

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

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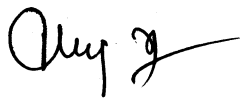
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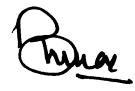
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		ACFT). q. Fordability: not less than 608 mm. r. Articulation: 300 mm (minimum). s. All electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against 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 Kg/ 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

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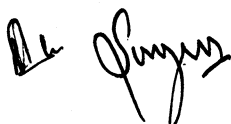
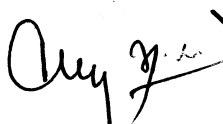
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		and AC receptacle on ground. k) Exhaust: To be located far away from pump operating position. l) Service Brake: All wheel type with split circuit. m) Towing eye/hook: 2 at front and 2 at rear n) Power take off: Engine department. Power to be operated 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 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 hydrostatic pressure of 0.3kg/cm². 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 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.

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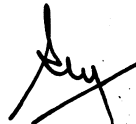
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		g. Spillage/surging/frothing: not allowed during accelerating/braking/ concerning. h. Foam quality standard: AR-AFFF as per IS 4989 (Part IV) specification and foam expansion ratio shall be 1:8 i. Foam production: Uninterrupted during creeping moving. 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 90° 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

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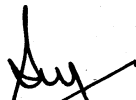
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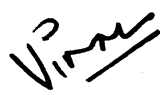
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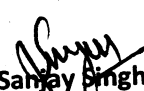
		z. Compressed Air carbon composite Breathing Apparatus set positive pressure 45 min duration complete with spare cylinders as per EN:137-4 set. (Technical specifications enclosed). aa. Medical First Aid Kit-01 set. bb. Special DCP Fire extinguisher for metal Fire-5 Kgs Cap: 02 Nos. (IS:15683) IS marked.
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.
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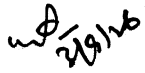

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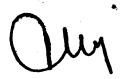

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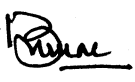

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Sh. Amit Saran
(DIG/CISF)


Sh. Vijay Prakash, IPS
ADG (HQ)/CISF
Chairman

3/9/2020


Director General/CISF

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

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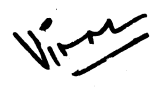
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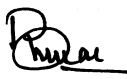
		condition in both ways i. Steering: Right Hand Steering is mandatory. j. Angle of Approach: 30 Degree Min. k. Angle of Departure: 30 Degree Min. l. Inter axle Clearance Angle: 12 degree Min. m. Under axle clearance FA/RA: as per BIS requirement. n. Slide Slope: 20% on both sides. o. Gradability: As per 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.
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		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.

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		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.

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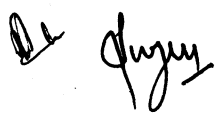
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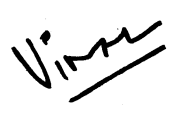
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		should be suitably baffled to prevent surging. d. The manhole of the tank of 450 mm diameter shall be used for foam filling and shall be clearly marked 'FOAM'. Means shall be provided for automatic venting of the foam compound tank when foam is being 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/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	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.

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		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.

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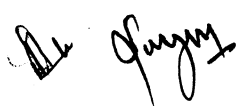
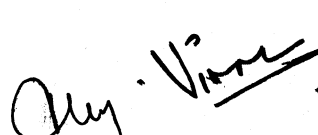
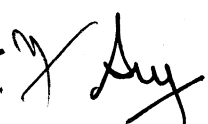
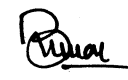
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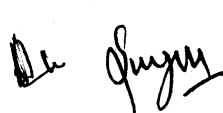
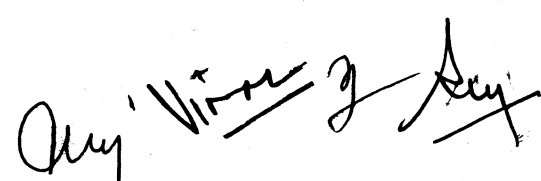
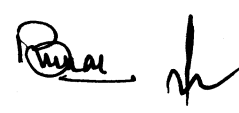
16.	Additional accessories fitted on vehicle	a. Siren: 95 decibel sound output at 100 m ahead and not less than 90° within side at a distance of 100 m, siren shall be mounted on cabin roof top and shall be fully protected from foam spills, rain water, dust and any damage due to monitor rotation. It shall 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.	It shall be checked physically, tested and should meet the requirement as per 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.	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.




		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.	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 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)	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.
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.	It shall be checked physically, tested and should meet the requirement as per relevant standards and QRs.





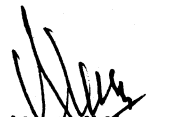




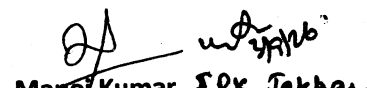

		g. Details of tools for maintenance/repairs/overhaul. h. The manufactures shall guarantee the materials, workmanship and operation for a period of 24 months from the receipt of equipment. i. Practical operation training to certain assemblies of specialized nature to be arranged. j. The supplier shall provide a list of customers with details to whom such equipment was supplied during past 3 years.	
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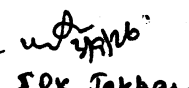

Sh. S K Yadav
(AC/BSF)


Sh. Vimal
(DC/SSB)

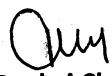

Sh. Anil Kapoor
(AC/ITBP)


Sh. Sanjay Singh
(AC/NSG)

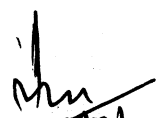

Manoj Kumar
(AC/CRPF)

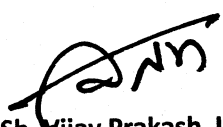

S P K. Tachar
A14/F, CISF


Sh. Rajesh Shukla
(ADO/DFS)


Sh. Pankaj Chawla
(Sc. "F"/CFEES-DRDO)


Sh. Binay Kumar
(AD/BPR&D)


Sh. Anil Bhatnagar
(DIG/CISF)


Sh. Vijay Prakash, IPS
ADG (HQ)/CISF
Chairman

3/9/2026


Director General/CISF

