bar min 50-60 cm. cutting capacity 50-60 cm, along with spare chain.	1	No.
4.a	Rotary circular saws, petrol engine operated with 14" diamond blade and 5 different types of abrasive blades, with spare blades for all types of blades. Weight within 15 kg.	1	No.
5	Portable Rotary Electric Hammer Drill with spare bits. Voltage 220-250 V, power 620 W approx., impact rate 0.2000 per min., rotary Drill Bit of 300 mm long-2 Nos.	1	Set
6	Fire hook as per BIS	5	Nos.

7	Long line 100 m size 50 mm circumferences (Polypropylene)	2	Length
8	Safety Belt – full body Harness with carabina hook & rope	2	Nos.
9	Hammer – 10 Kg.	6	Nos.
10	Rubber Gloves in container tested with 10,000 V as per BIS	10	Pairs
11	Shears, bolt cutter large with insulated handle of 600 mm	2	Nos.
12	Spreader for iron railings, double screw type 125 to 175 mm travel	2	Nos.
13	Water Proof rechargeable torch: The torch shall be water proof. There shall be 3 point toggle switch with intensity halogen bi-pin type 8 watt bulb two ultra-bright blue LED on the back side. The min run time of the torch shall be 3 hours with steady mode with halogen bulb and 6 hours with LED. The torch shall have rechargeable type led acid/Ni-Cd battery of 6 volts, 4.5 Ah capacity. The approx. weight of the torch shall be 1.5 kgs. and shall be supplied with quick release strap and charging accessories. The torch shall be in accordance with IP-58 or higher protection ensures uninterrupted lighting even under continuous immersion and all applicable safety standards and shall be brand new and of reputed make.	2	Nos.
14	Engineering Tools set (reputed make) consisting of: DE spanner 8" x ¾" -2 Nos Flat file through 8" - 1 No Three square file 6"-1 No Chisel 6"-1 No Screw Driver 8" heavy - 1 No Screw Driver 18" heavy-1 No Allen Key 105 to 10 mm-1 set Cutting plier heavy - 1 No Long nose pliers 7" heavy-1 No Hack saw with blade 12"-1 No Tool Box-1 No Tin cutter-1 No Pincer-1 No	1	Set
15	Electric Tools set (reputed make) consisting of: Industrial plier 10" heavy - 1 No Insulated screw driver 8"-1 No Electrical hand gloves tested at 11 KV Electrical tester heavy - 1 No Tool bag - 1 No Insulated tape 1 No	1	Set
16	Drilling machine 230 V(With a set of drill 12 Nos.)	1	No.
17	Nylon Rope ladder with snap hooks of 25 m length with aluminium round	1	No.
18	Structural Fire Protective suit conforming to EN 469 or ISO 11999-3 or IS 16890 with Fire Hood either confirming to NFPA 1971 or ISO 11999-9:2016 or EN 13911.	2	Sets
19	10.5 m trussed type double Aluminium extension ladder	1	No.
20	Life Jacket foam type MMD approved: the lift jacket shall be approved by MMD, Ministry of Shipping and shall meet the latest standard of IMCO & SOLAS. The jacket shall be foam field having floatability of 16.5 kgs. The size of the jacket shall be 80 x 37 x 10 cm approx. The jacket shall be provided with 3 M reflective tape with whistle. The cover of life jacket shall be made from nylon and orange in colour. The foam shall be soft neopropylene foam & airex. The lift jacket shall be provided with suitable	10	Nos.

	straps for securing.		
21	Life Buoy MMD approved with 30 m rope: The ring buoys shall be made from polyurethane having 800 mm O.D. and 430 mm I.D. the buoy shall be minimum 19.5 kgs. & the weight shall not be more than 4.5 kg. The ring buoys shall be provided polypropylene rope having 9.5 mm dia. The colour of the ring buoys shall be orange. The ring buoys shall be approved by MMD, Ministry of Shipping.	10	Nos.
22	Hydraulic Electrical-Hydraulically operated spreader complete with chain set The minimum spreading force on the open arm 20 tons Minimum spreading distance - 600 mm Minimum spreading force at closed arm-34-110 kN Minimum pulling distance-495 mm Minimum pulling force - 28 kN Weight not more than 20 kg. The equipment shall be completely independent from any external hydraulic power unit or hoses and shall be operated independently from each other by an electric power cable with tool adapter attached on the tool with back up of a rechargeable high capacity Li/Ion integrated Battery. To be supplied with battery charger, Power supply cable, 20 m extension cable reel. Accessories: Pulling chains, chain adaptors. The design of the tool shall be based on EN 13204 with type test certificate. The tools shall be of reputed make. Operation and maintenance manual shall be supplied.	1	Set
23	Hydraulic Electro-Hydraulic Cutter Min. blade opening: 150 mm Weight not more than – 20 kgs Cutting capacity – 30mm min. Cutting force-600 kN min. The equipment shall be completely independent from any external hydraulic power unit or hoses and shall be operated independently from each other by an electric power cable with tool adapter attached on the tool with back up of a rechargeable high capacity Li/Ion integrated Battery. To be supplied with battery charger, Power supply cable, 20m extension cable reel. The design of the tool shall be based on EN 13204 with type test certificate. The tools shall be of reputed make. Operation and maintenance manual should be supplied. The design of the tool shall be based on EN 13204 with type test certificate. The tools shall be of reputed make Operation and maintenance manual Tool kit with spare set (pair) of cutting blades	1	Set
24	Hydraulic Electro- Hydraulic Telescopic Ram Minimum Lifting force 103 kN. Minimum Retracted Length 540 mm Minimum extended length including extension and cross head-1200 mm Min. Piston stroke-358 mm Min. stroke of 2 nd plunger-250 mm Weight not more than 17 kgs The equipment shall be completely independent from any external hydraulic power unit or hoses and shall be operated independently from each other by an electric power cable with tool adapter attached on the tool with back up of a rechargeable high capacity Li/Ion integrated Battery. To be supplied with battery charger, Power supply cable, 20m extension cable reel. The design of the tool shall be based on EN 13204 with type test certificate. The tools shall be of reputed make. Operation and maintenance manual should be supplied	1	Set
25	Concrete breaker/chipping hammer – Big impact rate min. 0-1400 per /min. power input 1240 watt, single phase 230-250 volts, light in weight,	1	No.

	shock proof body with required accessories with pointed and flat bit (electrical operated)		
26	Pneumatic Lifting Air Bags (Flat Type) and Accessories: Working pressure shall be 10 bar & made from Kevlar reinforced nitrile rubber with 3 layers aramide reinforcement, Non slip design, capable of being interlocked when 2 bags are placed on top of each other. Insertion thickness of the bag shall not be more than 25 mm including profile Resistant to ozone and range of chemicals etc. The bags shall comply the following requirements Quantity: 1 each Lifting Capacity: 10 tons & 20 tons & 40 tons & 65 tons & 80 tons. The air bags are to be supplied with the following accessories: Pressure reducer 300 bar to 10 bar-02Nos Dual controller with pressure gauges-1 Air hose 5 m with couplings-2 Nos Air hose 10 m with couplings-2 Nos Single control unit – 2 No Air cylinder 6L 300 bar -2 nos. Shut off hose with safety valve 4 Nos Connection piece to connect two air cylinder-2 Nos The air bags and all its accessories shall comply the operating requirement and safety standard stipulated under EN 13731. The bags shall be brand new and of reputed make. The dual controller, pressure reducer, single control unit, shut off hose and air hoses shall be supplied in a suitable carrying box. Operation and maintenance manual shall be provided.	1	Set
27	Safety goggles as per EN standard	6	No.
28	Multi/5 gas detection with volatile organic compounds (VOCs). The instrument shall be compact and light weight. The instrument shall be capable of measuring five gases including combustible gas, oxygen, CO, Ammonia and chlorine. The device shall make comply all the safety standards stipulated under EN/NFPA applicable to the gas detection equipment.	1	No.
29	Combi-Tool (With pulling chain and adapter) Combi-tool shall be as per EN 13204, NFPA 1936 or equivalent. Working Pressure -not less than 700 bar, Spreading Force – Not less than 590 KN, Spreading Distance – Not less than 250 mm, Pulling Distance - Not less than 250 mm, Highest Pulling Force - Not less than 34 KN, Weight including battery - Not more than 20 Kg, Material of Cutter Blade - Dropped-Forged Special Steel Alloy, Material of Hinges, Pin, Levers - Corrosion Heat Treated Tool Steel, Type of Battery - Lithium Ion Based Rechargeable, Charging Time of Battery - not more than 120 min, Connector shall be provided to connect the tool to any 220 V Power source.	1	Set

b) List of equipment as per operational requirement of the users:-

Sl	Descriptions	Qty	Unit
1	Wet Suit: the wet suit shall conforming to IS 14252:1995 & IS 15809:2008 . It is one piece design overall with hood and zipper made from 3 mm reflective neoprene rubber. The wrist, ankle, and face seal	4	Sets

	shall be water tight. The suit shall be supplied with pair of 5 fingered heat reflective gloves made from 3 mm reflective neoprene rubber with double lining. The suit shall also be supplied with a pair of boots, which are made from heat reflective 5 mm neoprene rubber lining, non-slip sole and nylon side zipper. Suitable fins should also be supplied along with half/full face mask		
1 (a)	For Hazmat emergencies: a) Spill containment kit b) Portable bunds/dike c) Portable decontamination shower d) Neutralizing agents.	1 2 2 1	No. No. No. No.
2	Encapsulating Chemical Protective Gas tight and splash protection Suit with gloves and boot as per NFPA 1994-2007 certified or conforming to IS 15071:2002 and IS 17377 (Parts 1 & 2, 2020) including for Chemical/ Bio terrorism use (NBC Type Suit)	2	Sets
3	First Aid Medical Outfit for 50 persons	2	Sets
4	Blanket Woolen (in box) 160x225 cm (standard make)	6	Nos.
5	Blanket, Asbestos 2 x 2 mtrs (in box)	1	Nos.
6	Chain lifting 3 tons complete with end rings & shackles (of 6 Meter)	1	No.
7	Pulling & Lifting Machine, lifting 1.5 tonnes or Pulling 3 tons complete with wire rope & hook	1	Sets
8	Portable Concrete cutting chain saw with guide bar and diamond chain of minimum 14", petrol engine operated with spare chain. Weight within 15 kg.	1	Nos.
9	Portable petrol engine operated carbide tipped chain saw with 20" guide bar and chain with spare chain and depth gauge. Weight within 15 kg.	1	No.
9.a	Grapple with nylon rope of 40mm Circumferences & 30 m length	5	Nos.
9.b	Lowering line, 50 m size 50mm circumferences	1	Length
10	Short line 15 m size 50mm circumference (Polypropylene)	2	Length
11	Hardwood Blocks, assorted from 75mm to 225mm thick	12	Nos.
12	Spades	6	Nos.
13	Mattocks, Handle	6	Nos.
14	Pick Axe with Handle	6	Nos.
15	Axes	6	Nos.
16	Crow Bar 1 meter long	6	Nos.
17	Sledge Hammer	6	Nos.
18	Rake – 3 Prong	1	No.
19	High Safety Boots (high voltage)	6	Pairs
20	Mat Rubber Large	2	Pairs
21	Carpenter Tools Set consisting of: Carpenter hand saw 24" - 1 No Carpenter chisel farshi - 1 No Carpenter try square 12"-1 No Screw Driver 8" heavy-1 No Cutting Plier 8" heavy - 1 No Wooden maul file 10"-1 No	1	Set

	Carpenter tool box - 1 No. Chopper-1 No.		
22	Shears, bolt cutter with insulated handle of 400 mm	2	Nos.
23	Plastic traffic cones: Fiber glass cone with provision for fixing flasher, painted with red and white fluorescent strips. The cone shall also be fixed with reflectors on both sides.	10	Nos.
24	Rechargeable torch: Ni-Cd battery with quick charging facilities with spare battery pack simultaneously charging facilities, weight approx. 440 gms, 25000 peak beam in heavy duty bezel, "O" ring sealed, operation 1.7 hours continuous, minimum 5.5 watt black dot xenon bulb, antiglare coating, for maximum visibility in smoke & fog.	4	Nos.
25	Cordonning radium type rope – 5 Metre	6	Nos.
26	Full body safety harness made from Kevlar for cut and heat resistance for working in any condition conforming to EN 361 or IS 3521 (Part 1):2021	3	Nos.
27	Drivers Knife: The driver's knife shall be made from sea water grade stainless steel material. The minimum handle length shall be 4" having one side sharp edge and other side saw edge.	2	Nos.
28	Galvanised Steel bucket (9 litres capacity)	10	Nos.
29	Proppings – 20 ft. length (for propping at house collapses telescopic)	2	Nos.
30	Water Proof suits (rain coat)	2	Nos.
31	Rollers for moving heavy objects (6" dia x 4')	2	Nos.
32	Nylon ropes three strand Hawser laid size 50mm circumferences 30 m with breaking load 5.3 ton (IS:4272)	4	Nos.
33	Chokes (metal) for vehicles	4	Nos.
34	Insulated plier (12" size) screw driver (14" size) fuse remover, electrical tester	1	Set
35	Salvage sheets 12'x12' & 6'x4' - 1 each	1	Sets
36	Parachute knot complete for lowering purpose	1	No.
37	Inflatable Rubber boat 5 persons (bellow type with hand pump) rubber dinghy without board, motor 25 HP.	1	No.
38	Angle cutter (electric rescue saw) voltage 220-250V, Wattage approx. 2500 w, RPM min. 4000, disc diameter max. 250 mm (12"). Arbor size 20 mm with diamond tip blade -2 Nos and composite blade - 5 Nos	1	Set
39	Night vision OWL optics binoculars, focused ranged 25", field of view 596 at 1000 yards with storage case	1	Set
40	Rechargeable light for search & rescue operations: Rechargeable battery of lead acid type having 10 AH capacity, high intensity halogen 20 watt bulb, 400 lumens, minimum 100000 candle power, made from high impact ABS thermoplastic housing with rubberized impact bumpers, and scratched resistant lens cushion grip handle, up to 9 hours continuous run time, approx. size L 11.5" x W 5.1" x H 7", approx weight 7.4 lbs with AC & DC charger with mounted rack. Orange or yellow colour, CE approved.	2	Nos.
41	SINGLE ACTING COMPACT HYDRAULIC DOOR OPENER: The door opener same company is essential and door opener, shall be hydraulically operated with two toes, one fixed and one moving and it shall be suitable to force open doors of building that open to the inside and that can be reinforced or blocked.	1	No.
42	Rescue saw for laminated glass, metal and wood with charger and replaceable spare blades: Strokes per minute: 0-2000	1	No.

	Stroke Length: 1 inch/25 mm Battery: rechargeable li-ion 18V, 2 Ah Weight: within 5 kg		
43	Self-rescue automatic escape (standard size)	2	Nos.
44	Shovel	6	Nos.
45	Asbestos Gloves	6	Nos.
46	Safety belt with hook as per BIS	6	Nos.
47	Victim Location Unit (Search camera) with colour LCD screen Monitor display with communication system with accessories/attachments/extension line for search in under water min. up to a depth of 10 m. (CE marked). EN certificate to be submitted with the offer.	1	No.
48	Thermal Imaging Camera: The camera shall have LCD screen display. core/detector (uncooled micro bolometer with digital processing with 4 hour rechargeable battery with spare battery, AC/DC battery charger, wireless transmitter/receiver & other accessories. meeting MIL-STD-810-E standard. It should have coloured temperature pallets (3 types) with zoom feature. The camera shall be reputed imported make. EN certificate to be submitted with the offer.	1	No.
49	Temp. Measuring Device - Infrared portable temp. measuring device	1	No
50	Ascender & Descender device with 100 mtrs rope, ascending & locking handle with hook & rescue triangle/ rescue evacuation harness 'with parapet wall anchor- CE approved.	1	Set
51	Vehicle Stabilization Kit - Quick strut 122-200 cm- 2 nos Capacity of strut: 1000 kg Adjustment wrenches - 2 nos. Cluster hooks-2 nos Straps-2 nos Sleeves-2 nos Total weight: within 35 kgs Above should be supplied in carrying bag/case	1	No.
52	Leak Sealing Kit Leak sealing bag 1.5 bar with acid protection cover - 1 no. Foot air pump with safety valve 1 no. Inflation hose 10m, 1.5 bar 1 no. Tensioning and extension belts 10 m-2 nos Sealing plate 600x300x30 mm-2 nos. Sealing plate 1000x300x30 mm-1 no. Transport case for above	1	Set

TRIAL DIRECTIVES (TDs) OF
EMERGENCY RESCUE TENDER BIS:949-2012 (Reaffirmed 2017) with latest revision.

SL	Technical Parameter	Qualitative requirements (QRs)	Trial Directives (TDs for BOOs)
1	Purpose	The Multifunctional Emergency Rescue Tender shall be designed specifically for the purpose of use at fires which requires special equipment, rescue and other special service calls such as: 1.1 Large special fires in Cities, Towns and in industries requiring the use of Breathing Apparatus, special equipment, illumination equipment etc. 1.2 Lift, goods transport, railway or machine accidents for which special equipment are required. Major leakages of toxic or dangerous Liquids or gases. 1.3 To fulfill the above duties, the Rescue Tender shall be comprehensively equipped with an electric generator, lifting, cutting, breaking, pulling, pushing gears, oxy-acetylene cutting equipment, portable electrical tools, hydraulic rescue tools, lighting equipment and power driven winch. 1.4 The Rescue Tender shall be fast on road and easily maneuverable in crowded streets and normal sharp corners. The overall dimensions shall not exceed the limit specified herein.	The vehicle shall meet the requirement as per relevant standards and QRs.
02	General requirements	Design construction features, materials and equipment and interpretation of Terminology of specification of Emergency Rescue tender shall be in accordance with IS: 949-2012 (Reaffirmed 2017) with latest revision. 2.1 The appliance shall be designed to carry the equipment listed in Annex "A". The equipment shall be arranged on a manner to allow the	All items shall be physically checked and tested , and shall meet the requirements as per the relevant standards and approved Qualitative Requirements (QRs).

		crew members to get ready in vehicle itself. 2.2 The appliance shall be suitable geared to provide a road speed of 70 km/h on a level ground. The acceleration shall be such that with a warm running engine, the fully laden appliance shall attain a speed of 64 km/h in 55 sec. from a standing start, through the gears. 2.2.1 The appliance shall also be capable of being started from rest up a gradient of 1 in 4 when laden.	
3	Material selections and treatment	3.1 The choice of materials to be used in the construction of the appliance super structure shall be Zinc-treated galvanized or extruded Aluminium to provide adequate strength, long term durability and elasticity for absorbing operational stresses, while ensuring effective corrosion resistance and prevention of rusting. 3.2 Timber shall not be used in the body construction 3.3 The appliance shall be required for use in conditions with constant high humidity and heat. This shall be given full consideration while selecting the materials 3.4 All metal parts exposed to atmosphere shall be of corrosion resisting material. 3.5 Ferrous metal shall not be used for nickel or chromium plated fittings and the plating of all such fittings shall be of extra heavy quality.	All materials used in the construction of the appliance shall be physically verified and tested and shall conform to the requirements of relevant standards and approved Qualitative Requirements (QRs).
4	Designs and Construction	4.1 The chassis shall be of 4x2, 16T, 130 BHP (minimum), turbo charged air cooled, diesel engine, cowl chassis, Bharat stage -VI/ latest version or latest equivalent chassis. The Emergency Rescue Tender shall be equipped with a factory-fitted air-conditioned	All items shall be physically checked and tested, and shall meet the requirements as per the relevant standards and approved Qualitative Requirements (QRs). Necessary

		driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended.	material-of-construction certificates from the manufacturer, as per QRs, shall also be checked and verified.
4.2	Engine	The engine (oil fuel type) shall have sufficient cylinders based on finalization of Chassis. The engine shall be fitted with quick starting system. The engine shall be capable of driving the fully laden appliance at speed from starting without any preliminary running period, even under abnormally cold atmospheric conditions. The operating temperature of the engine cooling water shall be thermostatically controlled.	
4.3	Fuel System	4.3.1 The fuel tank shall have a minimum capacity of 140 L/OEM. A fuel tank contents gauge shall be fitted on the instrument panel in the driving compartment. 4.3.2 The filling orifice shall be of ample size, and shall be accessible position. The cap shall be clearly marked to show that it is for fuel.	Shall be checked physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
4.4	Electrical System	4.4.1 A heavy-duty alternator/generator shall be fitted to the engine to supply the vehicle 12 or 24 V DC electrical system. The alternator/generator shall be fitted with the necessary control unit. 4.4.2 A trickle charger shall be fitted in the cab and it shall be fitted with socket for connection to 230 V AC electrical systems. A red pilot lamp, to indicate when the battery is being charged from an external supply shall be provided. 4.4.3 All-important electrical circuits shall have separate fuses suitably indicated and grouped into a common fuse box, which shall be located in an accessible position. Provision shall be made to carry spare fuses in this box. 4.4.4 In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.

