

**Eol for Technology tie-up for Airfield Crash Fire Tender (ACFT) /  
Aircraft Rescue Fire Fighting Truck (ARFFT) Chassis**

EOI Ref: CTPAM /ACFT/2024

Date: 13-08-2024

**M/s. BEML Limited,  
BEML Soudha, 23/1,4<sup>th</sup> Main  
Sampangirama nagar,  
Bengaluru – 560027, India.**

**Notice for Inviting  
Expression of Interest (Eol)  
for Technology tie-up for -**

**Airfield Crash Fire Tender (ACFT) /  
Aircraft Rescue Fire Fighting Truck (ARFFT) Chassis**

**Reference No: CTPAM/ACFT/2024**

**Due closing date: 16.09.2024**

**Eol response mail ID: [bemleoi@bemltd.in](mailto:bemleoi@bemltd.in)**

**Contact for  
Clarifications:** **Gp. Capt. Chakrapani Mandela**  
**General Manager**  
**Corporate Technology Planning & Alliance Management**  
**BEML Soudha, BEML Limited**  
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**Mobile:+91-9731561710**

**Issued by**

**BEML LIMITED**

**(Schedule 'A' Company under Ministry of Defence, Government of India)**

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**SECTION-1**

**Disclaimer**

- 1.1** The information contained in this Expression of Interest (Eol) document provided to the Prospective Collaborator(s), by or on behalf of M/s BEML Limited or any of its executives or advisors, is provided to the Prospective Collaborator(s) on the terms and conditions set out in this Eol document and all other terms and conditions subject to which such information is provided.
- 1.2** The purpose of this Eol document is to provide the Prospective Collaborator(s) with information to assist the formulation of their proposal. This Eol document does not purport to contain all the information each Prospective Collaborator may require. This Eol document may not be appropriate for all persons, and it is not possible for BEML Limited, its executives or advisors to consider the business/investment objectives, financial situation and particular needs of each Prospective Collaborator who reads or uses this Eol document. Each Prospective Collaborator should conduct his own investigations and analysis and should check the accuracy, reliability and completeness of the information in this Eol document and where necessary, obtain independent advice from appropriate sources.
- 1.3** BEML Limited, its executives and advisors make no representation or warranty and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of the Eol document.
- 1.4** BEML Limited may, in its absolute discretion, but without being under any obligation to do so, modify, amend or supplement the information in this Eol document.
- 1.5** The issue of this Eol does not imply that BEML Limited, is bound to select and shortlist any or all the Prospective Collaborator(s). Even after selection of suitable Prospective Collaborator, BEML Limited is not bound to proceed ahead with the Prospective Collaborator and in no case be responsible or liable for any commercial and consequential liabilities in any manner whatsoever.
- 1.6** The Prospective Collaborator(s) shall bear all costs associated with the preparation, technical discussion/presentation and submission of response against this Eol. BEML Limited shall in no case be responsible or liable for these costs regardless of the conduct or outcome of the Eol process.
- 1.7** Canvassing in any form by the Prospective Collaborator(s) or by any other agency on their behalf shall lead to disqualification of their Eol.

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- 1.8** Notwithstanding anything contained in this Eol, BEML Limited, reserves the right to accept or reject any application and to annul the Eol process and reject all applications, at any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof. In the event that BEML Limited rejects or annuls all the applications, it may at its discretion, invite all eligible Prospective Collaborators to submit fresh applications.
- 1.9** BEML Limited reserves the right to disqualify any applicant during or after completion of Eol process, if it is found there was a material misrepresentation by any such applicant or the applicant fails to provide within the specified time, supplemental information sought by BEML Limited.
- 1.10** BEML Limited reserves the right to verify all statements, information and documents submitted by the applicant in response to the Eol. Any such verification or lack of such verification by BEML Limited shall not relieve the applicant of his obligations or liabilities hereunder nor will it affect any rights of BEML Limited.

