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

| Sl. | Specification | Qualitative requirements |
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| 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 :<br>**a.** Airport Service Manual- Part- I, DOC No. 9137-AN 1899 with latest applicable amendments.<br>**b.** Indian Standard IS 951:2003 (Functional requirement for Airfield Crash Tender)<br>**c.** National Fire Protection Code 414 edition 2012.<br>**d.** BS-VI/latest available.<br>**e.** Chassis: 6x6 chassis. |
| 3. | **Basic requirement** | **a.** Capacity of water tank: 6500 Ltrs.<br>**b.** Capacity of Foam tank 800 Ltrs or 12% of Water Capacity.<br>**c.** Auxiliary Foam Compatible: DCP (150 Kgs)<br>**d.** Overall Size should match the vehicle requirement<br>**e.** Drive: All Wheel Capability (Configuration 6x6)<br>**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.<br>**g.** Centre of Gravity: Centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading.<br>**h.** Tilt Angle/Stability: 28/30 degree on static condition in both ways<br>**i.** Steering: Right Hand Steering is mandatory.<br>**j.** Angle of Approach: 30 Degree Min.<br>**k.** Angle of Departure: 30 Degree Min.<br>**l.** Inter axle Clearance Angle: 12 degree Min.<br>**m.** Under axle clearance FA/RA: as per BIS requirement |



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| | | viii) 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.<br>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.<br>**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 5 persons including driver (two adjustable seats and a long fixed seat for 3 crew member). In addition there shall be instrument panel and equipment as specified without any hindrance to crew.<br>**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 $90^0$ for easy ingress and egress of crew.<br>**iii)** The cabin shall be weather proof and shall be full insulated thermally and acoustically with a fire resistant material.<br>**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.<br>**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.<br>**iii)** The services brakes shal stop t he vehic e within 1 0 7 m from 32 kmph and within 40 m from 64 kmph on a dry hard appropriat y roadway l evel, free from l oose materials and suffic ent y wide roadway wi hout any part of vehic e eav ng roadway |

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| | | 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.<br>q. Wheels: single wheel type<br>r. Tyres: with tubes or tubeless<br>s. Crew cabin: driver+5<br>t. Access doors: easy accessible to engine, pump, foam proportional system, battery storage, fluid reservoir.<br>u. Extension Ladder: Alloy aluminium extension ladder (10.5 m) light alloy Truss type - 1 No.<br>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<br>b. Filling: self-refilling from pump<br>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:<br>a) 20 percent side slop, and<br>b) 30 percent ascending/descending slope.<br>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/cm$^2$. The sheet thickness shall be as follows:-<br>Bottom : 5mm<br>Sides/front/Rear/Top : 4mm<br>Baffles : 3mm<br>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" |



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| | | i. Foam production: Uninterrupted during creeping/ moving.<br>j. "Foam proportioner" Induction rate 3% ,6% or 8% pre adjustable standard setting .<br>k. Filling hole with a trough on top shall be connected with a pipe reaching at the bottom to avoid aeration in the liquid.<br>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.<br>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.<br>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/cm$^2$ 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 Kgf/Cm$^2$ to suit monitor output for same suction.<br>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.<br>d. The entire pump assembly shall be hydraulically tested at 21.0 bar for at least 5 minutes.<br>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.<br>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.<br>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 |

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| **13.** | **Handlines** | a. Numbers: Two side lines on each side, operable from both cabin and panel.<br>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.<br>c. Control: Pneumatic ball valve type from cabin + additional manual control<br>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 120 l/min. |
| **14** | **Dry Chemical Powder systems (Supplementary extinguishing agent)** | a. No. of cylinders : 2 (One on each side)<br>b. Capacity: 75 Kgs each<br>c. Location: Suitably mounted in the storage locker.<br>d. Propellant gas: Dry Nitrogen in cylinder (cylinders shall be CCE approved).<br>e. Discharge Rates: 2.25 Kgs/sec.<br>f. DCP type: Foam compatible Dry Chemical Powder.<br>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<br>b. Pressure gauge (25kgf/cm$^2$)<br>c. foam tank pressure valve control(Foam tank valve control)<br>d. Monitor operation pneumatic pressure air control<br>e. Auxiliary air control.<br>f. Self defence foam nozzle control<br>g. Engine revolving control – RPM meter<br>h. Engine temperature lubricating oil temperature gauge.<br>i. Engine oil pressure gauge.<br>j. Battery charging meter- Ammeter |