4.5	Alternator Unit	4.5.1 A 230 V, 50-cycle alternator with its independent engine shall be provided. 4.5.2 The alternator shall be screen protected, continuously rated, self-regulating, self-excited, class 'E' insulation type, having an output of not less than 5 KVA at 0.8 power factor, (4 kW) 220 V Three phase, 50 cycles. 4.5.3 The alternator shall be equipped with a direct-coupled flange mounted exciter, which shall automatically keep the alternator voltage constant and provide an approximately straight-line voltage characteristic within 5 percent at all loads, and at any pre-set factor between 0.8 and unity. 4.5.4 Two cable reels each with 30 m of cable shall be provided. The cable shall be a 3-core duty flexible cords 250 V grade having a conductor of cross-section 4 mm (128/0.20 mm) conforming to IS 9968-1: 1988 AMD 3 2016 or IS 694: 2010 Reaffirmed 2015. 4.5.5 Controls shall be mounted near the generator and shall consist of the following: a) Three sockets (plugs) and switches with 3 phase connections b) Four sockets (plugs) & switches (MCB's) with single phase connections of min. 20 AMP capacity c) Four sockets (plugs) & switches (MCB's) with single phase connections of min. 10 AMP capacity d) RPM Meter digital - 1 No e) KW meter-1 No f) Ampere meter separate for each phase-Total-3Nos. g) Frequency meter - 1 No h) 32 Amps TPN MCB - 1 No i) Hand throttle control; j) Engine cooling water temperature gauge (if water cooled);	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.
4.6	Work	4.6.1 Enclosed accommodation for six persons shall be provided in the driver cab-cum-crew compartment including the driver and the in-	Shall be checked physically and should meet the requirement as per relevant standards and QRs.

		charge of the crew. Both the seats should be independent. The driver's seat should be adjustable and comfortable. a) The rear portion of the compartment of driver's cabin should have one removable seat for full width of cab for 4 (four) crew members b) The cab floor should be covered with 3 mm thick Aluminium chequered plate rigidly fixed to the under frame cross members by means of nuts and bolts or riveting. c) Trap doors for topping up oil etc wherever necessary shall be provided. d) One roof light should be provided in the driver's cabin dwell vision and external rear view mirrors should be fitted to the cab. e) The driver cum crew cabin shall be provided with full four doors, one for driver, and one for officer and two at the crew compartment. f) The doors shall be generously sized for easy embarking /disembarking of crewmembers. All the doors shall be fitted on the super structural members, each hung upon three invisible coach type M.S. stout hinges and fitted with best quality handles. The door handle on outside of driver seat shall have a locking arrangement. Other doors shall be lockable from inside. g) Aluminium tower bolt of 8" shall be provided for all the doors from inside Adequate grab rails shall be provided for easily boarding and alighting from the appliance. h) The windscreen glass shall be provided in the two valves and shall be flat in shape. Each glass shall be fitted in E.P.D.M. rubber beading. The glasses shall be 5 mm thick toughened safety glass. i) The rubber beading used for fitting glasses and window frame shall be E.P.D.M. rubber.	
4.6.2	Seats	a) The driver seat shall be adjustable type vertically, forward and	Shall be checked physically and should meet the requirement as per relevant

		backward. The officer seat shall be fixed type. Both the seats shall be rigidly fixed to the flooring by means of nuts and bolts. The seat cushion shall be of latex foam rubber 75 mm thick upholstered in good quality foam leather cloth. b) The back seat shall be of latex foam rubber 50 mm thick upholstered in good quality foam leather cloth. c) 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 fire-fighters, covered with 75 mm x 50 mm cushion latex foam rubber upholstered in good quality foam leather of approved shade. d) Below the crew seat, two lockers shall be provided, one for storage of batteries and another for keeping accessories. The extra length of battery cable shall be provided if required. e) The super structure of the cabin shall be constructed out of 14-gauge M.S. 45 x 45 x 20 mm-pressed "TOP HAT" sections. The super structure shall be strengthened specifically on the members with the lockers doors frames are to be fitted and the other members by providing brackets and gussets of 14-gauge M.S. plate securely welded. The details of super structure are as follows: i. Under frame cross members: 100 x 50 x 5 mm ii. Floor longitudinal members: 50 x 50 x 6 mm iii Vertical members on even side: 45 x 45 x 20 mm iv. Skirt member: 45 x 45 x 20 mm V. Waist member: 45 x 45 x 20 mm vi. Top deck longitudinal: 45 x 45 x 20 mm f) The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. g) The structure/frame work shall be	standards and QRs.
--	--	---	--------------------

		of welded constructions and made from 2 mm thick MS pressed sections and square tubes. h) The Angles and channels used in the appliance structure shall be of minimum 3 mm thickness and the entire material shall be Zinc-plated galvanized to ensure anti-corrosion protection and long-term durability. i) The plating thickness shall not be less than 20 microns. Two coats of Epoxy paint shall be applied to the completely welded structure. j) The structure shall be so designed to avoid any vibration/ratting / deformation in the intended usage of the vehicle. k) 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.	
4.6.3	Cable Winch	a) An electrically operated cable winch of 6-ton capacity should be provided. b) The winch unit should be complete with minimum 5.5 HP 12v DC series wound electric reversible motor for increased pulling power, rope drum, and 90 ft heavy duty galvanized EIPS wire rope with replaceable self-locking clevis hook and shall be mounted on the front bumper of the vehicle with suitable strong supports.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
4.6.4	Telescopic Light Mast:	a) A compact, low profile, roof mounted lighting system, fitted with 4 X 200 watts LED lights, vertically elevated pneumatically up to 15 feet (4.6m) shall be installed on the roof of the vehicle. b) Lighting shall be provided by a 12V or 24V DC with Remote Control, directional lighting system, with rotation & tilt lamps to provide total coverage. c) The remote control unit shall allow a person to operate all the functions of the light mast & accurately aim for complete directional positioning. In addition Auto-show, a one button command, automatically retracts, turnout the lights and stows the	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.

		entire system to the compact transport position shall also be included in the remote controller. d) The complete unit should comprise of handheld remote control with cable, rotation & tilt positioned, mounting frame with built in tilt system.	
4.6.5	Miscellaneous	a) A suitable bumper shall be provided at the rear rigidly fixed to the super structural members by means of nuts and bolts, fabricated from 100 x 50 x 5 mm M.S. channel. b) Two Cat ladders made out of Stainless steel round or square pipe of 1" dia shall be provided c) Two nos. of 1" dia Aluminium pipe railing with sufficient number of Aluminium double socket brackets shall be provided to the rear body over the deck. d) A heavy-duty towing hook shall be provided and fitted with the rear bumper by means of nuts and bolts; e) Quick removable type wire mesh guard made from 1" X1" size MS wire mesh of 16 SWG covered in MS angle frame shall be provided to all the glasses of driver-cum-crew cabin. f) An illuminated 'FIRE AND RESCUE' sign shall also be fitted to the outer centre front of the cab. g) The bodywork shall be designed to enclose as much as possible of the appliance without interfering with necessary accessibility but at the same time, shall have clean lines.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.
4.6.6	Lockers:	a) The lockers shall be provided for storage of all equipment listed in the Annexure. The lockers will have drawers as per the latest International Standards i.e. roll in-roll out type with opening in tapered position giving very easy & immediate access to all equipment. b) All equipment should be stowed very scientifically & systematically in the drawers & each piece of equipment shall have its designated location so that at the time of EMERGENCY the	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs. wherever necessary, shall also be checked And verified.

		required equipment can be very easily located & removed for use. c) Location of equipment (labels) shall be provided on each drawer for immediate identification. d) All the equipment shall be properly clamped and strapped in the drawers to prevent shifting of the equipment while the vehicle is in motion. e) The drawer sides shall be constructed from aluminium angles of minimum 100mm X 4mm thickness and the bottom floor of the drawers shall be made from 3 mm thick aluminium sheets and then covered with good quality neoprene rubber sheets. f) The drawers should have self-locking system to prevent accidental opening while the vehicle is in motion. The bottom edges of the drawers shall be covered with SS 304 angles of min 2 mm thickness. g) The ROLL IN-ROLL OUT drawers shall be made according to the required size of the equipment that is to be stowed. h) The lockers shall be covered with Push-Pull type Aluminium Roller Shutters only for faster & smoother rescue operation at the time of emergency. i) The roller shutters shall be made from extruded Aluminium sections with suitable roller, spring, guide channels etc. All Aluminium sections used shall be properly anodized. j) The Roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire fighting material. k) These roller shutters should open in every position of the vehicle even in rough terrain. Guide rails shall support the shutters over entire length on both sides to make them absolutely torsion free. l) The opening of the roller shutters shall be done by means of a lift bar provided.	
--	--	---	--

		m) This should be of the self-locking type so that while the vehicle is moving, the shutters do not open accidentally during movement of vehicle. n) Roller shutters shall be made of hollow rectangular shaped Aluminium links which shall be inter connected with rubber /plastic/ PVC profiles sealing the roller shutter watertight when closed. o) These roller shutters should be durable, maintenance free, weather and corrosion resistant. p) All lockers shall be fitted with internal lighting which shall be capable of being automatically switched 'ON' and 'OFF' by the opening and closing of the roller shutters. q) A master switch for isolating the locker lighting circuit shall also be provided.	
4.6.7	Access to the roof of the vehicle.	Grab-rails and non-slip steps be provided wherever necessary. A ladder made out of S.S. round or square pipe of 1" dia shall be provided at the rear of the appliance to provide easy access to the roof of the vehicle.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs. wherever necessary, shall also be checked and verified.
4.6.8	Trussed type extension ladder	A 10.5m Aluminium Trussed Type extension ladder as per IS 4571: 1977 shall be mounted on suitable gallows fitted with rollers and designed to facilitate easy and quick removal of the ladder from the rear of the appliance.	Shall be checked physically and should meet the requirement as per relevant standards and QRs.
4.6.9	Stretcher-Ladders	In addition, two stretcher-ladders shall be mounted separately on the appliance in such a way that they shall be removed easily, quickly and independently, when required. Specification of the stretcher-ladders shall be as follows: a) Stretcher ladder- Main ladder section shall be manufactured from Aluminium alloy and shall have following requirements: b) Overall length not less than 2.0 m c) Overall width not less than 600 mm d) Centre of rungs 210 mm approximately	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.
4.7	Stability	The stability of the appliance shall be	Shall be checked and should meet

		such that when under fully equipped and loaded conditions (but excluding crew). If the surface on which the appliance stands is tilted to either side, the point at which overturning occurs is not passed at an angle of $27\frac{1}{2}^{\circ}$ from the horizontal.	the requirement as per relevant standards and QRs.
5	Workmanship and finish	5.1 The standard of workmanship and finish of all mechanical and other parts shall be such that the parts normally required to be replaced, can be supplied and will fit-in correctly. 5.2 The complete exterior of the vehicle shall be painted with two finish coat fire-red colour conforming to shade No. 536 of IS 5. The paint shall conform to IS 2932. The Automobile paint (ICI/Dulux/DuPont etc.) shall only be used. 5.3 The driving compartment, crew's compartment, inside the vehicle and inside lockers shall be painted cream. Lockers shall be finished in shadow board painting or replica of items to show the position of each piece of equipment. 5.4 All other parts except engine shall be painted black. 5.5 Necessary anti-corrosion and priming coats shall be applied before painting. 5.6 Painting and phosphate of the chassis shall be carried out to withstand the climatic conditions in the tropics. 5.7 The words "Central Industrial Security Force, Fire Service Training Institute." In Hindi & English shall be painted on both sides of vehicle with monogram on the Body of Rescue Tender in a suitable size letters in Golden Yellow paint with Black colour shading. NOTE: The name of "Central Industrial Security Force, Fire Service Training Institute." is given as example, the names of respective organisation will be incorporated accordingly.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.
6	Instruction Book	Instruction Book Instruction book(s) for the guidance of the user, including both operating and normal maintenance procedures, shall be provided. The book(s) shall include an itemized and	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates, from statutory authority as per QRs, wherever

		illustrated spare parts list, giving reference to all the wearing parts.	necessary, shall also be checked and verified.
7	Accessories	The following accessories shall be provided in addition to these normally fitted on the chassis: a) One 250 mm diameter bell shall be mounted externally. It can be operated from inside the driving/crew compartment; b) Fog lamps- two, low mounted in front of appliance; c) Reversing light- one, suitable situated to assist reversing; d) LED Light bar min. 1200 mm wide with Aluminium Housing and max. 90 mm height with Blue and Red lighting shall be provided on top of the fire vehicle. e) Revolving beacon light- Two, of blue colour and shall be capable of throwing revolving beams of light round 360° with beams inclined upward, horizontally and downward. These shall be mounted on the cab-roof and second on roof at rear and shall be operated from the vehicle battery; f) Wind screen wipers (electrically operated) - of approved design -two; g) Tools- All tools required for normal routine maintenance of the appliance, which are not included in the kit for the chassis; h) Search light-two, adjustable to give flood or beam light and shall be mounted in convenient position on the appliance but at the same time, shall be capable of being readily removed and mounted on tripods away from the appliance. These shall each be supplied complete with tripod and not less than 30 m of TRS cable on reel mounted on the appliance; i) Spot light- two, adjustable and shall be mounted in convenient position on the roof of the appliance; and j) One, 12 volts battery operated siren shall be mounted in a convenient position.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.
8.	Marking	Each appliance shall be clearly and permanently marked with the following information: a) Manufacturer's name or trade-mark,	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs.

		if any; and b) Year of manufacture.	Necessary certificates from statutory authority as per QRs. wherever necessary. Shall also be checked and verified.
9.	Equipment for Emergency Rescue Tender	List of mandatory equipment for users is enclosed. However the list is not exhaustive, new inventions can also be added according to user requirements.	Shall be checked physically and tested and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs. wherever necessary. Shall also be checked and verified.

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

Sl	Specifications	Qualitative Requirements
A	Scope of Supply	i) The chassis shall be supplied by the manufacturer. ii) A 6x2, full forward control, BS VI/latest version or equivalent with cowl chassis. iii) Fabrication and mounting of 12000 Ltrs capacity water tank as per specifications. iv) Supply and mounting of high & low pressure firefighting pump as per specification. v) Supply and mounting of water monitor.
B	Purpose	The Water Tanker shall be used to carry the water for fire fighting purpose. The pump will be driven by P.T.O
C	Detailed specification	
1	Chassis	The chassis shall be suitable indigenous make as per following specifications suitable for mounting Water Tank having 12000 ltrs. Capacity with pump. The Water Tanker 12 KL Capacity with firefighting Pump shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended. 1.1 Make of the chassis: 6x2, 25T, 180 BHP (minimum), full forward control, cowl chassis, BS-VI or latest version emission ratio complaint/ any equivalent latest version chassis. 1.2 Type: 6x2, cowl chassis, full forward control, RHD, wheel base shall not be less than 4600 mm. 1.3 Engine: 6 Inline cylinder, water cooled, direct injection, turbo charged diesel engine developing minimum 180 B.H.P. with Bharat Stage VI/ equivalent latest version chassis. 1.4 GVW: Shall not exceed maximum permissible limit weight of chassis. 1.5 Fuel Tank: As per OEM 1.6 Tyres & Wheels: As per OEM, Spare wheel : 1 No. 1.7 Steering: Integral power steering 1.8 Tools: a) Hydraulic jack 40 Ton with lever b) Wheel spanner with lever c) Standard Tool kit d) Tyre inflation hose. 1.9 Manuals (I copy): a) Workshop manual b) Spare parts catalogue

		1.10 Driver Cabin: The chassis shall be fabricated for accommodation of 06 personnel including driver, Driver view mirror Cabin, windscreen, side windows, doors, adjustable driver seat, fixed Co-driver seat, wiper system, Horn, complete instrument cluster, preferably in PO RED colour. 1.11 The Angles and channels used in the appliance super structure shall be Zinc plated galvanized steel to ensure anti-corrosion protection and long term durability.									
2	Water Tank	2.1 The water tank shall have a capacity of 12000 Its when fully filled and made from SS sheet of grade 304 as per IS 6603, and Rectangular in shape with round corners. The tank shall be mounted on the chassis behind the driver's cabin. The detailed design drawing of the tank withits mounting shall be submitted with tender for scrutiny. 2.2 The water tank shall be mounted behind the driver cabin with a gap of minimum 450 mm. 2.3 The mounting of tank shall be directly on the chassis and as per the design approved by the chassis manufacturer. 2.4 The tank shall be rectangular in shape, with inbuilt forming (reinforced ribs) on both the sides. The sheet thickness shall be as follows:- <table border="0"> <tr> <td>Bottom</td><td>:</td><td>6 mm</td></tr> <tr> <td>Sides/front/Rear/Top</td><td>:</td><td>5 mm</td></tr> <tr> <td>Baffles</td><td>:</td><td>4 mm</td></tr> </table> 2.5 Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading. 2.6 The tank construction shall be such that there shall be no leakage and shall have overlapped joints of 25.4 mm between the bottom sheet and side sheets. The bottom sheet corner shall be rolled upward up to a minimum of 300 mm height and shall be welded to side sheets. The dimensions of the tank shall be clearly stated in the offer along with detailed volumetric calculation. 2.7 All the welding shall be by MIG welding process only. The welding of the tank shall be in such a manner that the first beading is from inside the shell and subsequent bead from outside the shell. The welded surface shall be cleaned of all slag, scale etc. There shall be minimum joints in the tank shell and hence plates used for fabrication of tank shall be of maximum size. 2.8 The water tank shall be mounted on the chassis on a sub frame using Rubber Metacones with sufficient saddle supports placed as per the availability of bolt holes in the chassis frame. The details shall be submitted along with the offer. These supports shall be fabricated from S.S. plate of minimum 10mm thick with a reinforcement plates of 6mm thick welded to tank shell from outside to the bottom sheet up to with continuous welding. 2.9 S.S. plate of suitable size and thickness shall be welded to the tank mounting pedestal for mounting the tank on mounting brackets provided in the chassis frame. The plates/brackets fitted to chassis frame shall also be provided with suitable gusset plates for reinforcement. 2.10 The Tank shall be fitted on the chassis with the help of 5/8" dia.	Bottom	:	6 mm	Sides/front/Rear/Top	:	5 mm	Baffles	:	4 mm
Bottom	:	6 mm									
Sides/front/Rear/Top	:	5 mm									
Baffles	:	4 mm									

		High tensile bolts with nylock nuts.
		2.11 The tank shall be mounted slightly sloping towards the rear so as to decant the tank completely.
		2.12 There shall be two circular manhole of 600 mm dia. Mounted on top of the tank.
		2.13 The water tight manhole covers of SS with good quality of rubber gasket shall be bolted to the collar of manhole. The manhole covers shall be provided with round threaded blank cap with lugs of 10" dia. with rubber gasket.
		2.14 The tank shall be provided with suitable arrangement of baffle plates to prevent the surge of water when the vehicle is in motion and accelerating, braking in speed and covering. The arrangement of baffle plates shall be clearly shown in the drawing.
		2.15 The baffle shall be arranged in a manner to facilitate the movement of a person throughout the tank for cleaning and welding purposes.
		2.16 Suitable eyes shall provide on the shell of water tank to enable it to be lifted from the vehicle for repairs/replacement as and when required.
		2.17 The tank shall be fitted with 100mm dia. Overflow pipe of 'C' class galvanized taken down below the chassis but without reducing the ground clearance.
		2.18 The tank shall be fitted with four 63 mm instantaneous hydrant connection with non-return valve, closed to pump panel for filling the tank throughout 50mm above galvanized 'C' class pipe.
		2.19 A draw pipe of 100 mm dia. of 'C' class galvanized shall be taken from the tank to the pump suction inlet, incorporating 100 mm butterfly valve of flexible connection (Rubber Bellow) shall be provided to this pipe to take the vibrations. A suitable size sump shall be provided below the tank to connect water draw pipe with SS strainer.
		2.20 A drain cock with 50 mm suitable ball valve shall be provided at the bottom of water tank.
		2.21 A cat ladder shall be provided and fitted at the rear of water tank and fabricated out of 1" dia. M.S. tabular pipe and 2mm thick.
		2.22 The complete top of water tank shall be covered with 10SWG aluminium chequered plate and fixed to the frame fabricated from 40x40x4 mm S.S. angles properly welded to the tank shell. The chequered plates shall be bolted to this frame and shall be removable type.
		2.23 Suction hose brackets of aluminium sheet of 3.15 mm thick with suitable fastening arrangement shall be provided on the top deck to accommodate 4 Nos. 140 mm dia. and 2.5 mtrs. length suction hoses with male and female couplings.
		2.24 The locker of suitable size shall be provided with doors and locking arrangement on both sides. The location and size shall be shown in the drawing. These lockers will be used for keeping delivery hoses, accessories and high pressure hose reel. The structure of the locker shall be made from 40x40x4 mm thick S.S. angles with 16SWG aluminium panelling from outside and 16 SWG aluminium chequered plate from inside. The floor panelling of locker shall be 10 SWG aluminium chequered plates

3	Fire Pump (Multi Pressure)	2.25 Suitable rear mudguards made from 16 SWG M.S. sheet with reinforcing ribs shall be provided and supported on MS. brackets.
		2.26 A suitable towing hook shall be provided at the rear of vehicle.
		2.27 An additional draw pipe of 150 mm dia. of 'C' class galvanized incorporating 150 mm butterfly "Audco" make valve with gun metal, female suction hose coupling shall be provided to the rear side of the vehicle.
		3.1 The water pump shall be centrifugal type, multi pressure made of bronze/gunmetal, having output capacity of 4000 LPM at 10 Kg/cm ² and 300LPM at 35 Kg/cm ² at 3 mtrs suction lift at NTP condition with automatic primer. The low pressure side will be of single stage and the high pressure side also with single stage having regenerative type impeller.
		3.2 The pump shall be CE marked meet international standards and conforming to EN-1028 Part-I & II.
		3.3 The pump shall comply following performance parameters. a) Normal Pressure output :4000 LPM at 10 kg/cm ² b) High pressure output : 300 LPM at 35 kg/cm ² c) Maximum pressure in :14kg/cm ² (shut off pressure normal pressure mode). d) Maximum pressure in :45 Kgs/cm ² high pressure mode. e) Deep lifting capacity of pump: 7mtrs in 36 sec. at NTP condition.
		3.4 The overall pump shall be constructed from gunmetal. The normal (low) pressure impeller, volute, and impeller wearing shall be made from gunmetal confirming to Gr. II of IS 318/1981 and the regenerative type high pressure impeller shall be of Stainless steel. The pump shaft shall be made from stainless steel (Grade 04Cr18Ni10 of IS: 6603). The bearing housing will be made of C.I. and all the studs and bolts coming in contact with water shall be of stainless steel. The bearings used in the pump shall be of reputed make.
		3.5 The normal and high-pressure impeller shall be mounted on a single shaft and normal (low) pressure impeller shall be dynamically balanced.
		3.6 The pump shall be provided with self-adjusting mechanical carbon seal assy.
		3.7 The pump shall be provided with an inbuilt filter of easily removable type, which shall filter the water before entering into the high pressure stage impeller.
		3.8 Operation of low pressure to high pressure or vice a versa shall be possible by actuation of single lever.
		3.9 The pump shall have facility to operate low pressure and high pressure mode simultaneously or individually, While high pressure mode is in operation and delivering 300 LPM at 35 kg/cm ² , the pressure in low pressure side shall not exceed 8.5 kg/cm ² .
		3.10 The pump shall be provided in built (integrated in the pump outlet manifold) Pressure Relief Valve (PRV) which shall operate automatically and shall not allow the high pressure to increase beyond 45 kg/cm ² .
		3.11 The size of high-pressure outlet shall be of 35 mm connected to high pressure hose reel.