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**SECTION-2**

**Schedule of Eol process & contact details**

**A. Schedule of Eol process**

The schedule of activities during the Eol Process shall be as follows

<b>Sl.No.</b>	<b>Description</b>	<b>Date</b>
1.	Issue of Eol Document	12.08.2024
2.	Last date of Submission of Eol response	16.09.2024

**B. Contact Details related to Eol**

**Chief of Vendor Development Cell**

23/1, 4<sup>th</sup> Main SR Nagar

BEML Soudha

BEML Limited

Bangalore-560027

Karnataka

India.

Mobile:9886379085 / 080 22963253

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**SECTION-3**

**About BEML Limited**

BEML Limited (formerly Bharat Earth Movers Limited) was established in May 1964 as a Public Sector Undertaking. The Company operates under three major Business verticals viz., Mining & Construction, Defence and Rail & Metro which are classified into 11 SBU's & 2 Micro SBU'S. The three verticals are serviced by four manufacturing units located at Bangalore, Kolar Gold Fields (KGF), Mysore and Palakkad. The products manufactured under the three Business Verticals are mentioned below.

<b>Defence &amp; Aerospace</b>	<b>Mining &amp; Construction</b>	<b>Rail &amp; Metro</b>
Tatra based High Mobility Trucks	Bull Dozers	Integral Rail Coaches
Recovery Vehicles	Excavators	Metro Cars
Bridge Systems	Loaders	AC EMUs
Vehicles for Missile Projects	Pipe Layers	OHE Cars
Tank Transportation Trailers	Wheeled Dozers	Steel and Aluminium Wagons
Milrail Wagons	Tyre Handlers	Track Laying Equipment
Mine Ploughs	Shovels	Utility Vehicles
Crash Fire Tenders	Dumpers	Treasury Vans
Snow Cutters	Water Sprinklers	Spoil Disposal Units
Aircraft Towing tractors	Motor Graders	Broad gauge Rail bus
Aircraft Weapon Loading Trolley	Underground Mining Equipment	

More details about the entire range of BEML's products and operations can be viewed by visiting our web site [www.bemlindia.in](http://www.bemlindia.in)

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**SECTION-4**

**Details of Expression of Interest (Eol)**

**4.1 Introduction:**

**4.1.1** BEML Limited is actively seeking partnerships with globally reputed Original Equipment Manufacturers (OEMs) who are looking to establish or expand their market, sourcing/manufacturing footprint in India for Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT).

**4.1.2** This Expression of Interest (Eol) seeks response from the Prospective Technology Collaborator(s), who are willing to be associated with BEML Limited through strategic partnership for joint development or supply of Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India (AAI).

**4.2 Scope of Cooperation:**

**4.2.1** BEML Limited through this Expression of Interest(s) is seeking Prospective Collaborator(s) for Technology Collaboration Agreement (TCA) for joint development of Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India AAI in accordance with the applicable requirement of **ICAO Doc-9137, NFPA-414** and other applicable regulations.

**4.2.2** The TCA shall enable BEML Limited to Design, Engineer, Manufacture, Assemble, Test, Supply, Field Install, Commission, Repair, Service and Retrofit Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India (AAI).

**4.2.3** The company should be interested to associate with BEML Limited in any of the following mode or co-operation subsequent to initial supply of completely build units.

- a) Joint Manufacturing.
- b) Providing Manufacturing License to BEML Limited.
- c) Providing Technology License to BEML Limited.
- d) Transfer of Technology (ToT) agreement.
- e) New Technology Development by joint working agreement.
- f) Any of the above or combination of above is also acceptable.

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**4.2.4** Government of India (GoI) intends to procure Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) under Buy (Indian-IDDMM) Category of Chapter II of Defence Acquisition Procedure (DAP) 2020. Buy (Indian)-IDDMM Category refers to the acquisition of from an Indian vendor for the products that have been indigenously designed, developed and manufactured with a minimum of 50% Indigenous Content (IC) on cost basis of the base contract price i.e. total contract price less taxes and duties.

**4.2.5** The latest version of DAP 2020 can be accessed on GoI, MoD website:  
<https://mod.gov.in/dod/defence-procurement-proc--dap>.