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| | | f. Multipurpose control branch pipe with male Instantaneous coupling, Qty-2 Nos.<br>g. Self-contained portable emergency light working on rechargeable battery, Qty 2 Nos.<br>h. Quick release knife - IS 5486, Qty-6 Nos.<br>i. 16mm diameter made by polypropylene rope length 30 m, Qty- 1 Nos.<br>j. Portable first aid box, Qty-1 No.<br>k. Foam making branch pipe FMB (10X). Qty - 2 nos.<br>l. 3 layer Fire Proximity suit (aluminized) with helmet (IS-2745), hood, gloves & boots, DIFR Approved, Qty-1 No.<br>m. Rubber hand gloves (20000V resistance) IS:4770, Qty-2 pairs.<br>n. Fireman helmets IS marked (IS:2745)- Qty 6 Nos.<br>o. Fast Battery Charger, Single phase, 12-24V/60 Amps.<br>p. Fireman Axe IS marked (IS:926) insulated for 20000V-2 Nos. Axe Serrated for 20000 V-2 Nos.<br>q. Bolt cutter – 2 Nos.<br>r. Wrench adjustable – 2 Nos.<br>aa. Ex-hand search light with charger- 1 No.<br>ab. Fire blanket 160x200 cm-2 Nos.<br>ac. Multipurpose petrol driven circular saw -1 Nos.<br>ad. PVC heavy duty stretcher.<br>ae. Portable High pressure water mist extinguisher-10 Ltrs capacity – 1 No. (Technical Specifications enclosed)<br>af. Standard tool kit – 1 No.<br>ag. Compressed Air carbon composite Breathing Apparatus set positive pressure 45 min duration complete with 4 spare cylinders as per EN:137 - 4 set. (Technical specifications enclosed).<br>ah. Medical First Aid Kit – 01 set.<br>ai. Special DCP Fire extinguisher for metal Fire-5 Kgs Capacity : 02 Nos. (IS:15683) IS marked. |

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| 18 | **SPECIAL FEATURES:** | a. Automatic lubrication system<br>b. 2x250 high pressure- LED lamp with remote control.<br>c. Rescue Tools:<br>i) Hydraulic Combi Tool-01 No.<br>ii) Self-rescue automatic escape (standard size): 01 No.<br>iii) Shovel, Spades, Pick Axe with handle, Axes Crow Bar 1 Meter long, Hammer -10 Kg. Sledge Hammer 01 No. Each.<br>iv) Long line 100 m size 50mm circumferences.<br>v) Rescue saw for laminated glass, metal and wood with charger and replaceable spare blades<br>vi) Hydraulic door opener-01 No.<br>vii) Safety Belt – full body harness with hook & rope -02Nos.<br>viii) Rescue Rams with accessories -01 No.<br>ix) Hydraulic cutter – 01 No.<br>x) Hydraulic spreader with pulling chains and adaptors- 01 No.<br>d. External power supply drive end plug for 220V<br>e. 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.<br>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.<br>Pump test to check rated output at varying pump pressures and to check increase in the temperature of engine oil and lubrication oil.<br>c. **Primer Test:** to check time required (36 seconds) for vertical lift of 7 m using 140 mm dia suction hose.<br>d. Foam induction/discharge rate confirming to IS specification.<br>e. **Expansion rate**- 1:(8-12) |
| 20 | **Manufacture Marking on Metallic Plate** | a. Manufacturers name and trademark must be Embossed on the pump casing.<br>b. Year of manufacture<br>c. Pump Capacity (Ltrs/min) and Pump No.<br>d. Water tank/foam tank capacity<br>e. Chassis model and serial No. and suppliers address<br>f. Instructions plate on each control panel for each reference of the driver/operator |



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| 21 | **General condtions:** | a. Supplier should supply 1 set of manuals as follows along with tender<br>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.<br>c. Parts manual with illustrated details of superstructure/sub. Assemblies, spares for each units, brought out item and sources of supply.<br>d. Repair/maintenance manual fully illustrated repair/overhaul illustration, tderance for fitting tools and procedures for dismanting and reassembly.<br>e. General arrangement drawings showing layout of equipment, piping, fluid flow control, electrical/structural design.<br>f. Spares parts list (with cost) for 2 years maintenance support.<br>g. Details of tools for maintenance/repairs/overhaul.<br>h. The manufactures shall guarantee the materials, workmanship and operation for a period of 24 months from the receipt of equipment.<br>i. Practical operation training to certain assemblies of specialized nature to be arranged<br>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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