		3.12 The thermal relief valve (TRV) shall be provided and fitted in the pump housing, which will open when both deliveries (HP and LP) are shut off for long time to control the temperature of pump water. The Thermal Relief Valve (TRV) should open at 60°C and shall reset automatically when the temperature of water is within limit.
		3.13 The pump design shall be modular type and shall not have gaskets/packing. The arrangement shall be such that the carbon seal can be attended/ removed without removing the pump body. The pump shall be provided deep groove heavy duty dual angular contact bearing immersed in oil bath.
		3.14 The pump shall be provided with one suction inlet of 140 mm dia having round threads confirming to IS:902 of 1974 and four numbers of 63 mm delivery outlets (IS:903) having screw down type quick closing clack valve (IS:4928) fitted with instantaneous couplings as per IS 903:1993. Blank caps fastened with chains and incorporating means to relieve pressure between the valve and the cap shall be provided one for each delivery valve and one 38 mm outlet with ball valve and female instantaneous coupling. The delivery valve screw shall not be with gland. The high pressure outlet shall not less than 25mm and shall either be flange or screw type.
		3.15 The efficiency of the pump shall be such that the power required shall not be more than available with the chassis at safe RPM for stationery and continuous operation.
		3.16 The pump shall be rear mounted connected to P.T.O by propeller shafts and universal and slip joint.
		3.17 If required the pump shall be provided with suitable ratio inbuilt gear box to match the PTO rpm and required pump rpm.
		3.18 All the valves used shall be of any standard make with all the piping of required size of 'C' class Galvanized.
		3.19 The pump shall be fitted with inbuilt twin piston reciprocating type priming system capable of priming the pump from 7 meters in not more than 36 seconds, when tested with the 140 mm suction hose at NTP conditions and considering the allowances as stated in IS: 950-2012. The pump shall attain a dry vacuum of 620 mm of Hg. The entire priming system shall be constructed in stainless steel and shall be actuated by an electromagnetic clutch immersed in oil bath of pump's bearing housing. Arrangement shall be made to actuate the primer in Manual and AUTO modes. When operating in Manual mode primer should be engaged simply by pressing a single button, only when it is needed. When operating in Auto mode, primer must be internally actuated and must automatically re-engage when pressure is lost. However, in both operating modes the primer shall disengage automatically at a pump discharge pressure of 1.5 to 2.0 kg/cm ² . The primer deactivation shall be controlled directly by a pump pressure sensing device. Priming system driven by any external belts/chain is not acceptable.
		3.20 The pump with its fitment shall be tested hydrostatically to 1.5 times the working pressure at the pump i.e. for low pressure side it shall be tested to 21 Kg/cm ² and high pressure side will be tested to 52 Kg/cm ² . This testing shall be carried out in presence of

		authorized representative of CISF and certificate to this effect from pump manufacture shall be submitted.
4	Power Take Off (PTO)	Split shaft Power Take Off shall be mounted at a suitable location on the chassis. The power take off shall be mounted on minimum two type foundation using rubber/ flexible mounts to isolate the PTO vibrations from the chassis and shall be designed to carry the unit weight and torque reactions, to constrain the PTO so as not to move significantly out of position, to allow chassis flexion. In no case welding/drilling shall be allowed on the chassis while mounting the PTO. Suitable sized U bolts may however be used for this purpose. The PTO alignment shall be in line with the existing drive line as far as possible. The new propeller shafts shall be free from welding defect and a spline and yoke arrangement shall be used. A general layout drawing of the PTO mounting shall be enclosed with the technical offer without which the tender shall not be considered. All the propeller shafts on the throughput side as well as at the pump drive side must be balanced to suitable standards. POWER TAKE OFF UNIT: The power take off unit of make Firehawk/Webster/Vas/Syall/Hale/Rosenbauer shall be able to transfer full torque of the engine to the axle. The PTO shall have an input to output ratio of minimum 1:1.62 so as to keep the engine rpm within the maximum torque range specified by the chassis/ engine manufacturer while the pump is operated at its duty point. The main casing shall be made in light aluminium alloy and shall be heat treated for additional strength, the bearing holders however shall be made in cast iron, and the gears shall be helical and shall be ground for noiseless operation. The gear shifting shall be of single lever type only and multiple linking to engage/disengage the pump side shall not be allowed. There shall be inbuilt self-locking arrangement to keep the unit firmly in the gear selected. The PTO shall have inbuilt water cooling arrangement to enable the usage of PTO in harsh environments on continuous basis. The max. Operating temperature of the oil shall not exceed 85-90°C (at NTP conditions) when the PTO is tested for endurance test with cooling arrangement. The PTO unit shall have provision to judge the oil level reasonably and shall be fitted with a magnetic drain plug along with breather and oil filler cap. Oil seals used shall be of highest quality and rotary seals/ water slingers shall be used over & above the oil seals to prevent dust/water entering into the oil seals. The gear shifting shall be achieved pneumatically with the aid of vehicle's air tank and an illuminated indication shall be given near the driver to indicate the completion of PTO engagement. A cable type flexible manual over ride for gear shifting shall also be provided near the driver's seat in case of loss of air pressure.
5	Control Panel	5.1 An adequately illuminated control panel shall be provided near the pump and easily accessible to the operator for operating different controls. The control panel of required size shall be made from 3.15 mm aluminium sheet (Aluminium sheets /chequered plates IS 737). 5.2 The control panel shall include the following items- 5.2.1 Throttle Control for engine 5.2.2 Pressure gauge : Low pressure 0 to 21 kg/Cm² (Glycerine filled); High pressure: 0 to 70 kg/cm²

		5.2.3 Compound gauge: Vacuum: 0 to 680 mm of Hg in Red. Pressure 0 to 10 kg/cm² in Black. 5.3 The pressure gauges shall be Glycerine filled with min 3" dia. Panel mounted. 5.4 High pressure hose reel circuit control 5.5 Change over lever from LP to HP mode located at convenient position. 5.6 LED level gauge/Clear acrylic glass tube, unbreakable type water level indicator calibrated on full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and empty.
6	High Pressure Hose Reel with Gun	6.1 Two high pressure hose reel 60 mtrs. shall be provided and fixed at suitable location preferably in lockers. These hose reels shall be connected to H.P. out let of pump with ball valve of suitable size. 6.2 The hose reel shall be made from carbon steel/Aluminium/Stainless steel/material with bearings/ bush made from gunmetal. 6.3 The design and size of hose reel shall be such that, it shall accommodate 60 mtrs. H.P. hose having 19.0 mm bore with quick connect couplings. The hose reel shall have 40kg /cm² working pressure and bursting pressure shall not be less than 120kg/cm² 6.4 Additional 60 mtrs hose with quick connect coupling (male & female) of above specifications shall be supplied loose, to connect the hose reel whenever required. The loose hose shall be stored in one of the locker during hose reel in winded condition. 6.5 The HP hose reel shall be provided with High Pressure fog/ Jet trigger type gun connect by quick connecting couplings. The gun shall be made from aluminium alloy with rubber grip handle. The inlet connection shall be of $\frac{3}{4}$ BSP (British Standard Pipe) and shall have leak proof rotating type hose connector. The gun shall be of constant flow type and shall have discharge capacity of 150 LPM approx. The gun shall have facility to set of either spray or jet pattern preferably in pistol grip. The gun shall have ability to work on pressure from 20 kg /cm² to 40 kg / cm² without affecting the discharge pattern. The weight of the gun assembly shall not be more than 3.0 kg.
7	Pump Test	The pump fitted on the vehicle shall be subjected to various tests as detailed below:- 7.1 The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 Kg/cm² to detect leakage, perforation etc. 7.2 The pump shall be run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After this test there shall not be any leakage of water through carbon seal. 7.3 The pump performance test will be carried out by running the pump at rated RPM and measuring the discharge at various pressures. 7.4 The pump will be subjected to Endurance test for a period of FOUR hours continuous running. The first three hours the pump shall deliver rated output of 4000 LPM at 8kg /cm² and next one hour will be 300 LPM at 35 Kg/cm² 7.5 During the endurance test the water shall not be replenished in the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standard recommendations for the continuous operation and engine should not show any sign of stresses.

		7.6 The primer shall be capable of lifting water at least 7.0 m, in not more than 36 seconds and preferably be fully automatic
8	Water Monitor	8.1 A water monitor of 2000 LPM capacity conforming to IS 8442 shall be mounted on the top of the vehicle between the driver cabin and water tank. 8.2 The monitor shall be of standard make. The output shall be set to three ranges varying from 900 to 2000 LPM. 8.3 The monitor shall be rotated 360° left and right and also move up and down. 8.4 The monitor shall be made from light alloy and shall be hard coated from inside to avoid abrasion and corrosion. 8.5 The monitor shall have horizontal reach of minimum 50 mtrs when supplied with water at pressure of 8 kg/cm² 8.6 The monitor shall be flange mounted with 80 mm butterfly valve provided at the bottom of monitor 8.7 The monitor pipeline shall be 'C' class galvanized pipe of 80 mm dia with suitable flanges. 8.8 The monitor shall be hydrostatically tested to the pressure of 16 kg/cm² 8.9 The monitor pipeline shall be supported suitably to avoid vibrations and cracking.
9	Electrical System	9.1 All the important electric circuit shall have separate fuses suitably indicated and shall be grouped into a common fuse box at an accessible position. The wiring shall be single pole with negative earth. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 9.2 Suitable sized wire shall be selected for different circuits considering the current consumption for that circuit. 9.3 All other light, dashboard light, cabin light, lockers lights shall be approved mark. 9.4 All the controlling switches of lights fitted on dashboard shall be of approved mark. 9.5 Two new Fog Lamps of approved make shall be provided and fitted on front bumper with controlling switch on dashboard. 9.6 Two rotating revolving beacon lamps of 24 volts, Amber colour lens duly mounted over the roof of cabin. 9.7 24 volts DC one mile range electric siren of standard make mounted on suitable place and heavy duty push button on driver and cleaner side. 9.8 Two-tone hooter cum P.A. System having 25 watt capacity with speaker mounted on the cabin roof and amplifier in the cabin. 9.9 Illuminated sign board with letter "FIRE" over the cabin.
10	Painting	10.1 The complete super structural members shall be painted with two coats of Red Oxide primer, and two coats of chassis Grey paint. 10.2 The complete external and internal aluminium panelling lockers shall be painted with two coats of Zinc Chromate paint. 10.3 The complete exterior of the vehicle shall be painted with two finish coats of "PO RED" Polyurethane" paint. The paint shade shall be similar to cabin shade.

		10.4 The complete under chassis painting shall be carried out. 10.5 The words "Central Industrial Security Force" Fire Service Training Institute "in English shall be painted on both sides of vehicle on the water tank in a suitable size letters in Golden Yellow paint with Black colour shading. NOTE: The name of "Central Industrial Security Force, Fire Service Training Institute." is given as example, the names of respective organisation will be incorporated accordingly.
11	Accessories	11.1 Quick removable type wire mesh guard shall be provided to wind screen glass. 11.2 Four aluminium hooks for keeping the uniform clothing shall be provided in driver's cabin. 11.3 A wireless set box made from 14 SWG aluminium sheet with lid shall be provided just behind the fireman seat with ½" wooden plank for fitting the wireless set. The design and mounting will be shown at the time of fabrication work.
12	Ladder Gallows	Gallows shall be provided to carry a 10.5 m, aluminium trussed type extension ladder. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.
13	Ladder	Trussed type ladder one no. as per approved specifications.
14	Stability	The stability of the vehicle shall be such that when fully laden and equipped (but excluding crew), the surface on which the vehicle stands is tilted to either side, the point at which overturning occurs shall not be less than 25 degree angle from horizontal.
15	Vehicle With Laden Test Fully	a) Gross vehicle weight shall be less than 25000 kg including crew, water and equipment. b) Maximum speed on level road, fully laden, 80 km/h. c) The appliance shall be capable of being started from rest on a gradient of 1 in 4. d) When travelling at 48 km/h on a level dry surface the foot brake shall be capable of stopping the vehicle within a distance of 15 m from the point at which the brake is applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
16	Workmanship & Finish	The vehicle shall be fabricated, painted with standard workmanship.

**TRIAL DIRECTIVES OF WATER TANKER 12KL CAPACITY WITH FIRE
FIGHTING PUMP**

Sl	Specifications	Qualitative Requirements	Trial Directives for BOOs
A	Scope of Supply	i) The chassis shall be supplied by the manufacturer. ii) A 6x2, full forward control, BS VI/latest version or equivalent with cowl chassis. iii) Fabrication and mounting of 12000 Ltrs capacity water tank as per specifications. iv) Supply and mounting of high & low pressure firefighting pump as per specification. v) Supply and mounting of water monitor.	The vehicle shall meet the requirement as per relevant standards and QRs.
B	Purpose	The Water Tanker shall be used to carry the water for fire fighting purpose. The pump will be driven by P.T.O	The vehicle shall meet the requirement as per relevant standards and QRs
C	Detailed specification		
1	Chassis	The chassis shall be suitable indigenous make as per following specifications suitable for mounting Water Tank having 12000 ltrs. Capacity with pump. The Water Tanker 12 KL Capacity with firefighting Pump shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended. 1.1 Make of the chassis: 6x2, 25T, 180 BHP (minimum), full forward control, cowl chassis, BS-VI or latest version emission ratio complaint/ any equivalent latest version chassis. 1.2 Type: 6x2, cowl chassis, full forward control, RHD, wheel base shall not be less than 4600 mm. 1.3 Engine: 6 Inline cylinder, water cooled, direct injection, turbo charged diesel engine developing minimum 180 B.H.P. with Bharat Stage VI/ equivalent latest version chassis.	shall meet the requirement as per relevant standards and QRs Shall be checked and tested physically and should meet the requirement as per relevant standards and QR. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified. shall meet the requirement as per relevant standards and QRs Shall be checked and tested physically and should meet the requirement as per relevant standards and QR. Necessary certificates from statutory authority as

			per QRs, wherever necessary, shall also be checked and verified.
		1.4 GVW: Shall not exceed maximum permissible limit weight of chassis.	shall meet the requirement as per relevant standards and QRs
		1.5 Fuel Tank: As per OEM	shall meet the requirement as per relevant standards and QRs
		1.6 Tyres & Wheels: As per OEM, Spare wheel : 1 No.	shall meet the requirement as per relevant standards and QRs
		1.7 Steering: Integral power steering	shall meet the requirement as per relevant standards and QRs
		1.8 Tools: a) Hydraulic jack 40 Ton with lever b) Wheel spanner with lever c) Standard Tool kit d) Tyre inflation hose.	shall meet the requirement as per relevant standards and QRs
		1.9 Manuals (I copy): a) Workshop manual b) Spare parts catalogue	shall meet the requirement as per relevant standards and QRs
		1.10 Driver Cabin: The chassis shall be fabricated for accommodation of 06 personnel including driver, Driver view mirror Cabin, windscreen, side windows, doors, adjustable driver seat, fixed Co-driver seat, wiper system, Horn, complete instrument cluster, preferably in PO RED colour. 1.11 The Angles and channels used in the appliance super structure shall be Zinc plated galvanized steel to ensure anti-corrosion protection and long term durability.	Shall be checked physically and should meet the requirement as per relevant standards and QRs.
2	Water Tank	2.1 The water tank shall have a capacity of 12000 Its when fully filled and made from SS sheet of grade 304 as per IS 6603, and Rectangular in shape with round corners. The tank shall be mounted on the chassis behind the driver's cabin. The detailed design drawing of the tank withits mounting shall be submitted with tender for scrutiny.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.

	2.2 The water tank shall be mounted behind the driver cabin with a gap of minimum 450 mm.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.3 The mounting of tank shall be directly on the chassis and as per the design approved by the chassis manufacturer.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.4 The tank shall be rectangular in shape, with inbuilt forming (reinforced ribs) on both the sides. The sheet thickness shall be as follows:- Bottom : 6 mm Sides/front/Rear/Top : 5 mm Baffles : 4 mm	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.5 Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.6 The tank construction shall be such that there shall be no leakage and shall have overlapped joints of 25.4 mm between the bottom sheet and side sheets. The bottom sheet corner shall be rolled upward up to a minimum of 300 mm height and shall be welded to side sheets. The dimensions of the tank shall be clearly stated in the offer along with detailed volumetric calculation.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.7 All the welding shall be by MIG welding process only. The welding of the tank shall be in such a manner that the first beading is from inside the shell and subsequent bead from outside the shell. The welded surface shall be cleaned of all slag, scale etc. There shall be minimum joints in the tank shell and hence plates used for fabrication of tank shall be of maximum size.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
	2.8 The water tank shall be mounted on the chassis on a sub frame using Rubber Metacones with sufficient saddle supports placed as per the availability of bolt holes in the chassis frame. The details shall be submitted along with the offer. These supports shall be fabricated from S.S. plate of minimum 10mm thick with a reinforcement plates of 6mm thick welded to tank shell from outside to the bottom sheet up to with continuous welding.	Shall be checked and should meet the requirement as per relevant standards and QRs.
	2.9 S.S. plate of suitable size and thickness shall be welded to the tank mounting pedestal for	Shall be checked and should meet the

		mounting the tank on mounting brackets provided in the chassis frame. The plates/brackets fitted to chassis frame shall also be provided with suitable gusset plates for reinforcement.	requirement as per relevant standards and QRs.
		2.10 The Tank shall be fitted on the chassis with the help of 5/8" dia. High tensile bolts with nylock nuts.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.11 The tank shall be mounted slightly sloping towards the rear so as to decant the tank completely.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.12 There shall be two circular manhole of 600 mm dia. Mounted on top of the tank.	Shall be checked physically
		2.13 The water tight manhole covers of SS with good quality of rubber gasket shall be bolted to the collar of manhole. The manhole covers shall be provided with round threaded blank cap with lugs of 10" dia. with rubber gasket.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.14 The tank shall be provided with suitable arrangement of baffle plates to prevent the surge of water when the vehicle is in motion and accelerating, braking in speed and covering. The arrangement of baffle plates shall be clearly shown in the drawing.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.15 The baffle shall be arranged in a manner to facilitate the movement of a person throughout the tank for cleaning and welding purposes.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		2.16 Suitable eyes shall provide on the shell of water tank to enable it to be lifted from the vehicle for repairs/replacement as and when required.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.17 The tank shall be fitted with 100mm dia. Overflow pipe of 'C' class galvanized taken down below the chassis but without reducing the ground clearance.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.18 The tank shall be fitted with four 63 mm instantaneous hydrant connection with non-return valve, closed to pump panel for filling the tank throughout 50mm above galvanized 'C' class pipe.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.19 A draw pipe of 100 mm dia. of 'C' class galvanized	Shall be checked and

		shall be taken from the tank to the pump suction inlet, incorporating 100 mm butterfly valve of flexible connection (Rubber Bellow) shall be provided to this pipe to take the vibrations. A suitable size sump shall be provided below the tank to connect water draw pipe with SS strainer.	should meet the requirement as per relevant standards and QRs.
		2.20 A drain cock with 50 mm suitable ball valve shall be provided at the bottom of water tank.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.21 A cat ladder shall be provided and fitted at the rear of water tank and fabricated out of 1" dia. M.S. tabular pipe and 2mm thick.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.22 The complete top of water tank shall be covered with 10SWG aluminium chequered plate and fixed to the frame fabricated from 40x40x4 mm S.S. angles properly welded to the tank shell. The chequered plates shall be bolted to this frame and shall be removable type.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.23 Suction hose brackets of aluminium sheet of 3.15 mm thick with suitable fastening arrangement shall be provided on the top deck to accommodate 4 Nos. 140 mm dia. and 2.5 mtrs. length suction hoses with male and female couplings.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.24 The locker of suitable size shall be provided with doors and locking arrangement on both sides. The location and size shall be shown in the drawing. These lockers will be used for keeping delivery hoses, accessories and high pressure hose reel. The structure of the locker shall be made from 40x40x4 mm thick S.S. angles with 16SWG aluminium panelling from outside and 16 SWG aluminium chequered plate from inside. The floor panelling of locker shall be 10 SWG aluminium chequered plates	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.25 Suitable rear mudguards made from 16 SWG M.S. sheet with reinforcing ribs shall be provided and supported on MS. brackets.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.26 A suitable towing hook shall be provided at the rear of vehicle.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		2.27 An additional draw pipe of 150 mm dia. of 'C' class galvanized incorporating 150 mm butterfly "Audco" make valve with gun metal, female	Shall be checked and should meet the requirement as per