**4.2.6** Interested Parties meeting the Pre-qualification requirements (PQR) as specified in clause 4.3 below are invited to submit their response to this Eol, as per indicative scope of technology transfer given in Annexure-1. Upon receipt of response(s) against this Eol, BEML Limited will review the response(s) to ascertain suitability of the offer and shortlist Prospective Collaborator(s) for further discussions. Detailed discussions on commercial and other terms and conditions to finalize the Technology Collaboration Agreement (TCA) shall be held with shortlisted Prospective Collaborator(s). The detailed terms and conditions for such a paid-up license agreement shall be mutually agreed upon.

**4.3 Pre-qualification requirements (PQR):**

**4.3.1** The Prospective Collaborator(s) shall meet following qualification requirements as on the date of submission of Eol (to be substantiated by a documentary evidence):

**4.3.2** The Prospective Collaborator should have designed, engineered, manufactured, tested, supplied and commissioned similar vehicle (broad technical specifications at **Annexure-3 & Annexure-4**) and such equipment should have completed at least three (03) years of service in India as on date of closing of this Eol.

OR

**4.3.3** The Prospective Collaborator should have designed similar Aircraft Rescue Fire Fighting Truck (broad technical specifications at **Anenxure-3 & Annexure-4**) and their designed equipment should have completed at least three (03) years of service in India as on date of closing of this Eol.



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**4.4 Instructions:**

**4.4.1** The interested Prospective Collaborator(s) should submit their response(s) along with enclosed Annexures on or before **16.09.2024**

**Annexure-1:** Indicative Scope of Technology Transfer.

**Annexure-2:** Prospective Collaborator's Experience in the field of Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India (AAI).

**Annexure-3:** General technical specifications of Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for 6500L capacity proposed for TCA.

**Annexure-4:** General technical specifications of Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for 10000L capacity proposed for TCA.

**Annexure-5:** Reference List: The Prospective Collaborator's major supplies in last 15 years.

**4.4.2** The response shall necessarily be accompanied with following details:

- a) Company background.
- b) Product Profile.
- c) Technical details.
- d) Reference list of customers.
- e) Annual Audited financial reports for last 3 (three) years.

**4.4.3** Language: All correspondences and documents related to the Eol response shall be in English language, provided that any printed literature furnished by the Prospective Collaborator(s) may be written in another language, as long as such literature is accompanied by a translation of its pertinent passages in English language in which case, for purposes of interpretation of the bid, the English translation shall govern.

**4.4.4** The Prospective Collaborator(s) shall abide by the terms & conditions, as applicable, of the Eol.

**4.4.5** All pages of the response against this Eol shall be duly signed by the authorised signatory.

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**4.4.6** Multiple proposals from the same Prospective Collaborator should not be submitted.

**4.4.7** BEML Limited at its discretion shall inspect the Prospective Collaborator's works/office/reference site premises for the purpose of evaluation, as deemed necessary before selection of Collaborator. BEML Limited decision in this regard shall be final.

**4.4.8** Any Prospective Collaborator which has been debarred/blacklisted by Central/State Governments of India or by any entity controlled by Central/State Governments of India from participating in any of their project, as on date of submission of Eol, shall not be eligible to submit the Eol.

**4.4.9** BEML Limited shall receive applications pursuant to this Eol in accordance with the terms set forth herein, as modified, altered, amended and clarified from time to time by BEML Limited, and all applications shall be submitted in accordance with such terms on or before the date specified in this Eol for submission of applications. In case any amendment/corrigendum to this Eol is issued, it shall be notified only in the BEML Limited website [www.bemlindia.in](http://www.bemlindia.in)

**4.4.10** Shortlisted bidder should consider following also while submitting the response

- a) Prospective partner may also be required to enter into a long-term Supply Agreement and meet the expected delivery requirements and other Terms & Conditions of RFP / Tender to be issued by BEML Limited on cost basis.
- b) Prospective partner should be willing to associate with BEML Limited for conducting the Field Evaluation Trials conducted by various agencies.
- c) The prospective partner shall be required to provide the desired Unit(s) of ACFT/ARFFT chassis for Field Evaluation Trials in varying climatic altitude and terrain conditions in India.
- d) Prospective partner would be required to support BEML Limited during interactions with the various agencies in India for initial screening, participation in the customer RFP / Tender and subsequent qualification process by way of deputing their experts to India and providing the required information and clarifications as required/sought by customer.
- e) Prospective Collaborator shall provide firm and irrevocable commitment to provide product support in terms of maintenance, materials and spares etc. for a minimum period of 15 years from the date of last supply to BEML Limited.