		suction hose coupling shall be provided to the rear side of the vehicle.	relevant standards and QRs.
3	Fire Pump (Multi Pressure)	3.1 The water pump shall be centrifugal type, multi pressure made of bronze/gunmetal, having output capacity of 4000 LPM at 10 Kg/cm² and 300LPM at 35 Kg/cm² at 3 mtrs suction lift at NTP condition with automatic primer. The low pressure side will be of single stage and the high pressure side also with single stage having regenerative type impeller. 3.2 The pump shall be CE marked meet international standards and conforming to EN-1028 Part-I & II. 3.3 The pump shall comply following performance parameters. a) Normal Pressure output :4000 LPM at 10 kg/cm² b) High pressure output : 300 LPM at 35 kg/cm² c) Maximum pressure in :14kg/cm² (shut off pressure normal pressure mode). d) Maximum pressure in :45 Kgs/cm² high pressure mode. e) Deep lifting capacity of pump: 7mtrs in 36 sec. at NTP condition. 3.4 The overall pump shall be constructed from gunmetal. The normal (low) pressure impeller, volute, and impeller wearing shall be made from gunmetal confirming to Gr. II of IS 318/1981 and the regenerative type high pressure impeller shall be of Stainless steel. The pump shaft shall be made from stainless steel (Grade 04Cr18Ni10 of IS: 6603). The bearing housing will be made of C.I. and all the studs and bolts coming in contact with water shall be of stainless steel. The bearings used in the pump shall be of reputed make. 3.5 The normal and high-pressure impeller shall be mounted on a single shaft and normal (low) pressure impeller shall be dynamically balanced. 3.6 The pump shall be provided with self-adjusting mechanical carbon seal assy.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QR. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified. Shall be checked and tested physically and should meet the requirement as per relevant standards and QR. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified. Shall be checked and tested physically and should meet the requirement as per relevant standards and QR. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified. Shall be checked and should meet the requirement as per relevant standards and QRs. Shall be checked and should meet the

			requirement as per relevant standards and QRs.
		3.7 The pump shall be provided with an inbuilt filter of easily removable type, which shall filter the water before entering into the high pressure stage impeller.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		3.8 Operation of low pressure to high pressure or vice versa shall be possible by actuation of single lever.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		3.9 The pump shall have facility to operate low pressure and high pressure mode simultaneously or individually, While high pressure mode is in operation and delivering 300 LPM at 35 kg/cm ² , the pressure in low pressure side shall not exceed 8.5 kg/cm ² .	Shall be checked and tested physically and should meet the requirement as per relevant standards and QR.
		3.10 The pump shall be provided in built (integrated in the pump outlet manifold) Pressure Relief Valve (PRV) which shall operate automatically and shall not allow the high pressure to increase beyond 45 kg/cm ² .	Shall be checked and tested physically and should meet the requirement as per relevant standards and QR.
		3.11 The size of high-pressure outlet shall be of 35 mm connected to high pressure hose reel.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		3.12 The thermal relief valve (TRV) shall be provided and fitted in the pump housing, which will open when both deliveries (HP and LP) are shut off for long time to control the temperature of pump water. The Thermal Relief Valve (TRV) should open at 60°C and shall reset automatically when the temperature of water is within limit.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QR.
		3.13 The pump design shall be modular type and shall not have gaskets/packing. The arrangement shall be such that the carbon seal can be attended/removed without removing the pump body. The pump shall be provided deep groove heavy duty dual angular contact bearing immersed in oil bath.	Shall be checked and should meet the requirement as per relevant standards and QRs.
		3.14 The pump shall be provided with one suction inlet of 140 mm dia having round threads conforming to IS:902 of 1974 and four numbers of 63 mm delivery outlets (IS:903) having screw down type quick closing clack valve (IS:4928) fitted with instantaneous couplings as per IS 903:1993. Blank caps fastened with chains and incorporating means to relieve pressure between the valve and the cap	Shall be checked and should meet the requirement as per relevant standards and QRs.

		shall be provided one for each delivery valve and one 38 mm outlet with ball valve and female instantaneous coupling. The delivery valve screw shall not be with gland. The high pressure outlet shall not less than 25mm and shall either be flange or screw type.	
		3.15 The efficiency of the pump shall be such that the power required shall not be more than available with the chassis at safe RPM for stationary and continuous operation.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QR.
		3.16 The pump shall be rear mounted connected to P.T.O by propeller shafts and universal and slip joint.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		3.17 If required the pump shall be provided with suitable ratio inbuilt gear box to match the PTO rpm and required pump rpm.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
		3.18 All the valves used shall be of any standard make with all the piping of required size of 'C' class Galvanized.	Shall be checked physically and should meet the requirement as per relevant standards and QRs.
		3.19 The pump shall be fitted with inbuilt twin piston reciprocating type priming system capable of priming the pump from 7 meters in not more than 36 seconds, when tested with the 140 mm suction hose at NTP conditions and considering the allowances as stated in IS: 950-2012. The pump shall attain a dry vacuum of 620 mm of Hg. The entire priming system shall be constructed in stainless steel and shall be actuated by an electromagnetic clutch immersed in oil bath of pump's bearing housing. Arrangement shall be made to actuate the primer in Manual and AUTO modes. When operating in Manual mode primer should be engaged simply by pressing a single button, only when it is needed. When operating in Auto mode, primer must be internally actuated and must automatically re-engage when pressure is lost. However, in both operating modes the primer shall disengage automatically at a pump discharge pressure of 1.5 to 2.0 kg/cm ² . The primer deactivation shall be controlled directly by a pump pressure sensing device. Priming system driven by	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.

		any external belts/chain is not acceptable.	
		3.20 The pump with its fitment shall be tested hydrostatically to 1.5 times the working pressure at the pump i.e. for low pressure side it shall be tested to 21 Kg/cm ² and high pressure side will be tested to 52 Kg/cm ² . This testing shall be carried out in presence of authorized representative of CISF and certificate to this effect from pump manufacture shall be submitted.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
4	Power Take Off (PTO)	Split shaft Power Take Off shall be mounted at a suitable location on the chassis. The power take off shall be mounted on minimum two type foundation using rubber/ flexible mounts to isolate the PTO vibrations from the chassis and shall be designed to carry the unit weight and torque reactions, to constrain the PTO so as not to move significantly out of position, to allow chassis flexion. In no case welding/drilling shall be allowed on the chassis while mounting the PTO. Suitable sized U bolts may however be used for this purpose. The PTO alignment shall be in line with the existing drive line as far as possible. The new propeller shafts shall be free from welding defect and a spline and yoke arrangement shall be used. A general layout drawing of the PTO mounting shall be enclosed with the technical offer without which the tender shall not be considered. All the propeller shafts on the throughput side as well as at the pump drive side must be balanced to suitable standards.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
		POWER TAKE OFF UNIT: The power take off unit of make Firehawk/Webster/Vas/Syall/Hale/Rosenbauer shall be able to transfer full torque of the engine to the axle. The PTO shall have an input to output ratio of minimum 1:1.62 so as to keep the engine rpm within the maximum torque range specified by the chassis/engine manufacturer while the pump is operated at its duty point. The main casing shall be made in light aluminium alloy and shall be heat treated for additional strength, the bearing holders however shall be made in cast iron, and the gears shall be helical and shall be ground for noiseless operation. The gear shifting shall be of single lever type only and multiple linking to engage/disengage the pump side shall not be allowed. There shall be inbuilt self-locking arrangement to keep the unit firmly in the gear selected. The PTO shall have inbuilt water cooling arrangement to enable the usage of PTO in harsh environments on continuous basis. The max. Operating temperature of the oil shall not exceed 85-90°C (at NTP conditions) when the PTO is tested for endurance test with cooling arrangement. The PTO unit shall have provision to judge the oil level reasonably and shall be fitted with a magnetic drain	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.

		plug along with breather and oil filler cap. Oil seals used shall be of highest quality and rotary seals/ water slingers shall be used over & above the oil seals to prevent dust/water entering into the oil seals. The gear shifting shall be achieved pneumatically with the aid of vehicle's air tank and an illuminated indication shall be given near the driver to indicate the completion of PTO engagement. A cable type flexible manual over ride for gear shifting shall also be provided near the driver's seat in case of loss of air pressure.	
5	Control Panel	5.1 An adequately illuminated control panel shall be provided near the pump and easily accessible to the operator for operating different controls. The control panel of required size shall be made from 3.15 mm aluminium sheet (Aluminium sheets /chequered plates IS 737). 5.2 The control panel shall include the following items- 5.2.1 Throttle Control for engine 5.2.2 Pressure gauge : Low pressure 0 to 21 kg/Cm² (Glycerine filled); High pressure: 0 to 70 kg/cm² 5.2.3 Compound gauge: Vacuum: 0 to 680 mm of Hg in Red. Pressure 0 to 10 kg/cm² in Black. 5.3 The pressure gauges shall be Glycerine filled with min 3" dia. Panel mounted. 5.4 High pressure hose reel circuit control 5.5 Change over lever from LP to HP mode located at convenient position. 5.6 LED level gauge/Clear acrylic glass tube, unbreakable type water level indicator calibrated on full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and empty.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
6	High Pressure Hose Reel with Gun	6.1 Two high pressure hose reel 60 mtrs. shall be provided and fixed at suitable location preferably in lockers. These hose reels shall be connected to H.P. out let of pump with ball valve of suitable size. 6.2 The hose reel shall be made from carbon steel/Aluminium/Stainless steel/material with bearings/ bush made from gunmetal. 6.3 The design and size of hose reel shall be such that, it shall accommodate 60 mtrs. H.P. hose having 19.0 mm bore with quick connect couplings. The hose reel shall have 40kg /cm² working pressure and bursting pressure shall not be less than 120kg/cm² 6.4 Additional 60 mtrs hose with quick connect coupling (male & female) of above specifications shall be supplied loose, to connect the hose reel whenever required. The loose hose shall be stored in one of the locker during hose reel in winded condition. 6.5 The HP hose reel shall be provided with High	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.

		Pressure fog/ Jet trigger type gun connect by quick connecting couplings. The gun shall be made from aluminium alloy with rubber grip handle. The inlet connection shall be of $\frac{3}{4}$ BSP (British Standard Pipe) and shall have leak proof rotating type hose connector. The gun shall be of constant flow type and shall have discharge capacity of 150 LPM approx. The gun shall have facility to set of either spray or jet pattern preferably in pistol grip. The gun shall have ability to work on pressure from 20 kg /cm² to 40 kg / cm² without affecting the discharge pattern. The weight of the gun assembly shall not be more than 3.0 kg.	
7	Pump Test	The pump fitted on the vehicle shall be subjected to various tests as detailed below:- 7.1 The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 Kg/cm² to detect leakage, perforation etc. 7.2 The pump shall be run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After this test there shall not be any leakage of water through carbon seal. 7.3 The pump performance test will be carried out by running the pump at rated RPM and measuring the discharge at various pressures. 7.4 The pump will be subjected to Endurance test for a period of FOUR hours continuous running. The first three hours the pump shall deliver rated output of 4000 LPM at 8kg /cm² and next one hour will be 300 LPM at 35 Kg/cm² 7.5 During the endurance test the water shall not be replenished in the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturer's standard recommendations for the continuous operation and engine should not show any sign of stresses. 7.6 The primer shall be capable of lifting water at least 7.0 m, in not more than 36 seconds and preferably be fully automatic	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
8	Water Monitor	8.1 A water monitor of 2000 LPM capacity confirming to IS 8442 shall be mounted on the top of the vehicle between the driver cabin and water tank. 8.2 The monitor shall be of standard make. The output shall be set to three ranges varying from 900 to 2000 LPM. 8.3 The monitor shall be rotated 360° left and right and also move up and down. 8.4 The monitor shall be made from light alloy and shall be hard coated from inside to avoid abrasion and corrosion. 8.5 The monitor shall have horizontal reach of	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.

		minimum 50 mtrs when supplied with water at pressure of 8 kg/cm² 8.6 The monitor shall be flange mounted with 80 mm butterfly valve provided at the bottom of monitor 8.7 The monitor pipeline shall be 'C' class galvanized pipe of 80 mm dia with suitable flanges. 8.8 The monitor shall be hydrostatically tested to the pressure of 16 kg/cm² 8.9 The monitor pipeline shall be supported suitably to avoid vibrations and cracking.	
9	Electrical System	9.1 All the important electric circuit shall have separate fuses suitably indicated and shall be grouped into a common fuse box at an accessible position. The wiring shall be single pole with negative earth. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 9.2 Suitable sized wire shall be selected for different circuits considering the current consumption for that circuit. 9.3 All other light, dashboard light, cabin light, lockers lights shall be approved mark. 9.4 All the controlling switches of lights fitted on dashboard shall be of approved mark. 9.5 Two new Fog Lamps of approved make shall be provided and fitted on front bumper with controlling switch on dashboard. 9.6 Two rotating revolving beacon lamps of 24 volts, Amber colour lens duly mounted over the roof of cabin. 9.7 24 volts DC one mile range electric siren of standard make mounted on suitable place and heavy duty push button on driver and cleaner side. 9.8 Two-tone hooter cum P.A. System having 25 watt capacity with speaker mounted on the cabin roof and amplifier in the cabin. 9.9 Illuminated sign board with letter "FIRE" over the cabin.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs. Necessary certificates from statutory authority as per QRs, wherever necessary, shall also be checked and verified.
10	Painting	10.1 The complete super structural members shall be painted with two coats of Red Oxide primer, and two coats of chassis Grey paint. 10.2 The complete external and internal aluminium panelling lockers shall be painted with two coats of Zinc Chromate paint. 10.3 The complete exterior of the vehicle shall be painted with two finish coats of "PO RED"	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.

		Polyurethane" paint. The paint shade shall be similar to cabin shade. 10.4 The complete under chassis painting shall be carried out. 10.5 The words "Central Industrial Security Force" Fire Service Training Institute "in English shall be painted on both sides of vehicle on the water tank in a suitable size letters in Golden Yellow paint with Black colour shading. NOTE: The name of "Central Industrial Security Force, Fire Service Training Institute." is given as example, the names of respective organisation will be incorporated accordingly.	
11	Accessories	11.1 Quick removable type wire mesh guard shall be provided to wind screen glass. 11.2 Four aluminium hooks for keeping the uniform clothing shall be provided in driver's cabin. 11.3 A wireless set box made from 14 SWG aluminium sheet with lid shall be provided just behind the fireman seat with ½" wooden plank for fitting the wireless set. The design and mounting will be shown at the time of fabrication work.	Shall be checked and tested physically and should meet the requirement as per relevant standards and QRs.
12	Ladder Gallows	Gallows shall be provided to carry a 10.5 m, aluminium trussed type extension ladder. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.	Shall be checked physically
13	Ladder	Trussed type ladder one no. as per approved specifications.	Shall be checked physically and tested physically and should meet the requirement as per relevant standards and QRs.
14	Stability	The stability of the vehicle shall be such that when fully laden and equipped (but excluding crew), the surface on which the vehicle stands is tilted to either side, the point at which overturning occurs shall not be less than 25 degree angle from horizontal.	Shall be checked physically and tested physically and should meet the requirement as per relevant standards and QRs.
15	Vehicle Test Fully With Laden	a) Gross vehicle weight shall be less than 25000 kg including crew, water and equipment. b) Maximum speed on level road, fully laden, 80 km/h. c) The appliance shall be capable of being started from rest on a gradient of 1 in 4. d) When travelling at 48 km/h on a level dry surface the foot brake shall be capable of stopping the vehicle within a distance of 15 m from the point at which the brake is applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface	Shall be checked physically and tested physically and should meet the requirement as per relevant standards and QRs.

		gradient of 1 in 4 when in neutral gear.	
16	Workmanship & Finish	The vehicle shall be fabricated, painted with standard workmanship.	Shall be checked physically and should meet the requirement as per relevant standards and QRs.

QUALITATIVE REQUIREMENTS (QRs) OF HYDRAULIC PLATFORM 32 MTRS

Sl	Parameter	Qualitative Requirement/ Specification
1	SCOPE	1.1 This specification covers hydraulic platform unit with a working height of 32M working height shall be measured as the height from ground level to cage base plus 1.5 M. The operational stability shall be safe on an inline of 7°. The structural strength of booms shall be secure and designed for 1.5 times rated load at prescribed reach. The manufacturer of the hydraulic platform shall be an ISO: 9001 certified Company who meets the eligibility conditions. 1.2 The scope of the contract includes the manufacture of the hydraulic platform step by step mounting of the same on purchaser's chassis, bodywork and fitment of accessories. Inspection, supply and training of operators nominated by purchaser as well as rendering warranty services. 1.3 The Hydraulic Platform shall be designed as per the designed, operational stability and structural strength based on the criteria laid in International/National norms and other norms and standards applicable for elevated raised platforms used for Fire Fighting and rescue operations. 1.4 The manufacturer/supplier should have supplied similar Hydraulic Platforms of minimum 32M height and above in past to the emergency/fire services with satisfactory performance. 1.5 The manufacturer/supplier should have the facility of trained manpower for repair and maintenance of Hydraulic platform through its authorized sales/service agents in India. Or they should confirm in writing that they will establish service center in India and shall provide support to the vehicle for the period of warranty and extended support for further period thereafter, either in the form of AMC (Annual Maintenance Contract) or paid service.
2	Chassis	2.1 The Chassis shall be 6x4, having approx., 5000 mm Wheel Base (as per Central Motor Vehicle Rules 1989) with fully factory built cabin and suitable capacity PTO. The Vehicle Chassis shall be a Right Hand Drive and shall comply emission norms in force. 2.2 The Chassis shall be homologated from the appropriate authority in India. 2.3 The engine shall be six cylinders, inline, Diesel with direct injection, turbo charges with intercooler. 2.4 The engine-developing minimum 250 HP (184KW) at 2000 rpm approx. or higher capacity, which will meet operating parameters. 2.5 The clutch shall be single plate, dry type, and power assistant. 2.6 The gearbox shall be synchromesh type with crawler gear manual gearbox or automatic gearbox. 2.7 Rear Axle shall be Tandem Bogie type with Hub reduction and differential lock between the wheels and axles. 2.8 Chassis frame shall be 'C' Channel section made of high strength steel with cross members. 2.9 The Steering shall be integral power steering with collapsible steering wheel and column. 2.10 The Front Suspension shall be leaf spring type and the rear suspension shall be reverse scamel type with shock absorber in the front or equivalent. 2.11 The Brakes shall be dual circuit airbrakes, with parking brakes acting on rear wheels.

		2.12 Fuel Tank – Capacity shall be minimum 300 ltrs with lockable fuel cap. 2.13 The Chassis shall be provided with 11.00 Rx 20 radial tyres – 11 nos. with spare tyres or equivalent. 2.14 The chassis shall be provided with single day type cab with RED colour, made from high strength steel fully trimmed, external panels hot dip galvanized with hydraulic cab tilting mechanism. The Cab suspension shall be provided with coil spring and shock absorber. The cab shall be provided with adequate ventilation, rear view mirrors, windscreen and windows, adjustable driver seat, wiper system along with all other standards fitments. 2.15 The Electrical system shall be 24 V, with suitable capacity batteries & Alternator for charging the batteries. 2.16 The chassis shall be supplied with standards tool kit, hydraulic jack of 20 Ton capacity, operator & workshop manuals. 2.17 The Chassis shall be fitted with gearbox mounted, suitable capacity Power Take Off, Unit to drive the hydraulic pump for boom movements. 2.18 The Chassis shall comply all the provisions and enactment of Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989 and any amendment from time to time. The Hydraulic Platform shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended. The unit shall meet the following operating parameters:- - Minimum working height from ground level....32.0M. - Minimum cage floor height from ground level.....30.0M - Minimum safe working load (without water monitor in operation).....400 kg - Minimum safe working load (with water monitor in operation).....200 kg - Minimum reach* (*from slew center) to cage corner at 400 kg....18.0M - Continuous unlimited rotation in both directions-360°+endless - Maximum outrigger width with both jacks extended (as per design)....6M - Cage rotation (left and right).....45° - Full working load permitted in wind speed upto.....12.5M/Sec - Max time for reaching to maximum height and vice-versa.....90 seconds. - Max time for turning through complete circle...120 seconds. - Max time for extending jacks on both sides.....30 seconds. - Total operating time, including stabilizing, cage from rest and 90°turntable/ turret rotation.....180 seconds (Minimum)
3	Main Frame	The main frame shall be a fully welded rectangular steel structure fixed on to the chassis frame with bolts and springs so as to allow performance and durability of the chassis without causing stress concentration in the chassis beam. The hydraulic tank of suitable capacity shall be integrated into the main frame with proper heat decapitation facilities.
4	Stabilizing System	4.1 The stabilizing and levelling system of the unit should consist of four vertical/horizontal jacks, which allow safe levelling of the whole unit and maximum stability in all permitted working conditions (operating on a slope of 7 degrees). The four welded box section outrigger beams slide

	inside the outrigger housings and extend and retract by means of four double acting hydraulic cylinders placed inside the beam housing. 4.2 The following jacking positions shall be feasible: a) <u>Outrigger beams fully extended on bothsides:</u> This is normal working position, which allows maximum outreach at full working load over 360° continuous unlimited turntable/turret rotations and the use of the monitor within its full capacity and working range. b) <u>Outrigger beams fully extended only on one side with turntable rotation interlock:</u> In order to reduce the jacking width in narrow spaces, outrigger beams should be extended only on one side, either left or right in working direction. A safety system on the turntable should allow only 180° rotation over the working direction and automatically stop its motion once the center line of the chassis has been reached, preventing rotation of the turntable over the not extended side. Outreach and height over the working side should not be affected. 4.3 <u>Vertical jacks with positive safety lock valves and self-aligning feed plates:</u> Each outrigger beam should be equipped at its end with a hydraulic jacking cylinder with self-aligning ground contact foot plate (by means of movable joint) capable of lifting the unit completely off the ground, level the machine and keep it in its position even under continuous load conditions. Each jacking cylinder should be attached to a lock valve that prevents creeping in case of pressure failure. 4.4 <u>Automatically switched on jack blinking lights:</u> Each vertical jacking cylinder should be equipped, at its upper front side, with a grill protected red blinking light, which is automatically switched on when the PTO control in the truck cab is engaged. 4.5 <u>Additional square spreader plates:</u> In order to reduce the specific ground pressure of the jacks without exceeding the vehicle width when in stowed transport position, four separate foot plates of adequate size will have to be provided and stowed near outrigger. A handle on each plate allows for immediate and easy positioning under the jacks. 4.6 <u>Rear center mounted outrigger control box:</u> The outrigger control should include 2 systems: manual and automatic. When in automatic control mode, one button controls to automatically stabilize vehicle in safe working condition. When in manual control mode, the vertical jacks and outriggers can be controlled, one by one, independently or simultaneously. The lockable outrigger control box should be located at the rear of the vehicle. The control box should include a spirit levelling gauge, a green indicator light 'platform system on', a pushbutton control for the activation of the stand-by electro-hydraulic pump, engine start/stop button, Emergency stop button. Hour meter. A display unit shall be installed at the outrigger control panel, showing the operator the maximum outreach system at the particular setup position. This system is to include normal jacking and one sided jacking. 4.7 <u>Outrigger stowed indicator light in truck cab:</u>
--	---

		In order to control the transport stowage of the outriggers from the cab before departure, an indicator light should be provided on the cab dashboard, which indicates to the driver that the outrigger beams and jacks have been retracted and are in the transport position. 4.8 <u>Outrigger safety interlocks:</u> A safety system inhibits any operation of the platform before the outriggers have been set. Outrigger controls are isolated and cannot be moved if the boom is not in transport position and has not activated the boom rest switch. Reciprocally, the boom movement should not be activated until and unless the outriggers have been activated and properly deployed. 4.9 <u>Level sensor with audible alarm:</u> A level sensor measures both the fore and aft and sideways inclination of the unit and gives audible warning if the permitted level tolerance is exceeded.
5	Bodywork and equipment locker	A steel framework structure panelled by steel/aluminium should be provided. The entire framework should be treated for corrosion resistance before panelling. Two lockers on each side of the vehicle with low and easy access should be provided. The doors/shutters to lockers must be dust and water-resistant. They shall have drain holes to drain away water from the stowed equipment. Lockers shall be equipped with lights so that the operator can have better visibility while stowing the equipment. There shall be two side ladders, one on either-side to provide access to the main work deck.
6	Booms	6.1 The hydraulic platform shall be of telescopic cum-articulated design. So as to meet operating parameters such as safe working load, working height and outreach as well as 'up, over and down' access at building. All booms should be made from high strength welded box section in steel construction-with-internal treatment against corrosion. One Amber light at joint of main boom and tip boom should be provided. The cage pivot should be mounted at the top end of the tip boom and at the top of the cage for inherent tilt safety, which allows for 45° right/left cage swivelling. A well visible matching sign on the cage support should indicate when the cage is horizontally aligned for its stowing position. The cage shall be stowed between the cabin and turn table. An indicator light on both control stations should be provided to indicate when the boom is horizontally aligned and in matching position above the boom rest for its stowage. 6.2 The booms shall be box/trapezoidal section type, welded construction; welding method shall be of latest technology to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels shall be used for load bearing structure. 6.3 The main boom elevation and lowering shall be controlled by two hydraulic cylinders that both have their separate safety devices and can alone carry the entire load in case of failure of any one of the cylinders. The first boom shall be able to elevate in the range of 00 to 83° angle approx. 6.4 All telescopic sections of the first boom shall move in a synchronized way and there shall not be any intermediate jerks during extension/retraction. Automatic slowdown mechanism at the beginning of the movement as well as end of the movement shall be provided to all boom movements. All the moving sections shall be fitted with adjustable

		guides/rollers to provide smooth and accurate movement. Various maintenance points shall be located well at hand either outside the boom or behind easily removable covers. 6.5 All booms shall be internally and externally primed and painted for long life span, treated against rust and corrosion.
7	Turntable	7.1 The turntable should be powered by a hydraulic motor. The 360° continuous endless clockwise and anti-clockwise rotating turntable should be mounted over sub-frame at chassis rear so as to keep overall transport height of the folded platform to minimum The turntable should be bolted to a slew ring with High tensile bolts. 7.2 The hydraulic motor driving the slew system connected either directly or through suitable reduction gearbox should have adequate power to rotate the turntable in any position with full payload in the Cage. The slew brake should always be in permanently and automatically applied until the slew motion control of the turntable is activated, thus releasing the brake with hydraulic pressure. The fail safe brake should be able to hold the turntable in locked position, with any boom position when hydraulic power is removed. 7.3 A well designed rotary connector mounted under the platform turntable should convey water through 80mm stainless steel or equivalent water way, hydraulic and electric power from the truck chassis to the turntable and up to the cage at boom end, While allowing for endless unrestricted rotation of the turntable over 360° in both directions. 7.4 There shall be provision for the manual rotation of turntable in case of failure of hydraulic system. 7.5 Pins securing the hydraulic cylinders to boom and turntable shall be properly installed and secured. 7.6 The hydraulic hoses, tubings and connections provided in the turntable shall be free from kinks, chaffing or leaks.
8	Working Cage	8.1 The robust and spacious fire fighting cage made of tubular steel/aluminium profiles should have approx. 2 sq.mtr floorspace offering ample room for up to four fully equipped fire men (two operating with monitor). 8.2 Minimum safe cage working load should be 400 kg and minimum safe cage working load with monitor operational should be 200kg. 8.3 It should be approximately 2m long, 1m wide and 1.1m high. A 1.1m high handrail around the cage should be provided to protect people in the cage. The cage should be equipped with a closed footboard all around the cage floor to prevent objects lying on the cage floor to fall from the cage. 8.4 One- side and one front entrance to the cage are to be provided. The front entrance should comprise of an in wards opening gate with spring closing system, whereas the side entrance comprise of full width opening with fall bar protection. The cage floor should be covered with non-slip steel/aluminum plates with draining holes or small mesh expanded grill floor plates. 8.5 A front drop down platform (1.45m x 0.45m) with quick release and 180 kg capacity is to be provided to form a bridge between the cage and building for firefighting or rescue purpose. 8.6 The water line with shut valve and a flange for the installation of the 63 mm manual control water monitor should end at the bottom front inside center of the cage. A second 63 mm outlet with shut valve is to be

		provided under the monitor for an additional hose with hand branch or a second 'clamp-on' monitor. A multiple water spraying nozzles with shut valve from the cage should be provided at the bottom of the cage for self-protection of the crew from excessive heat and smoke, by acting as a water curtain heat protection 'shield'. 8.7 Direct access to the cage from ground or the vehicle deck without auxiliary ladder: The two entrances provided should allow for a direct and immediate access to the cage with full equipment without the help of an auxiliary ladder from ground level (with lowered tip boom) or from the vehicle deck (with boom in stowed position). 8.8 Automatic cage levelling with emergency over-ride: Cage levelling system should be fully automatic. The cage should remain constantly in a levelled horizontal position referred to the ground, irrespective of boom position and load in cage. In the unlikely event of failure of automatic cage levelling system, an emergency lever, manually controlled, should actuate a hydraulic mechanism to enable crew in cage to level cage directly. 8.9 Independent horizontal cage rotation: The slew unit of the cage should be set for a rotation of min, 45° left and 45° right directions. This rotation is to be independent of the turntable slew. The cage rotation control should be available from the cage and turntable control. The rotation balconies, windows, roof etc. from the front cage gate, irrespective of the boom position, in case of fire fighting and rescue operations 8.10 Cage control box: The cage control should be similar to turn table control. It should also include the same LCD display as main control. The dust and water resistant control box in the cage should contain all necessary control elements. A cover made from weather resistant material is to be provided for protection of the control box when not being used. 8.11 Proportional controls: - The lever controls for boom and slew functions shall be joystick type proportional controls, ergonomically positioned in weatherproof and spray water resistant control box. Easy interpretable symbols identifying the function of each control lever/button, without language barrier shall be displayed on panel. - A LCD display panel should be provided that permanently indicates the boom height and outreach on a clearly visible and rear-illuminated type display, with illumination adequate for night display. The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps to sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. - Other controls are to be controlled by an additional control lever or switch control. All controls should be of 'dead-man' type and return automatically to neutral position, stopping the motion, if the control is
--	--	--

		abandoned. 8.12 A cage collision guard shall be provided and shall be integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. The system shall stop all movements. 8.13 An emergency stop button shall be provided on both control panels to provide immediate and complete "freezing of all systems in case of an unexpected emergency. 8.14 There shall be a "bleed down" system, which can be operated from working cage and turntable control panel to lower the booms and bring the working cage down onto the ground even if hydraulic pressure or electric power is not available with rotation mechanism. 8.15 Electric sockets in cage: The following electric outlets/connections should be provided in the cage- • 1 No. 24V DC socket that is directly fed by the vehicle electric system. • 1 No. 220 V AC socket with connection line from slew unit up to cage • 2 Nos. 24 Volts X 70 Watts lights mounted on swivelling brackets should be fitted on the cage railing to provide sufficient lighting and safety to the crew during search and rescue operation at night. Two more floodlights will be installed at the rear of the body to provide ground lighting.
9	Intercommunication to the turntable control station	The hands free loudspeaker type intercom transmitter and receiver must be placed on the rear center of the cage and connected by a shielded cable with an identical second set placed on the turret of the turntable. The intercom system should allow, once switched on, loudness adjustment and free communication between base control and cage control positions.
10	Monitor	10.1 Water monitor shall be connected to the piping system and shall be mounted outside the cage in a suitable position so that the entire cage floor area can be fully utilized. 10.2 The monitor shall be made of light alloy and fitted with jet/ fog nozzle with maximum capacity of 2000 LPM at 8 kgf/cm². 10.3 The Monitor shall have Horizontal rotational movement to left and right of minimum 160° and also vertical 65° and 15° down movement minimum. 10.4 There shall be ball valve type control valve for the monitor and the monitor shall be manually operated.
11	Rescue Ladder	The unit must be equipped with a Telescopic type Aluminum rescue ladder; the width of top section shall be approx 490mm and approx 250 mm railing height. The distance between each rung should be 280mm minimum and shall not be more than 300 mm. To enable an easy access from ladder to the cage, there should be a suitable drop down platform at the cage. The step section should be made of special profile with non-slip external surfaces. The ladder system must be attached onto the side of the booms and shall give direct access from ground to the cage for rescue purposes. In case of platform of telescopic design, the ladder movement shall be synchronized with boom telescopic movement.
12	Hydraulic System	12.1 The Hydraulic power shall be provided by a reliable and adequate capacity variable displacement axial piston pump, which shall be driven by the vehicle power take off. 12.2 The filtration system of the hydraulic oil shall consist of suction strainer in the suction line, pressure filters in each pressure circuit, return filter in return line and air filter on the reservoir. All the pressure filters shall have blockage indicator.

		12.3 All hydraulic cylinders shall be double acting with hard chrome plated piston rods and shall be fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders. 12.4 Hydraulic oil tank shall be integrated or fitted into the main frame and shall have proper heat dissipation system. The tank shall be fitted with oil level gauge, temperature gauge, and suction connections with closing valves for easy maintenance and draining outlet with closing valve. 12.5 All the controls for the boom movement and slew functions shall be joystick type proportional controls, ergonomically designed in weatherproof and spray water resistant control box. Easy interpretable symbols identifying the function of each control lever/button, in English language shall be displayed on panel. 12.6 The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps too sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. All the control levers shall be dead man's type and should return to zero automatically when released. 12.7 Pressure measuring points with quick coupling for connection of a manometer supplied with the unit are to be provided for each hydraulic circuit. All platform motions are to be performed either by double acting hydraulic cylinders or hydraulic motors with automatic brake. 12.8 Hoses shall be tested to twice rated-pressure and the bursting pressure shall be at least four times the rated pressure.
13	Backup system	The hydraulic platform should be supplied with 3 Nos. (three) different and independent back-up systems, which guarantee that the cage, booms, slew, outriggers and vertical jacks can be operated, for stowing purpose, even if any failure occurs to the chassis engine or main pump. 13.1 AUXILIARY ENGINE DRIVEN PUMP: The unit should be fitted with suitable Diesel/ Petrol powered auxiliary engine with self start facility mounted at a suitable location. It should allow the use of the platform, for stowage only, when the main truck engine fails. The on/off controls for this engine shall be provided on all control panels. 13.2 BATTERY DRIVEN HYDRAULIC PUMP: The 24V battery driven stand-by electro-pump shall be provided to allow retraction and stowage of the unit in transport position from all control stations. This pump shall also feed the hydraulic oil to the cage levelling mechanism for manual levelling of the cage. 13.3 MANUAL OVER-RIDE - In case of complete failure of electric and hydraulic power a manually operated hand pump or other suitable arrangement shall be provided for all boom and outrigger movements for stowing the unit.
14	Electrical System	a. 14.1 The electrical system shall be 24V DC from the chassis battery, which is kept, charged when the engine is running. All electrical circuits shall be provided with fuses. Output sockets for battery supply power shall be provided at the turntable and cage. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit

		pipng to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 14.2 When the main current is switched on, amber blinking lights, mounted on the outriggers, underneath the working cage and booms shall be automatically switched on. Amber colored rotating beacons on each side of the driver's cabin roof shall be provided. The switching controls shall be in the driver's cabin. 14.3 <u>SIREN AND PUBLIC ADDRESS SYSTEM:</u> An electric siren unit will be fitted at a suitable place on vehicle cab. Control, panel for the same will be suitably located in the driver's cabin and siren shall have fast (yelp) and slow (wail) sounds. Microphone shall be fitted with push to talk switch, to allow public address message to override the siren function. 14.4 Two yellow fog lights shall be mounted at front bumpers or other suitable locations and controls provided in driver's cabin.
15	Turntable and cage control panel	15.1 Control panels shall be provided at the turntable as well as at the cage. A convenient sitting arrangement for the operator shall be provided at the turntable. Both the panels shall be similar to avoid confusion, with over riding controls provided at the turntable control. 15.2 The control station shall be fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position shall be covered by nonslip aluminium plate. 15.3 The control panel at turn table and cage shall be exactly alike which will reduce the risk of confusion amongst operators under stress or even panic. Both the control panels shall be provided with weather protection covers/box. 15.4 The turntable control panel shall have a change over switch to select the control station from which the operation is performed. 15.5 Both control panels shall be fitted with following warning, indication and control devices, and shall be marked by clear symbols for easy recognition 15.5.1 Visual and audible indication for exceeding safe working load in the cage. 15.5.2 Visual warning for activation of working cage collision guard system. 15.5.3 Visual indication for ground pressure of the outriggers. 15.5.4 Visual indication for the rescue ladder "Rungs in alignment". 15.5.5 Visual indication for the center position of the booms. 15.5.6 Visual indication for the center position of the working cage. 15.5.7 Starting and stopping of chassis engine. 15.5.8 Switch, for the operating battery driven pump for hydraulic back-up system 15.5.9 Starting and stopping switch for standby diesel engine for hydraulic backup system 15.5.10 Joystick control levers for each movement. 15.5.11 Push buttons/joystick for cage slewing. 15.5.12 Emergency stop button. 15.5.13 Overriding of the automatic working cage levelling system. 15.5.14 Manual operation for the working cage levelling system. 15.5.15 Switches for activating the bleed down system near turn table control panel.

		15.5.16 LCD display monitors indicating- • Main boom length. • Main boom angle. • Cage load. • Outreach
16	Indicators and control in driver's cabin.	The following indicators and controls shall be provided in driver's cabin- 1. Visual warning for booms and outriggers not intraveling position. 2. Visual indication for any of the lockers not in closed position. 3. Visual indication for engagement of PTO. 4. Hour meter.
17	Safety Device	The unit must be designed for absolute safety, keeping in view the application and should be equipped with the latest technologies available. The following safety devices should be strictly included- a) boom rest until the outrigger beams have been set in permitted jacking position: i.e. all four jacks deployed, with wheels off the ground b) The boom and slew movements shall be consistent with jacking position, described previously c) Outreach management: The installed outreach management should control the boom position of the unit to prevent excessive outreach. An automatic motion should cut or stop the machine once the permitted limit has been reached and thereafter should allow only safe increasing motions. d) Lock valves shall be provided on all cylinders to ensure that the system remains in position in the event of hose failure. Over-center valves shall be provided in place of lock valves on all boom cylinders, which apart from performing the load holding function of lock valve, in event of hydraulic pressure failure, also ensure smooth movement of the boom cylinders. e) End stroke speed damping, Main boom lift motions must have an automatic end-stroke damping system, which reduces the end-stroke speed independent of the control lever position. f) Automatic speed ramps: All main boom controls should have an automatic speed ramp function for automatic speed acceleration and deceleration on activating and releasing the control. g) Dead man lever controls: all lever controls must be of dead man type, returning automatically to zero if abandoned, stopping the motion in neutral position. h) Collision guard: The cage motion must be cut out on contact of cage collision guard with obstacle. i) Restrictor valves are to be provided to ensure slow descent in the event of lock valve failure j) Automatic stops to prevent platform from reaching unsafe area of operation shall be provided. k) Emergency cut off device shall be provided at turntable and cage controls to cut off all functions, with easy restoration. l) Manual rotation of turntable should be possible in case of emergency. m) Illumination of cage and base controls shall be provided for night operation. n) Anchor points for 4 safety harnesses are to be provided in cage. - o). Level indicators at outrigger control box.
18	Water Way	18.1 The unit must be equipped with water pipeline for fire extinguishing operations that connects inlets on the chassis with the cage monitor. A 75mm diameter corrosion resistant telescopic pipeline must be fixed on sides of booms (on the opposite side to rescue ladder).

		18.2 Articulated pipe connections with flexible hoses are to be provided at boom pivoting points and for the connection to the cage. The water line must end at the front of the cage where the monitor coupling flange and an additional 63mm outlet with shut valve for water hose and hand branch or additional clamp-on monitor are provided. 18.3 Multiple self-protection water sprinkler nozzles must be provided at the bottom of the cage to protect cage occupants from radiant heat. The shut valve for the water spray curtain should be located in the cage. The water pipe line shall be fitted with over pressure- relief valve as means to relieve excess pressure. The valve should be mounted beneath the turntable. 18.4 Intakes shall be located, one on each side of the vehicle, placed in a well-protected but easily accessible position on the front of rear outriggers. Both the intakes should be fitted with quarter turn ball valves and 63mm male instantaneous couplings. 18.5 Swivel-in-line-which shall be mounted in the center line of the turntable shall be so placed that maintenance is carried out without hindrance. Continuous rotation of hydraulic platform shall be provided even if water supply is used simultaneously. 18.6 The water line shall be protected from possible over pressure by means of relief valves (set at a pressure of 12 kg/cm²) mounted underneath of the turntable. 18.7 An additional outlet of 63mm (as per BS standards) with female coupling and closing ball valve shall be provided to the water piping the cage. There shall be drain cocks fitted in the piping to enable to drain the water from the piping after use.
19	Portable Fire Pump	A portable fire pump (Centrifugal) made from Aluminum alloy material with SS main shaft having rated performance of 1600 LPM at 7 KG/CM² while working on 3M static suction lift at NTP shall be provided. The pump shall be powered by a self-contained petrol engine with cooling system and push button/ standby hand recoil start system The pump shall be light weight for easy handling. The pump shall have two delivery outlets of 63mm diameter (BIS standards) with instantaneous couplings and 100 mm suction inlet with blank cap. The primer shall either be Exhaust ejector type or Rotary type or automatic piston type, capable of lifting the water from a depth of 7 mtr within 30 seconds. The pump and engine shall be mounted on SS carrying frame with four folding handles. The fuel tank capacity shall be adequate to run the pump for minimum one hour delivering full rated output. The pump shall be mounted in one of the locker with suitable roll in/out arrangement. All necessary instruments, controls, levers, lights, switches etc shall be provided.
20	Breathing Air System	Compressed breathing air supply from turntable to the cage shall be provided through a four way manifold at the cage. There should be four breathing air masks at cage conforming to BIS Standards. Four nos. of 6 liters 300 bar steel or Carbon composite air cylinders shall be provided at turntable with pressure reducer valve and other fitments. It should be possible to change the cylinders without interrupting the air supply.
21	Stretcher carrier	Provision for drop down stretcher carrier shall be made at the working cage. The carrier shall be provided in such a way that the whole cage area is still available to its occupants. This is the same as indicated in heading "Working Cage".
22	Painting	Surfaces of steel structure shall be first sand blasted or shot blasted or

		chemically cleaned, followed by primer and surface, before being painted with high gloss paint. The booms shall be primed from inside also. The paint used shall be as under- a. Working cage - White aluminium b. Working cage support, boom sections, turntable, cylinders - white c. Main frame, outriggers, body work - Red
23	Digital Display Unit	23.1 The vehicle shall be provided with 3 full colour LCD display situated at outrigger center at turntable and the cage control panels. 23.2 The display shall be TFT type, trans reflective of minimum 6.5 inches size with 396x 23 RGB pixels, full colours with Multifunctional Membrane type Push buttons, LED/Lamps for Warning lights with Backlight. 23.3 The display shall show the location of the fault if occurred in the system operating the vehicle.
24	Fault Finding System	24.1 The control system of the vehicle shall have self-fault finding system. If any fault occurs during the operation the system shall find out the same and shall show the location of the defective component on the display. The system shall incorporate simple test screens to enable testing of the working cage and the turntable control panel. The tests shall also cover display unit push buttons, Joysticks. 24.2 For maintenance purposes the following tools shall be provided as standards supply. • Fault finding system and fault register • Status screens for sensors, switches, hydraulic valves, control lamps etc. • Total operation and hour meter. • Operation and hour meter since last service • Service counters and alarm for general maintenance • Software verification management. • Service laptop with compatible software relevant to the system.
25	Accessories	The following accessories will be supplied along with the unit- • Wooden outrigger spreader plates - 04 Nos • Working range diagrams at turn table and cage - 02 Nos. • 24V/70W working light with universal bracket - 02 Nos. • Lifting hook under cage capacity 400 kg - 01 Nos. • Fitments for safety belts and harness at cage - 04 Nos. • Hydraulic pressure gauge - 01 Nos. • Drop down stretcher at cage - 01 Nos. • Plug for 24 V working light at turntable and cage - 01 Nos. • Medical First Responder kit - 02 Nos. • Delivery hose Type B, ISI marked 63mm X 30m length - 10 Nos. (with matching coupling) • Portable ABC Type Extinguisher' 10 kg capacity - 02 Nos. • Service laptop with all accessories compatible to system - 01 Nos. • Safety belts - 05 Nos.
26	Tools and Manuals	a) A kit containing all the necessary tools for regular service and maintenance of the vehicle shall be supplied along with the unit for all the equipment & machines as per manufacturer's recommendations. b) Instruction manuals for the operation and maintenance of the chassis and hydraulic platform unit (including all systems) standby engine, self-contained fire pump and itemized spare parts list will be supplied along with the appliance. The quantity shall be as under-

		• Spare parts catalogue cum Operation manuals for hydraulic platform - 02 Nos. • Workshop manual for fire pump - 02 Nos • Spare parts catalogue for standby engine - 02 Nos
27	Stability	The stability of the vehicle (in traveling position) when fully equipped and loaded {excluding crew member}, with hydraulic platform resting on the resting stand and without extending the stabilizing jacks shall be such that it shall remain stable and shall not overturn even if the surface on which the vehicle stands has inclination on either side from the horizontal as per the safety norms stipulated in national/ international standards.

TRAIL DIRECTIVIES (TDs) OF HYDRAULIC PLATFORM 32 MTRS

Sl	Parameter	Qualitative Requirement/ Specification	Trial Directives for BOOs
1	SCOPE	1.1 This specification covers hydraulic platform unit with a working height of 32M working height shall be measured as the height from ground level to cage base plus 1.5 M. The operational stability shall be safe on an inline of 7°. The structural strength of booms shall be secure and designed for 1.5 times rated load at prescribed reach. The manufacturer of the hydraulic platform shall be an ISO: 9001 certified Company who meets the eligibility conditions. 1.2 The scope of the contract includes the manufacture of the hydraulic platform step by step mounting of the same on purchaser's chassis, bodywork and fitment of accessories. Inspection, supply and training of operators nominated by purchaser as well as rendering warranty services. 1.3 The Hydraulic Platform shall be designed as per the designed, operational stability and structural strength based on the criteria laid in International/National norms and other norms and standards applicable for elevated raised platforms used for Fire Fighting and rescue operations. 1.4 The manufacturer/supplier should have supplied similar Hydraulic Platforms of minimum 32M height and above in past to the emergency/fire services with satisfactory performance. 1.5 The manufacturer/supplier should have the facility of trained manpower for repair and maintenance of Hydraulic platform through its authorized sales/service agents in India. Or they should confirm in writing that they will establish service center in India and shall provide support to the vehicle for the period of warranty and extended support for further period thereafter, either in the form of AMC (Annual Maintenance Contract) or paid service.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
2	Chassis	2.1 The Chassis shall be 6x4, having approx., 5000 mm Wheel Base (as per Central Motor Vehicle Rules 1989) with fully factory built cabin and suitable capacity PTO. The Vehicle Chassis shall be a Right Hand Drive and shall comply emission norms in force. 2.2 The Chassis shall be homologated from the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

	appropriate authority in India. 2.3 The engine shall be six cylinders, inline, Diesel with direct injection, turbo charges with intercooler. 2.4 The engine-developing minimum 250 HP (184KW) at 2000 rpm approx. or higher capacity, which will meet operating parameters. 2.5 The clutch shall be single plate, dry type, and power assistant. 2.6 The gearbox shall be synchromesh type with crawler gear manual gearbox or automatic gearbox. 2.7 Rear Axle shall be Tandem Bogie type with Hub reduction and differential lock between the wheels and axles. 2.8 Chassis frame shall be 'C' Channel section made of high strength steel with cross members. 2.9 The Steering shall be integral power steering with collapsible steering wheel and column. 2.10 The Front Suspension shall be leaf spring type and the rear suspension shall be reverse scamel type with shock absorber in the front or equivalent. 2.11 The Brakes shall be dual circuit airbrakes, with parking brakes acting on rear wheels. 2.12 Fuel Tank – Capacity shall be minimum 300 ltrs with lockable fuel cap. 2.13 The Chassis shall be provided with 11.00 Rx 20 radial tyres – 11 nos. with spare tyres or equivalent. 2.14 The chassis shall be provided with single day type cab with RED colour, made from high strength steel fully trimmed, external panels hot dip galvanized with hydraulic cab tilting mechanism. The Cab suspension shall be provided with coil spring and shock absorber. The cab shall be provided with adequate ventilation, rear view mirrors, windscreen and windows, adjustable driver seat, wiper system along with all other standards fitments. 2.15 The Electrical system shall be 24 V, with suitable capacity batteries & Alternator for charging the batteries. 2.16 The chassis shall be supplied with standards tool kit, hydraulic jack of 20 Ton capacity, operator & workshop manuals. 2.17 The Chassis shall be fitted with gearbox mounted, suitable capacity Power Take Off,	
--	--	--

		Unit to drive the hydraulic pump for boom movements. 2.18 The Chassis shall comply all the provisions and enactment of Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989 and any amendment from time to time. The Hydraulic Platform shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended. The unit shall meet the following operating parameters:- - Minimum working height from ground level.....32.0M. - Minimum cage floor height from ground level.....30.0M - Minimum safe working load (without water monitor in operation).....400 kg - Minimum safe working load (with water monitor in operation).....200 kg - Minimum reach* (*from slew center) to cage corner at 400 kg....18.0M - Continuous unlimited rotation in both directions-360°+endless - Maximum outrigger width with both jacks extended (as per design)....6M - Cage rotation (left and right).....45° - Full working load permitted in wind speed upto.....12.5M/Sec - Max time for reaching to maximum height and vice-versa.....90 seconds. - Max time for turning through complete circle...120 seconds. - Max time for extending jacks on both sides.....30 seconds. - Total operating time, including stabilizing, cage from rest and 90°turntable/ turret rotation.....180 seconds (Minimum)	
3	Main Frame	The main frame shall be a fully welded rectangular steel structure fixed on to the chassis frame with bolts and springs so as to allow performance and durability of the chassis without causing stress concentration in the chassis beam. The hydraulic tank of suitable capacity shall be integrated into the main frame with proper heat decapitation facilities.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

4	Stabilizing System	4.1 The stabilizing and levelling system of the unit should consist of four vertical/horizontal jacks, which allow safe levelling of the whole unit and maximum stability in all permitted working conditions (operating on a slope of 7 degrees). The four welded box section outrigger beams slide inside the outrigger housings and extend and retract by means of four double acting hydraulic cylinders placed inside the beam housing. 4.2 The following jacking positions shall be feasible: a) <u>Outrigger beams fully extended on bothsides:</u> This is normal working position, which allows maximum outreach at full working load over 360° continuous unlimited turntable/turret rotations and the use of the monitor within its full capacity and working range. b) <u>Outrigger beams fully extended only on one side with turntable rotation interlock:</u> In order to reduce the jacking width in narrow spaces, outrigger beams should be extended only on one side, either left or right in working direction A safety system on the turntable should allow only 180° rotation over the working direction and automatically stop its motion once the center line of the chassis has been reached, preventing rotation of the turntable over the not extended side. Outreach and height over the working side should not be affected. 4.3 <u>Vertical jacks with positive safety lock valves and self-aligning feed plates:</u> Each outrigger beam should be equipped at its end with a hydraulic jacking cylinder with self-aligning ground contact foot plate (by means of movable joint) capable of lifting the unit completely off the ground, level the machine and keep it in its position even under continuous load conditions. Each jacking cylinder should be attached to a lock valve that prevents creeping in case of pressure failure. 4.4 <u>Automatically switched on jack blinking lights:</u> Each vertical jacking cylinder should be equipped, at its upper front side, with a grill protected red blinking light, which is	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
---	--------------------	---	---

		automatically switched on when the PTO control in the truck cab is engaged. 4.5 <u>Additional square spreader plates:</u> In order to reduce the specific ground pressure of the jacks without exceeding the vehicle width when in stowed transport position, four separate foot plates of adequate size will have to be provided and stowed near outrigger. A handle on each plate allows for immediate and easy positioning under the jacks. 4.6 <u>Rear center mounted outrigger control box:</u> The outrigger control should include 2 systems: manual and automatic. When in automatic control mode, one button controls to automatically stabilize vehicle in safe working condition. When in manual control mode, the vertical jacks and outriggers can be controlled, one by one, independently or simultaneously. The lockable outrigger control box should be located at the rear of the vehicle. The control box should include a spirit levelling gauge, a green indicator light 'platform system on', a pushbutton control for the activation of the stand-by electro-hydraulic pump. engine start/stop button, Emergency stop button. Hour meter. A display unit shall be installed at the outrigger control panel, showing the operator the maximum outreach system at the particular setup position. This system is to include normal jacking and one sided jacking. 4.7 <u>Outrigger stowed indicator light in truck cab:</u> In order to control the transport stowage of the outriggers from the cab before departure, an indicator light should be provided on the cab dashboard, which indicates to the driver that the outrigger beams and jacks have been retracted and are in the transport position. 4.8 <u>Outrigger safety interlocks:</u> A safety system inhibits any operation of the platform before the outriggers have been set. Outrigger controls are isolated and cannot be moved if the boom is not in transport position and has not activated the boom rest switch. Reciprocally, the boom	
--	--	---	--

		movement should not be activated until and unless the outriggers have been activated and properly deployed. 4.9 <u>Level sensor with audible alarm:</u> A level sensor measures both the fore and aft and sideways inclination of the unit and gives audible warning if the permitted level tolerance is exceeded.	
5	Bodywork and equipment locker	A steel framework structure panelled by steel/aluminium should be provided. The entire framework should be treated for corrosion resistance before panelling. Two lockers on each side of the vehicle with low and easy access should be provided. The doors/shutters to lockers must be dust and water-resistant. They shall have drain holes to drain away water from the stowed equipment. Lockers shall be equipped with lights so that the operator can have better visibility while stowing the equipment. There shall be two side ladders, one on either-side to provide access to the main work deck.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
6	Booms	6.1 The hydraulic platform shall be of telescopic cum-articulated design. So as to meet operating parameters such as safe working load, working height and outreach as well as 'up, over and down' access at building. All booms should be made from high strength welded box section in steel construction-with-internal treatment against corrosion. One Amber light at joint of main boom and tip boom should be provided. The cage pivot should be mounted at the top end of the tip boom and at the top of the cage for inherent tilt safety, which allows for 45°right/left cage swivelling. A well visible matching sign on the cage support should indicate when the cage is horizontally aligned for its stowing position. The cage shall be stowed between the cabin and turn table. An indicator light on both control stations should be provided to indicate when the boom is horizontally aligned and in matching position above the boom rest for its stowage. 6.2 The booms shall be box/trapezoidal section type, welded construction; welding method shall be of latest technology to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels shall be used for load bearing structure.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		6.3 The main boom elevation and lowering shall be controlled by two hydraulic cylinders that both have their separate safety devices and can alone carry the entire load in case of failure of any one of the cylinders. The first boom shall be able to elevate in the range of 00 to 83° angle approx. 6.4 All telescopic sections of the first boom shall move in a synchronized way and there shall not be any intermediate jerks during extension/retraction. Automatic slowdown mechanism at the beginning of the movement as well as end of the movement shall be provided to all boom movements. All the moving sections shall be fitted with adjustable guides/rollers to provide smooth and accurate movement. Various maintenance points shall be located well at hand either outside the boom or behind easily removable covers. 6.5 All booms shall be internally and externally primed and painted for long life span, treated against rust and corrosion.	
7	Turntable	7.1 The turntable should be powered by a hydraulic motor. The 360° continuous endless clockwise and anti-clockwise rotating turntable should be mounted over sub-frame at chassis rear so as to keep overall transport height of the folded platform to minimum The turntable should be bolted to a slew ring with High tensile bolts. 7.2 The hydraulic motor driving the slew system connected either directly or through suitable reduction gearbox should have adequate power to rotate the turntable in any position with full payload in the Cage. The slew brake should always be in permanently and automatically applied until the slew motion control of the turntable is activated, thus releasing the brake with hydraulic pressure. The fail safe brake should be able to hold the turntable in locked position, with any boom position when hydraulic power is removed. 7.3 A well designed rotary connector mounted under the platform turntable should convey water through 80mm stainless steel or equivalent water way, hydraulic and electric power from the truck chassis to the turntable and up to the cage at boom end, While allowing for endless unrestricted	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		rotation of the turntable over 360° in both directions. 7.4 There shall be provision for the manual rotation of turntable in case of failure of hydraulic system. 7.5 Pins securing the hydraulic cylinders to boom and turntable shall be properly installed and secured. 7.6 The hydraulic hoses, tubings and connections provided in the turntable shall be free from kinks, chaffing or leaks.	
8	Working Cage	8.1 The robust and spacious fire fighting cage made of tubular steel/aluminium profiles should have approx. 2 sq.mtr floorspace offering ample room for up to four fully equipped fire men (two operating with monitor). 8.2 Minimum safe cage working load should be 400 kg and minimum safe cage working load with monitor operational should be 200kg. 8.3 It should be approximately 2m long, 1m wide and 1.1m high. A 1.1m high handrail around the cage should be provided to protect people in the cage. The cage should be equipped with a closed footboard all around the cage floor to prevent objects lying on the cage floor to fall from the cage. 8.4 One- side and one front entrance to the cage are to be provided. The front entrance should comprise of an in wards opening gate with spring closing system, whereas the side entrance comprise of full width opening with fall bar protection. The cage floor should be covered with non-slip steel/aluminum plates with draining holes or small mesh expanded grill floor plates. 8.5 A front drop down platform (1.45m x 0.45m) with quick release and 180 kg capacity is to be provided to form a bridge between the cage and building for firefighting or rescue purpose. 8.6 The water line with shut valve and a flange for the installation of the 63 mm manual control water monitor should end at the bottom front inside center of the cage. A second 63 mm outlet with shut valve is to be provided under the monitor for an additional hose with hand branch or a second 'clamp-on' monitor. A multiple water spraying nozzles with shut valve from the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		cage should be provided at the bottom of the cage for self-protection of the crew from excessive heat and smoke, by acting as a water curtain heat protection 'shield'. 8.7 Direct access to the cage from ground or the vehicle deck without auxiliary ladder: The two entrances provided should allow for a direct and immediate access to the cage with full equipment without the help of an auxiliary ladder from ground level (with lowered tip boom) or from the vehicle deck (with boom in stowed position). 8.8 Automatic cage levelling with emergency over-ride: Cage levelling system should be fully automatic. The cage should remain constantly in a levelled horizontal position referred to the ground, irrespective of boom position and load in cage. In the unlikely event of failure of automatic cage levelling system, an emergency lever, manually controlled, should actuate a hydraulic mechanism to enable crew in cage to level cage directly. 8.9 Independent horizontal cage rotation: The slew unit of the cage should be set for a rotation of min, 45° left and 45° right directions. This rotation is to be independent of the turntable slew. The cage rotation control should be available from the cage and turntable control. The rotation balconies, windows, roof etc. from the front cage gate, irrespective of the boom position, in case of fire fighting and rescue operations 8.10 Cage control box: The cage control should be similar to turn table control. It should also include the same LCD display as main control. The dust and water resistant control box in the cage should contain all necessary control elements. A cover made from weather resistant material is to be provided for protection of the control box when not being used. 8.11 Proportional controls: a. The lever controls for boom and slew functions shall be joystick type proportional controls, ergonomically positioned in weatherproof and spray water resistant	
--	--	---	--

		control box. Easy interpretable symbols identifying the function of each control lever/button, without language barrier shall be displayed on panel. b. A LCD display panel should be provided that permanently indicates the boom height and outreach on a clearly visible and rear-illuminated type display, with illumination adequate for night display. The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps to sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. c. Other controls are to be controlled by an additional control lever or switch control. All controls should be of 'dead-man' type and return automatically to neutral position, stopping the motion, if the control is abandoned. 8.12 A cage collision guard shall be provided and shall be integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. The system shall stop all movements. 8.13 An emergency stop button shall be provided on both control panels to provide immediate and complete "freezing of all systems in case of an unexpected emergency. 8.14 There shall be a "bleed down" system, which can be operated from working cage and turntable control panel to lower the booms and bring the working cage down onto the ground even if hydraulic pressure or electric power is not available with rotation mechanism. 8.15 Electric sockets in cage: The following electric outlets/connections should be provided in the cage- • 1 No. 24V DC socket that is directly fed by the vehicle electric system. • 1 No. 220 V AC socket with connection line from slew unit up to cage • 2 Nos. 24 Volts X 70 Watts lights mounted	
--	--	---	--

		on swivelling brackets should be fitted on the cage railing to provide sufficient lighting and safety to the crew during search and rescue operation at night. Two more floodlights will be installed at the rear of the body to provide ground lighting.	
9	Intercommunication to the turntable control station	The hands free loudspeaker type intercom transmitter and receiver must be placed on the rear center of the cage and connected by a shielded cable with an identical second set placed on the turret of the turntable. The intercom system should allow, once switched on, loudness adjustment and free communication between base control and cage control positions.	To be checked/ tested physically by BOO as per the certificate provided by the firm.
10	Monitor	10.1 Water monitor shall be connected to the piping system and shall be mounted outside the cage in a suitable position so that the entire cage floor area can be fully utilized. 10.2 The monitor shall be made of light alloy and fitted with jet/ fog nozzle with maximum capacity of 2000 LPM at 8 kgf/cm². 10.3 The Monitor shall have Horizontal rotational movement to left and right of minimum 160° and also vertical 65° and 15° down movement minimum. 10.4 There shall be ball valve type control valve for the monitor and the monitor shall be manually operated.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
11	Rescue Ladder	The unit must be equipped with a Telescopic type Aluminum rescue ladder; the width of top section shall be approx 490mm and approx 250 mm railing height. The distance between each rung should be 280mm minimum and shall not be more than 300 mm. To enable an easy access from ladder to the cage, there should be a suitable drop down platform at the cage. The step section should be made of special profile with non-slip external surfaces. The ladder system must be attached onto the side of the booms and shall give direct access from ground to the cage for rescue purposes. In case of platform of telescopic design, the ladder movement shall be synchronized with boom telescopic movement.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
12	Hydraulic System	12.1 The Hydraulic power shall be provided by a reliable and adequate capacity variable displacement axial piston pump, which shall be driven by the vehicle power take off. 12.2 The filtration system of the hydraulic oil shall consist of suction strainer in the suction line, pressure filters in each	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		pressure circuit, return filter in return line and air filter on the reservoir. All the pressure filters shall have blockage indicator. 12.3 All hydraulic cylinders shall be double acting with hard chrome plated piston rods and shall be fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders. 12.4 Hydraulic oil tank shall be integrated or fitted into the main frame and shall have proper heat dissipation system. The tank shall be fitted with oil level gauge, temperature gauge, and suction connections with closing valves for easy maintenance and draining outlet with closing valve. 12.5 All the controls for the boom movement and slew functions shall be joystick type proportional controls, ergonomically designed in weatherproof and spray water resistant control box. Easy interpretable symbols identifying the function of each control lever/button, in English language shall be displayed on panel. 12.6 The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps too sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. All the control levers shall be dead man's type and should return to zero automatically when released. 12.7 Pressure measuring points with quick coupling for connection of a manometer supplied with the unit are to be provided for each hydraulic circuit. All platform motions are to be performed either by double acting hydraulic cylinders or hydraulic motors with automatic brake. 12.8 Hoses shall be tested to twice rated-pressure and the bursting pressure shall be at least four times the rated pressure.	
13	Backup system	The hydraulic platform should be supplied with 3 Nos. (three) different and independent back-up	Shall be tested/ measured/ checked physically as per

		systems, which guarantee that the cage, booms, slew, outriggers and vertical jacks can be operated, for stowing purpose, even if any failure occurs to the chassis engine or main pump. <u>13.1 AUXILIARY ENGINE DRIVEN PUMP:</u> The unit should be fitted with suitable Diesel/ Petrol powered auxiliary engine with self start facility mounted at a suitable location. It should allow the use of the platform, for stowage only, when the main truck engine fails. The on/off controls for this engine shall be provided on all control panels. <u>13.2 BATTERY DRIVEN HYDRAULIC PUMP:</u> The 24V battery driven stand-by electro-pump shall be provided to allow retraction and stowage of the unit in transport position from all control stations. This pump shall also feed the hydraulic oil to the cage levelling mechanism for manual levelling of the cage. <u>13.3 MANUAL OVER-RIDE -</u> In case of complete failure of electric and hydraulic power a manually operated hand pump or other suitable arrangement shall be provided for all boom and outrigger movements for stowing the unit.	relevant national/ international standard by the B.O.O.
14	Electrical System	a. 14.1 The electrical system shall be 24V DC from the chassis battery, which is kept, charged when the engine is running. All electrical circuits shall be provided with fuses. Output sockets for battery supply power shall be provided at the turntable and cage. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 14.2 When the main current is switched on, amber blinking lights, mounted on the outriggers, underneath the working cage and booms shall be automatically switched on. Amber colored rotating beacons on each side of the driver's cabin roof shall be provided. The switching controls shall be in the driver's cabin. <u>14.3 SIREN AND PUBLIC ADDRESS SYSTEM:</u>	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		An electric siren unit will be fitted at a suitable place on vehicle cab. Control, panel for the same will be suitably located in the driver's cabin and siren shall have fast (yelp) and slow (wail) sounds. Microphone shall be fitted with push to talk switch, to allow public address message to override the siren function. 14.4 Two yellow fog lights shall be mounted at front bumpers or other suitable locations and controls provided in driver's cabin.	
15	Turntable and cage control panel	15.1 Control panels shall be provided at the turntable as well as at the cage. A convenient sitting arrangement for the operator shall be provided at the turntable. Both the panels shall be similar to avoid confusion, with over riding controls provided at the turntable control. 15.2 The control station shall be fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position shall be covered by nonslip aluminium plate. 15.3 The control panel at turn table and cage shall be exactly alike which will reduce the risk of confusion amongst operators under stress or even panic. Both the control panels shall be provided with weather protection covers/box. 15.4 The turntable control panel shall have a change over switch to select the control station from which the operation is performed. 15.5 Both control panels shall be fitted with following warning, indication and control devices, and shall be marked by clear symbols for easy recognition 15.5.1 Visual and audible indication for exceeding safe working load in the cage. 15.5.2 Visual warning for activation of working cage collision guard system. 15.5.3 Visual indication for ground pressure of the outriggers. 15.5.4 Visual indication for the rescue ladder "Rungs in alignment". 15.5.5 Visual indication for the center position of the booms. 15.5.6 Visual indication for the center position of the working cage. 15.5.7 Starting and stopping of chassis engine. 15.5.8 Switch, for the operating battery driven	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

		pump for hydraulic back-up system 15.5.9 Starting and stopping switch for standby diesel engine for hydraulic backup system 15.5.10 Joystick control levers for each movement. 15.5.11 Push buttons/joystick for cage slewing. 15.5.12 Emergency stop button. 15.5.13 Overriding of the automatic working cage levelling system. 15.5.14 Manual operation for the working cage levelling system. 15.5.15 Switches for activating the bleed down system near turn table control panel. 15.5.16 LCD display monitors indicating- • Main boom length. • Main boom angle. • Cage load. • Outreach	
16	Indicators and control in driver's cabin.	The following indicators and controls shall be provided in driver's cabin- 1. Visual warning for booms and outriggers not intraveling position. 2. Visual indication for any of the lockers not in closed position. 3. Visual indication for engagement of PTO. 4. Hour meter.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
17	Safety Device	The unit must be designed for absolute safety, keeping in view the application and should be equipped with the latest technologies available. The following safety devices should be strictly included- a) boom rest until the outrigger beams have been set in permitted jacking position: i.e. all four jacks deployed, with wheels off the ground b) The boom and slew movements shall be consistent with jacking position, described previously c) Outreach management: The installed outreach management should control the boom position of the unit to prevent excessive outreach. An automatic motion should cut or stop the machine once the permitted limit has been reached and thereafter should allow only safe increasing motions. d) Lock valves shall be provided on all cylinders to ensure that the system remains in position in the event of hose failure. Over-center valves shall be provided in place of lock valves on all boom cylinders, which apart from performing the load holding function of lock valve, in event of hydraulic pressure failure, also ensure smooth movement of the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

		boom cylinders. e) End stroke speed damping, Main boom lift motions must have an automatic end-stroke damping system, which reduces the end-stroke speed independent of the control lever position. f) Automatic speed ramps: All main boom controls should have an automatic speed ramp function for automatic speed acceleration and deceleration on activating and releasing the control. g) Dead man lever controls: all lever controls must be of dead man type, returning automatically to zero if abandoned, stopping the motion in neutral position. h) Collision guard: The cage motion must be cut out on contact of cage collision guard with obstacle. i) Restrictor valves are to be provided to ensure slow descent in the event of lock valve failure j) Automatic stops to prevent platform from reaching unsafe area of operation shall be provided. k) Emergency cut off device shall be provided at turntable and cage controls to cut off all functions, with easy restoration. l) Manual rotation of turntable should be possible in case of emergency. m) Illumination of cage and base controls shall be provided for night operation. n) Anchor points for 4 safety harnesses are to be provided in cage. o). Level indicators at outrigger control box.	
18	Water Way	18.1 The unit must be equipped with water pipeline for fire extinguishing operations that connects inlets on the chassis with the cage monitor. A 75mm diameter corrosion resistant telescopic pipeline must be fixed on sides of booms (on the opposite side to rescue ladder). 18.2 Articulated pipe connections with flexible hoses are to be provided at boom pivoting points and for the connection to the cage. The water line must end at the front of the cage where the monitor coupling flange and an additional 63mm outlet with shut valve for water hose and hand branch or additional clamp-on monitor are provided. 18.3 Multiple self-protection water sprinkler nozzles must be provided at the bottom of the cage to protect cage occupants from radiant heat. The shut valve for the water	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

		spray curtain should be located in the cage. The water pipe line shall be fitted with over pressure- relief valve as means to relieve excess pressure. The valve should be mounted beneath the turntable. 18.4 Intakes shall be located, one on each side of the vehicle, placed in a well-protected but easily accessible position on the front of rear outriggers. Both the intakes should be fitted with quarter turn ball valves and 63mm male instantaneous couplings. 18.5 Swivel-in-line-which shall be mounted in the center line of the turntable shall be so placed that maintenance is carried out without hindrance. Continuous rotation of hydraulic platform shall be provided even if water supply is used simultaneously. 18.6 The water line shall be protected from possible over pressure by means of relief valves (set at a pressure of 12 kg/cm²) mounted underneath of the turntable. 18.7 An additional outlet of 63mm (as per BS standards) with female coupling and closing ball valve shall be provided to the water piping the cage. There shall be drain cocks fitted in the piping to enable to drain the water from the piping after use.	
19	Portable Fire Pump	A portable fire pump (Centrifugal) made from Aluminum alloy material with SS main shaft having rated performance of 1600 LPM at 7 KG/CM² while working on 3M static suction lift at NTP shall be provided. The pump shall be powered by a self-contained petrol engine with cooling system and push button/ standby hand recoil start system The pump shall be light weight for easy handling. The pump shall have two delivery outlets of 63mm diameter (BIS standards) with instantaneous couplings and 100 mm suction inlet with blank cap. The primer shall either be Exhaust ejector type or Rotary type or automatic piston type, capable of lifting the water from a depth of 7 mtr within 30 seconds. The pump and engine shall be mounted on SS carrying frame with four folding handles. The fuel tank capacity shall be adequate to run the pump for minimum one hour delivering full rated output. The pump shall be mounted in one of the locker with suitable roll in/out arrangement. All necessary instruments, controls, levers, lights, switches etc shall be provided.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
20	Breathing Air	Compressed breathing air supply from turntable	Shall be tested/ measured/

	System	to the cage shall be provided through a four way manifold at the cage. There should be four breathing air masks at cage conforming to BIS Standards. Four nos. of 6 liters 300 bar steel or Carbon composite air cylinders shall be provided at turntable with pressure reducer valve and other fitments. It should be possible to change the cylinders without interrupting the air supply.	checked physically as per relevant national/ international standard by the B.O.O..
21	Stretcher carrier	Provision for drop down stretcher carrier shall be made at the working cage. The carrier shall be provided in such a way that the whole cage area is still available to its occupants. This is the same as indicated in heading "Working Cage".	Shall be tested/ measured/ checked physically
22	Painting	Surfaces of steel structure shall be first sand blasted or shot blasted or chemically cleaned, followed by primer and surface, before being painted with high gloss paint. The booms shall be primed from inside also. The paint used shall be as under- a. Working cage - White aluminium b. Working cage support, boom sections, turntable, cylinders - white c. Main frame, outriggers, body work - Red	Shall be tested/ measured/ checked physically
23	Digital Display Unit	23.1 The vehicle shall be provided with 3 full colour LCD display situated at outrigger center at turntable and the cage control panels. 23.2 The display shall be TFT type, trans reflective of minimum 6.5 inches size with 396x 23 RGB pixels, full colours with MultifunctionalMembrane type Push buttons, LED/Lamps for Warning lights with Backlight. 23.3 The display shall show the location of the fault if occurred in the system operating the vehicle.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
24	Fault Finding System	24.1 The control system of the vehicle shall have self-fault finding system. If any fault occurs during the operation the system shall find out the same and shall show the location of the defective component on the display. The system shall incorporate simple test screens to enable testing of the working cage and the turntable control panel. The tests shall also cover display unit push buttons, Joysticks. 24.2 For maintenance purposes the following tools shall be provided as standards supply. • Fault finding system and fault register • Status screens for sensors, switches, hydraulic valves, control lamps etc. • Total operation and hour meter. • Operation and hour meter since last service • Service counters and alarm for general	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

		maintenance • Software verification management. • Service laptop with compatible software relevant to the system.	
25	Accessories	The following accessories will be supplied along with the unit- • Wooden outrigger spreader plates - 04 Nos • Working range diagrams at turn table and cage - 02 Nos. • 24V/70W working light with universal bracket - 02 Nos. • Lifting hook under cage capacity 400 kg - 01 Nos. • Fitments for safety belts and harness at cage - 04 Nos. • Hydraulic pressure gauge - 01 Nos. • Drop down stretcher at cage - 01 Nos. • Plug for 24 V working light at turntable and cage - 01 Nos. • Medical First Responder kit - 02 Nos. • Delivery hose Type B, ISI marked 63mm X 30m length - 10 Nos. (with matching coupling) • Portable ABC Type Extinguisher'10 kg capacity - 02 Nos. • Service laptop with all accessories compatible to system - 01 Nos. • Safety belts - 05 Nos.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
26	Tools and Manuals	a) A kit containing all the necessary tools for regular service and maintenance of the vehicle shall be supplied along with the unit for all the equipment & machines as per manufacturer's recommendations. b) Instruction manuals for the operation and maintenance of the chassis and hydraulic platform unit (including all systems) standby engine, self-contained fire pump and itemized spare parts list will be supplied along with the appliance. The quantity shall be as under- • Spare parts catalogue cum Operation manuals for hydraulic platform - 02 Nos. • Workshop manual for fire pump - 02 Nos • Spare parts catalogue for standby engine - 02 Nos	Shall be checked physically by the B.O.O.
27	Stability	The stability of the vehicle (in traveling position) when fully equipped and loaded {excluding crew member}, with hydraulic platform resting on the resting stand and without extending the stabilizing jacks shall be such that it shall remain stable and shall not overturn even if the surface on which the vehicle stands has inclination on	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

		either side from the horizontal as per the safety norms stipulated in national/ international standards.	
--	--	--	--

TECHNICAL SPECIFICATIONS/QRs OF WATER MIST EXTINGUISHER 09/10 LTRS
CAPACITY (BACK PACK TYPE/HIGH PRESSURE)

Sl	Technical Parameter	Qualitative requirements (QRs)
1	Nomenclature/Name of product/gadget/equipment	High pressure water mist CAF fire extinguisher Back-pack type, ultra-light, Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved pressure vessel 9/10 ltrs and air cylinder.
2	Conformity	The Water Mist & CAF (Back Pack) high pressure extinguisher shall be confirmed to EN 3-7:2004+A1:2007-08 standards. The complete system shall be tested for compliance from an internationally/nationally Govt. accredited laboratory for compliance to all 30 clauses (3.2, 3.15, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2, 6.3, 7.1.1, 7.1.2, 7.2, 7.3, 7.4, 8.1, 8.2, 9.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6.1 & 10.6.2, 14.1, 14.2, 15.2, 15.3, 16.1, 16.2) of EN 3 – 7:2004 + A1: 2007-08 (E) Standard mandatorily applicable for the complete system.”
3	Mounting type	Backpack
4	Configuration/Description	It shall be mounted on a sturdy frame suitably cushioned for comfort, provided with shoulder pads for carrying as a backpack and a handle to be carried by hand. All materials used shall be of a fire-retardant type. Backpack shall be supplied with air cylinders.
5.	Model & make	Model Number shall be permanently marked as declared in Accredited Laboratory Test Report.
6.	Main Components:	Pressure vessel shall be hold the media with safety valve, compressed air cylinder coupled with a reducer, hose pipes for discharge of water mist media, extinguishing gun.

CONSTRUCTION: -

7.	Air Cylinder Material	Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approval
8.	Type of Foam	Special AFFF Compound conforming for higher fire rating A55, B233, spreading coefficient for special AFFF Compound shall be +5 minimum, concentrations shall be 6%.
9	Commercial Brand Name, laboratory test report, fire	Commercial Brand Name of the Special foam (fire extinguishing medium) as per accredited laboratory test report wherein higher fire ratings i.e. A55,

	ratings with foam	B233, E1000 V (Die Electric Suitability) achieved, to be declared.
10	Characteristics of extinguishing medium of AFFF Compound with infrared spectrogram (to be furnished)	Characteristics of extinguishing medium of Special AFFF Compound shall be- Density: 1.04 (kg/cm ³ , Viscosity: 1.35 (m ² /s, pH Factor 7.8, Refractive Index 1.34 @ 20+/- 2° C (accredited laboratory test report required)
11	Pressure Vessel Material & Capacity (Nominal Charge)	Ultra light Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved of 09/10 litre capacity.
12	Minimum wall thickness of pressure vessel (mm)	Minimum wall thickness of pressure vessel should be 5 mm
13	Extinguishing gun material	Stainless Steel
14	Weight of extinguishing gun.	Shall not more than 750+/- 50 gram.
15	Length of Standard of Hose for backpack system.	Hose shall be EN marked, not less than 1.3 meters for backpack system.
16	Weight of fully charged Backpack system	Weight of fully charged Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Backpack system shall be not more than 20kg.

PERFORMANCE:-

17	Air Cylinder Capacity (Ltrs)	2 litres
18	Air Cylinder pressure (Bar)	300 bar
19	High Pressure Type	High Pressure Type (Dynamic Operating pressure to be tested in the Govt. accredited laboratory test report which will be considered as high pressure for as per clause No. 3.15 of EN 3 – 7:2004 + A1:2007-08 (E) Standard.) ≥ 37.6 Bar for Ultra-light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved vessel.

20	Lancing Distance of Gun	More than 15 +/- 2 meter
21	Minimum operating time	25 +/- 2 second
22	Operating temperature	System shall be designed for 60°C or more and minimum 5° C or less and certified by the manufacturer as per Clause 7.4 of EN 3-7:2004+A1:2007-08 standards as per the accredited test report for backpack system.
23	Fire Rating	Class A, Class B and Electrical Fire Rating with Special AFFF Compound for back pack 55A, 233B, E1000V (Die Electric suitability) with commercial brand name of fire extinguishing medium as per accredited laboratory test report for Backpack System.

CERTIFICATION:-

24	Approval	PED (Pressure Equipment Directives) approval as per 97/23/EC (Encumbrance Certificate)
25	Pressure Gauge	Pressure Vessel shall be fitted with a pressure gauge (CE-Marked)
26	NOC (No Objection Certificate)	No objection certificate (NOC) for Air cylinder and its valve & Pressure Vessel containing body No. from Petroleum and Explosives Safety Organization (PESO)/approval of CCE Nagpur is mandatory.
27	Pressure Vessel	Pressure Vessel shall be CE marked from Notified body.
28	Consent from OEM	Specific consent of the OEM for the value additions made along with a confirmation that fire ratings of the equipment would not be affected by these value additions.
29	Test Reports	Test Report No. should be declared/mentioned with date.
30	Declaration about Govt. Accredited Laboratory where Test Conducted	Name of NABL/Central Govt. Accredited Laboratory where Test Conducted is required.
31	Pre dispatch inspection	Pre Dispatch Inspection (PDI) of product shall be carried out by CISF Fire officers as per specifications, at the vendor site where all the testing facilities are available.

**TRIAL DIRECTIVES (TDs) OF WATER MIST EXTINGUISHER 09/10 LTRS
CAPACITY (BACK PACK TYPE/HIGH PRESSURE)**

Sl	Technical Parameter	Qualitative requirements (QRs)	Trial Directives
1	Nomenclature/Name of product/gadget/equipment	High pressure water mist CAF fire extinguisher Back-pack type, ultra-light, Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved pressure vessel 9/10 ltrs and air cylinder.	To be checked physical by BOOs at vender site.
2	Conformity	The Water Mist & CAF (Back Pack) high pressure extinguisher shall be confirmed to EN 3-7:2004+A1:2007-08 standards. The complete system shall be tested for compliance from an internationally/nationally Govt. accredited laboratory for compliance to all 30 clauses (3.2, 3.15, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2, 6.3, 7.1.1, 7.1.2, 7.2, 7.3, 7.4, 8.1, 8.2, 9.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6.1 & 10.6.2, 14.1, 14.2, 15.2, 15.3, 16.1, 16.2) of EN 3 – 7:2004 + A1: 2007-08 (E) Standard mandatorily applicable for the complete system.”	To be checked and verified with relevant EN certificates.
3	Mounting type	Backpack	Fitment to be checked physically.
4	Configuration/Description	It shall be mounted on a sturdy frame suitably cushioned for comfort, provided with shoulder pads for carrying as a backpack and a handle to be carried by hand. All materials used shall be of a fire-retardant type. Backpack shall be supplied with air cylinders.	To be checked physically by the BOOs.
5.	Model & make	Model Number shall be permanently marked as declared in Accredited Laboratory Test Report.	To be checked physically and verified with relevant certificates by the BOOs.
6.	Main Components:	Pressure vessel shall be hold the media with safety valve, compressed air cylinder coupled with a reducer, hose pipes for discharge of water mist media, extinguishing gun.	To be checked physically by the BOOs.

CONSTRUCTION: -

7.	Air Cylinder Material	Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approval	To be checked physically and verified with relevant certificates by the BOOs.
8.	Type of Foam	Special AFFF Compound conforming for higher fire rating A55, B233, spreading coefficient for special AFFF Compound shall be +5 minimum, concentrations shall be 6%.	To be checked physically by the BOOs.
9	Commercial Brand Name, laboratory test report, fire ratings with foam	Commercial Brand Name of the Special foam (fire extinguishing medium) as per accredited laboratory test report wherein higher fire ratings i.e. A55, B233, E1000 V (Die Electric Suitability) achieved, to be declared.	To be checked physically and also to be verified with relevant certificates from Govt. Approved lab.
10	Characteristics of extinguishing medium of AFFF Compound with infrared spectrogram (to be furnished)	Characteristics of extinguishing medium of Special AFFF Compound shall be- Density: 1.04 (kg/cm ³ , Viscosity: 1.35 (m ² /s, pH Factor 7.8, Refractive Index 1.34 @ 20+/- 2° C (accredited laboratory test report required)	To be verified with relevant certificates from Govt. Approved lab.
11	Pressure Vessel Material & Capacity (Nominal Charge)	Ultra light Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved of 09/10 litre capacity.	To be physically checked and verified with relevant certificates by the BOOs.
12	Minimum wall thickness of pressure vessel (mm)	Minimum wall thickness of pressure vessel should be 5 mm	To be checked and verified with relevant certificates
13	Extinguishing gun material	Stainless Steel	To be checked and verified with relevant certificates
14	Weight of extinguishing gun.	Shall not more than 750+/- 50 gram.	To be checked physically by the BOOs.

15	Length of Standard of Hose for backpack system.	Hose shall be EN marked, not less than 1.3 meters for backpack system.	To be physically checked and verified with relevant certificates by the BOOs.
16	Weight of fully charged Backpack system	Weight of fully charged Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Backpack system shall be not more than 20kg.	To be checked physically by the BOOs.

PERFORMANCE:-

17	Air Cylinder Capacity (Ltrs)	2 litres	To be checked physically by the BOOs.
18	Air Cylinder pressure (Bar)	300 bar	To be checked physically by the BOOs.
19	High Pressure Type	High Pressure Type (Dynamic Operating pressure to be tested in the Govt. accredited laboratory test report which will be considered as high pressure for as per clause No. 3.15 of EN 3 – 7:2004 + A1:2007-08 (E) Standard.) <u>≥ 37.6</u> Bar for Ultra-light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved vessel.	To be checked and verified with relevant certificates by the BOOs.
20	Lancing Distance of Gun	More than 15 +/- 2 meter	To be tested physically by the BOOs.
21	Minimum operating time	25 +/- 2 second	To be tested physically by the BOOs.
22	Operating temperature	System shall be designed for 60°C or more and minimum 5° C or less and certified by the manufacturer as per Clause 7.4 of EN 3-7:2004+A1:2007-08 standards as per the accredited test report for backpack system.	To be checked and verified with relevant certificates.
23	Fire Rating	Class A, Class B and Electrical Fire Rating with Special AFFF Compound for back pack 55A, 233B, E1000V (Die Electric suitability) with commercial brand name of fire extinguishing medium as per accredited laboratory	To be checked and verified with relevant

		test report for Backpack System.	certificates.
--	--	----------------------------------	---------------

CERTIFICATION:-

24	Approval	PED (Pressure Equipment Directives) approval as per 97/23/EC (Encumbrance Certificate)	To be checked and verified with relevant certificates.
25	Pressure Gauge	Pressure Vessel shall be fitted with a pressure gauge (CE-Marked)	To be checked physically and verified with relevant certificates.
26	NOC (No Objection Certificate)	No objection certificate (NOC) for Air cylinder and its valve & Pressure Vessel containing body No. from Petroleum and Explosives Safety Organization (PESO)/approval of CCE Nagpur is mandatory.	To be checked and verified with relevant certificates.
27	Pressure Vessel	Pressure Vessel shall be CE marked from Notified body.	To be checked and verified with relevant certificates.
28	Consent from OEM	Specific consent of the OEM for the value additions made along with a confirmation that fire ratings of the equipment would not be affected by these value additions.	To be checked and verified with relevant certificates.
29	Test Reports	Test Report No. should be declared/mentioned with date.	To be checked and verified with relevant certificates as per EN.
30	Declaration about Govt. Accredited Laboratory where Test Conducted	Name of NABL/Central Govt. Accredited Laboratory where Test Conducted is required.	Firm to submit certificates from NABL accredited / Central Govt. Approved lab.
31	Pre dispatch inspection	Pre Dispatch Inspection (PDI) of product shall be carried out by CISF Fire officers as per specifications, at the vendor site where all the testing facilities are available.	To be carried out by BOOs at vendor's site.

**QUALITATIVE REQUIREMENTS (QRS) OF WATER MIST EXTINGUISHER 2X9/10LTRS
CAPACITY HIGH PRESSURE TYPE (MOTOR CYCLE MOUNTED)**

PART-I

Sl.	Technical Parameters	Qualitative requirements (QRs)
1.	Motor Cycle	Enfield Motorcycle or equivalent, BS-VI or above, 5 speed 350 cc, self start, Disc brake, PO Red in color, suitable for mounting of fire fighting equipment, Temp registration, insurance etc. shall be in the scope of motor cycle dealer/supplier.

PART-II

Sl.	Technical Parameters	Qualitative requirements (QRs)
1.	Nomenclature/ Name of product/gadget/equipment	High pressure water mist CAF fire extinguisher, back pack type, ultra-light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Pressure Vessel 9/10 ltrs capacity and Air Cylinder mounted, two Nos. mounted on Motorcycle.
2.	“Conformity to National/ International standard.	The Water Mist & CAF (Back Pack) high pressure extinguisher shall be confirmed to EN 3-7:2004+A1:2007-08 standards. The complete system shall be tested for compliance from an internationally / nationally Govt. accredited laboratory for compliance to all 30 clauses (3.2, 3.15, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2, 6.3, 7.1.1, 7.1.2, 7.2,7.3, 7.4, 8.1, 8.2, 9.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6.1 &10.6.2, 14.1, 14.2, 15.2, 15.3, 16.1& 16.2) of EN 3-7:2004 + A1:2007-08 (E).Standard mandatorily applicable for the complete system.”
3.	Mounting type	Motor Cycle mounted but excluding motorcycle.
4.	Configuration/ Description	It shall be mounted on a sturdy frame suitable cushioned for comfort, provided with shoulder pads for carrying as backpack and a handle to be carried by hand. All materials used shall be of fire retardant type. Backpack shall be supplied with air cylinders.
5.	Model & Make	Model Number shall be permanently marked as declared in Govt. Accredited Laboratory Test Report.

CONSTRUCTION:

Sl.	Technical Parameters	Qualitative requirements (QRs)
------------	-----------------------------	---------------------------------------

6.	Main Components	Pressure vessel shall be hold the media with safety valve, compressed air cylinder coupled with a reducer,hose pipes for discharge of water mist media extinguishing gun.
7.	Operating temperature (max and minimum)	System shall be designed for 60°C or more and minimum 5° C or less and certified by the manufacturer as per Clause 7.4 of EN 3-7:2004+A1:2007-08 standards as per the accredited test report for backpack system.
8.	Make, Model, accessories and fittings of the Motor cycle.	Configuration (Two backpacks each containing two air cylinder of 2 litre each shall be mounted on the motorcycle Royal Enfield or equivalent, BS-VI or above Motorcycle, 5 speed 350 cc, self start, Disc brake, PO Red in color, front windshield (2mm thick good quality transparent FRP), leg guard (made from 25mmdia 16 gauge nickel plated steel pipe), a Siren (12V 30 Amp audible at a distance of 200m), two blinking lights (12 V 20W each red lights with flasher), First Aid Box (cotton absorbent100gm, Band aid10 pcs., Burnol 2 pcs. Tincture Iodine 100 ml) and Gel blanket shall also be mounted on motorcycle. The motor cycle shall have space to store two air cylinders and breathing apparatus. The wind shield shall be duly marked with a logo as desired by the user.
9.	Model Number/ Laboratory Test Report etc.	Model Number shall be permanently marked as declared in Govt. Accredited Laboratory Test Report.
10.	Air Cylinders Capacity (Ltrs)	2 liters each
11.	No. of air Cylinder	4
12.	Air Cylinder pressure (Bar)	300 bar
13.	Air Cylinder Material	Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved.
14.	Type of Foam	Special AFFF Compound conforming for higher fire rating A55, B233, Spreading coefficient for special AFFF Compound shall be +5 minimum, concentrations shall be 6%.
15.	Composition of foam	If special foam, mention the composition/ Water 96% 1,2-Ethandiol.
16.	Commercial Brand Name, laboratory test report/ fire rating with foam	Commercial Brand Name of the special foam (fire extinguishing medium) as per Govt. accredited laboratory test report wherein higher fire rating i.e. A55, B233, E1000V (Die Electric Suitability) achieved, to be declared.
17.	Characteristics of extinguishing medium of AFFF Compound with infrared spectrogram (to be	Characteristics of extinguishing medium of special AFFF compound shall be Density: 1.04 (kg/cm ³ , Viscosity : 1.35 (m ² /s), pH factor 7.8, Refractive Index 1.34 @ 20 ±2°C (Govt. accredited laboratory test report required).

	furnished)	
18.	Fire rating etc.	Class A, Class B and Electrical Fire Rating with Special AFFF Compound for backpack 55A, 233B,E1000V (Die Electric suitability) with commercial brand name of fire extinguishing medium as per Govt. accredited laboratory test report for backpack system.
19.	Pressure Vessel Material & capacity (Nominal charge)	Pressure vessel material should be Ultralite Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved having capacity 9/10 ltrs. Minimum wall thickness of pressure vessel shall be 5mm.
20.	Capacity (Nominal Charge)	9 liters each
21.	Extinguishing gun material	Stainless Steel
22.	Extinguishing gun weight	Shall not more than 750 ± 50 gram.
23.	Length and standard of Hose	Hose shall be EN marked, not less than 1.3 meter for backpack system.
24.	Weight of fully charged Backpack system vessel having Ultralite Carbon Composite with liner made of PET/PA/HDPE/Aluminum or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel.	Weight of each fully charged Backpack system having Ultralite Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel Shall not be more than 20 kg.
25.	Overall weight of the Two wheeler	The gross weight of the Two wheeler shall not be more than the permissible limit of the RTO carrying with Two pillions.

PERFORMANCE:-

26.	High Pressure Type Dynamic Operating pressure type, report etc. for Ultralite Carbon Composite vessel.	High Pressure Type (Dynamic Operating pressure to be tested in the Govt. accredited laboratory test report which will be considered as high pressure for as per clause No. 3.15 of EN3-7:2004 + A1:2007-08 (E) Standard.) ≥ 37.6 Bar for Ultra lightCarbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel
27.	Lancing Distance of Gun	More than 15 ± 2 meter
28.	Temperature sustainability and standard	The air hoses shall be suitable for minus 40° C to 100° C temperature and EN mark on hose.

29.	Minimum operating time	25 +/-2 Second
30.	Fire Rating	55A ,233B, 1000V with AFFF Compound as per EN.

CERTIFICATION:-

31.	PED approval as per Directive 97/23/EC	PED (Pressure Equipment Directives) approval as per 97/23/EC (Encumbrance Certificate).
32.	Pressure gauge	Pressure Vessel shall include a pressure gauge fitted on the vessel (CE Marked from notified body) to measure the air cylinder pressure.
33.	“No objection certificate (NOC) for Pressure Vessel from Petroleum and Explosives Safety Organization (PESO) Nagpur .”	No Objection certificate (NOC) for Air cylinder and its valve Pressure Vessel from Petroleum and Explosives Safety Organization (PESO)/ approval from CCE Nagpur is mandatory.
34.	Pressure Vessel should have CE Marking from Notified body	Pressure vessel shall be CE marked from notified body.
35.	The air cylinders shall have PESO, Nagpur approval	The air cylinder shall be approved by PESO, Nagpur. Certificate containing body No. shall be produced at the time of delivery (PDI).
36.	Specific consent of the OEM for the value additions	Specific consent of the OEM for the value additions made along with a confirmation that fire ratings of the equipment would not be affected by these value additions.
37.	Test Report as per EN Standard (serial number 1 above)	Test Report as per EN Standard serial number 1 above shall be produced.
38.	Test Report No.	Test Report No.should be declared.
39.	Test Report Date	Test Report date should be declared.
40.	Name of NABL/ Central Govt Accredited Laboratory where Test Conducted	The name of the NABL accredited or Central Government approved laboratory where the test was conducted shall be clearly indicated.
41.	NOC Letter No. Date of PESO Nagpur for Pressure Vessel	NOC Letter No. and date should be mentioned.
42.	Pre dispatch inspection	Pre Dispatch Inspection (PDI) of product shall be carried out by CISF Fire officer as per specification, at the vendor site where all the testing facilities are available.

TRIAL DIRECTIVES (TDs) OF WATER MIST EXTINGUISHER 2X9/10LTRS CAPACITY
HIGH PRESSURE TYPE (MOTOR CYCLE MOUNTED)

PART-I

Sl.	Technical Parameters	Qualitative requirements (QRs)	Trial Directives for BOOs
1.	Motor Cycle	Royal Enfield or equivalent Motorcycle, BS-VI or above, 5 speed 350 cc, self start, Disc brake, PO Red in color, suitable for mounting of fire fighting equipment, Temp registration, insurance etc. shall be in the scope of motor cycle dealer/supplier.	Shall meet the requirement as per relevant standard and QRs. Firm has to provide certificate from OEM that there will no adverse effect on engine or chassis after modification and to be tested/ checked physically by BOOs.

PART-II

Sl.	Technical Parameters	Qualitative requirements (QRs)	Trial Directives for BOOs
1.	Nomenclature/ Name of product/gadget/equipment	High pressure water mist CAF fire extinguisher, back pack type, ultra-light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Pressure Vessel 9/10 ltrs capacity and Air Cylinder mounted, two Nos. mounted on Motorcycle.	To be checked and verified by BOOs and shall meet the requirement as per relevant standard and QRs.
2.	“Conformity to National/ International standard.	The Water Mist & CAF (Back Pack) high pressure extinguisher shall be confirmed to EN 3-7:2004+A1:2007-08 standards. The complete system shall be tested for compliance from an internationally / nationally Govt. accredited laboratory for compliance to all 30 clauses (3.2, 3.15, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2, 6.3, 7.1.1, 7.1.2, 7.2,7.3, 7.4, 8.1, 8.2, 9.2, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6.1 &10.6.2, 14.1, 14.2, 15.2, 15.3, 16.1& 16.2) of EN 3-7:2004 + A1:2007-08 (E).Standard mandatorily applicable for the complete system.”	To be checked and verified with relevant EN certificates.

3.	Mounting type	Motor Cycle mounted but excluding motorcycle.	To be checked physically by BOOs.
4.	Configuration/ Description	It shall be mounted on a sturdy frame suitable cushioned for comfort, provided with shoulder pads for carrying as backpack and a handle to be carried by hand. All materials used shall be of fire retardant type. Backpack shall be supplied with air cylinders.	To be checked physically by BOOs.
5.	Model & Make	Model Number shall be permanently marked as declared in Govt. Accredited Laboratory Test Report.	To be checked physically and verified with relevant certificates.

CONSTRUCTION:

Sl.	Technical Parameters	Qualitative requirements (QRs)	Trial Directives for BOOs
6.	Main Components	Pressure vessel shall be hold the media with safety valve, compressed air cylinder coupled with a reducer,hose pipes for discharge of water mist media extinguishing gun.	To be checked physically by BOOs.
7.	Operating temperature (max and minimum)	System shall be designed for 60°C or more and minimum 5° C or less and certified by the manufacturer as per Clause 7.4 of EN 3-7:2004+A1:2007-08 standards as per the accredited test report for backpack system.	To be checked and verified with relevant EN certificates by BOOs.
8.	Make, Model, accessories and fittings of the Motor cycle.	Configuration (Two backpacks each containing two air cylinder of 2 litre each shall be mounted on the motorcycle Royal Enfield or equivalent Motorcycle, BS-VI or above, 5 speed 350 cc, self start, Disc brake, PO Red in color, front windshield (2mm thick good quality transparent FRP), leg guard (made from 25mmdia 16 gauge nickel plated steel pipe), a Siren (12V 30 Amp audible at a distance of 200m), two blinking lights (12 V 20W each red lights with flasher), First Aid Box	To be checked and verified by BOOs.

		(cotton absorbent 100gm, Band aid 10 pcs., Burnol 2 pcs. Tincture Iodine 100 ml) and Gel blanket shall also be mounted on motorcycle. The motorcycle shall have space to store two air cylinders and breathing apparatus. The wind shield shall be duly marked with a logo as desired by the user.	
9.	Model Number/ Laboratory Test Report etc.	Model Number shall be permanently marked as declared in Govt. Accredited Laboratory Test Report.	To be checked and verified by BOOs.
10.	Air Cylinders Capacity (Ltrs)	2 liters each	To be checked and verified with relevant EN and PESO certificates.
11.	No. of air Cylinder	4	To be checked physically by BOOs.
12.	Air Cylinder pressure (Bar)	300 bar	To be checked physically by BOOs.
13.	Air Cylinder Material	Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved.	To be checked and verified with relevant EN and PESO certificates.
14.	Type of Foam	Special AFFF Compound conforming for higher fire rating A55, B233, Spreading coefficient for special AFFF Compound shall be +5 minimum, concentrations shall be 6%.	To be checked and verified with relevant certificates from Govt approved lab.
15.	Composition of foam	If special foam, mention the composition/ Water 96% 1,2-Ethandiol.	To be checked and verified with relevant certificates from Govt. approved lab.
16.	Commercial Brand Name, laboratory test report/ fire rating with foam	Commercial Brand Name of the special foam (fire extinguishing medium) as per Govt. accredited laboratory test report wherein higher fire rating i.e. A55, B233, E1000V (Dielectric Suitability) achieved, to be declared.	To be tested physically and verified by BOOs and verified with relevant certificate from Govt. approved lab.

17.	Characteristics of extinguishing medium of AFFF Compound with infrared spectrogram (to be furnished)	Characteristics of extinguishing medium of special AFFF compound shall be Density: 1.04 (kg/cm ³ , Viscosity : 1.35 (m ² /s), pH factor 7.8, Refractive Index 1.34 @ 20 ±2°C (Govt. accredited laboratory test report required).	To be checked and verified with relevant certificates from Govt. approved lab.
18.	Fire rating etc.	Class A, Class B and Electrical Fire Rating with Special AFFF Compound for backpack 55A, 233B,E1000V (Die Electric suitability) with commercial brand name of fire extinguishing medium as per Govt. accredited laboratory test report for backpack system.	To be checked and verified with relevant certificate as per EN from NABL accredited or Central Govt. approved lab.
19.	Pressure Vessel Material & capacity (Nominal charge)	Pressure vessel material should be Ultralite Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved having capacity 9/10 ltrs. Minimum wall thickness of pressure vessel shall be 5mm.	To be checked physically and verified with relevant certificate by BOOs.
20.	Capacity (Nominal Charge)	9 liters each	To be checked physically and verified by BOOs.
21.	Extinguishing gun material	Stainless Steel	To be checked physically and verified with relevant certificate by BOOs.
22.	Extinguishing gun weight	Shall not more than 750 ±50 gram.	To be checked physically by BOOs.
23.	Length and standard of Hose	Hose shall be EN marked, not less than 1.3 meter for backpack system.	To be checked physically and verified with relevant certificate by BOOs.
24.	Weight of fully charged Backpack system vessel having Ultralite Carbon Composite with liner made of	Weight of each fully charged Backpack system having Ultralite Carbon Composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material,	To be checked physically by BOOs.

	PET/PA/HDPE/Aluminum or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel.	compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel Shall not be more than 20 kg.	
25.	Overall weight of the Two wheeler	The gross weight of the Two wheeler shall not be more than the permissible limit of the RTO carrying with Two pillions.	To be checked physically by BOOs.

PERFORMANCE:-

26.	High Pressure Type Dynamic Operating pressure type, report etc. for Ultralite Carbon Composite vessel.	High Pressure Type (Dynamic Operating pressure to be tested in the Govt. accredited laboratory test report which will be considered as high pressure for as per clause No. 3.15 of EN3-7:2004 + A1:2007-08 (E) Standard.) ≥ 37.6 Bar for Ultra light Carbon composite with liner made of PET/PA/HDPE/Aluminium or any internationally accepted liner material, compliant with PED 97/23/EC, CE marking requirements and PESO approved Vessel	To be checked and verified with relevant certificate as per EN by BOOs.
27.	Lancing Distance of Gun	More than 15 ± 2 meter	To be checked physically by BOOs.
28.	Temperature sustainability and standard	The air hoses shall be suitable for minus 40° C to 100° C temperature and EN mark on hose.	To be checked and verified with relevant certificate as per EN by BOOs.
29.	Minimum operating time	25 $\pm$ 2 Second	To be checked physically by BOOs.
30.	Fire Rating	55A ,233B, 1000V with AFFF Compound as per EN.	To be checked physically and verified with relevant certificate as per EN by BOOs.

CERTIFICATION:-

31.	PED approval as per Directive 97/23/EC	PED (Pressure Equipment Directives) approval as per 97/23/EC (Encumbrance Certificate).	To be checked and verified with relevant certificate as per EN by BOOs.
32.	Pressure gauge	Pressure Vessel shall include a pressure	To be checked physically

		gauge fitted on the vessel (CE Marked from notified body) to measure the air cylinder pressure.	and verified with relevant certificate by BOOs.
33.	“No objection certificate (NOC) for Pressure Vessel from Petroleum and Explosives Safety Organization (PESO) Nagpur .”	No Objection certificate (NOC) for Air cylinder and its valve Pressure Vessel from Petroleum and Explosives Safety Organization (PESO)/ approval from CCE Nagpur is mandatory.	To be checked and verified with relevant certificate by BOOs.
34.	Pressure Vessel should have CE Marking from Notified body	Pressure vessel shall be CE marked from notified body.	To be checked and verified with relevant certificate by BOOs.
35.	The air cylinders shall have PESO, Nagpur approval	The air cylinder shall be approved by PESO, Nagpur. Certificate containing body No. shall be produced at the time of delivery (PDI).	To be checked and verified with relevant certificate by BOOs.
36.	Specific consent of the OEM for the value additions	Specific consent of the OEM for the value additions made along with a confirmation that fire ratings of the equipment would not be affected by these value additions.	To be checked and verified with relevant certificate by BOOs.
37.	Test Report as per EN Standard (serial number 1 above)	Test Report as per EN Standard serial number 1 above shall be produced.	To be checked and verified with relevant certificate as per EN by BOOs.
38.	Test Report No.	Test Report No.should be declared.	To be checked physically by BOOs.
39.	Test Report Date	Test Report date should be declared.	To be checked physically by BOOs.
40.	Name of NABL/ Central Govt Accredited Laboratory where Test Conducted	Name of NABL/Central Govt. Accredited laboratory where test conducted is required.	Firm to submit certificates from NABL/Central Govt. Accredited laboratory for confirming. To be checked and verified by BOOs.
41.	NOC Letter No. Date of PESO Nagpur for Pressure Vessel	NOC Letter No. and date should be mentioned.	To be checked and verified with relevant certificate by BOOs.
42.	Pre dispatch inspection	Pre dispatch inspection of product shall be carried out by CISF Fire Officer as	To be conducted by the BOOs at the site of the

		per QRs at the vendor site where all the testing facilities are available.	Vendor.
--	--	--	---------