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- f) Prospective partner is required to confirm that in case of getting shortlisted as a result of this Eol process, following support shall necessarily be provided to BEML Limited in order to enable BEML Limited to prepare and submit a competitive techno-commercial bid to customer as per the terms of the customer RFP / Tender (& other requirements as applicable) and also to successfully execute the contract in case of BEML Limited emerging as L1 bidder:
- I. To provide costing elements required for preparation of BEML offer against customer RFP.
  - II. To provide a price list with long term validity with Price Variation Clause for assemblies / subassemblies / components / spares / Manufacturer's Recommended List of Spares etc. for items to be sourced from prospective partner.
  - III. Any other requirement felt necessary as per customer.
  - IV. Above mentioned requirements are only indicative in nature, however any other document/information/input required by BEML Limited for cost estimation and for preparation & submission of techno-commercial bid to customer shall have to be provided by the prospective partner.

**4.5 Process to be Confidential:**

**4.5.1** Information relating to the examination, clarification, evaluation and comparison of Eol and recommendations shall not be disclosed to Prospective Collaborator(s). Any effort by Prospective Collaborator(s) to influence BEML Limited in processing of Eol or selection decisions may result in the rejection of the response against Eol.

**4.6 Governing Laws & Jurisdiction:**

**4.6.1** The Eol process shall be governed by, and construed in accordance with the laws of India and the Courts at Bangalore (India) shall have exclusive jurisdiction over all disputes arising under, pursuant to and / or in connection with the Eol process. Any foreign entity interested for collaboration with BEML Limited of building ACFT/ARFFT chassis must have necessary clearance from their Government for Technology Sharing & Collaboration.

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**Annexure-1**

**Indicative Scope of Technology Transfer**

<b><u>Sl.No.</u></b>	<b><u>Description</u></b>
a)	Licensing & transfer of state of the art technology relating to Design, Engineer, manufacture, Assemble, Test, Supply, Field Install, Commission, Repair, Service and Retrofit Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India (AAI).
b)	Transfer of improvements/modifications/developments/up gradations to be carried out by the Prospective Collaborator(s) during the period of TCA for taking care of new market requirements and obsolescence. Subsequent updates required due to component obsolescence or updates implemented by Prospective Collaborator(s) due to safety consideration would also be provided.
c)	Assistance in planning & establishing the new manufacturing, assembly and testing facilities & processes/ suitable augmentation at BEML Limited existing facilities/processes by way of expert advice in terms of identifying, sizing & selection and preparation of specification of equipment / machinery required for manufacturing, their layout and foundation etc. Deputation of Collaborator's expert for commissioning of the manufacturing facilities, design of special tools and dies, jigs & fixtures etc.
d)	Support through engineering services from Collaborator's design office / manufacturing facilities for licensed products.
e)	Training of BEML Limited engineers to Design- know-how knowledge transfer, Engineer, Manufacture, Assemble, Test, Supply, Field Install, Commission, Repair, Service and Retrofit the Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis.
f)	Deputation of Collaborator's experts to assist BEML Limited in absorbing the technology for licensed products.
g)	Transfer of applicable Proprietary software/computer programs including logics and source code, if any.
h)	During the field trials and regular operation, if any modifications/updates are carried out to improve the performance/reliability of the system the same shall also be transferred to BEML Limited with complete know-how.
i)	Technology being proposed should be the latest/ state-of-the-art being marketed by the Prospective Collaborator.
j)	Transfer of information to enable BEML Limited to source/procure those items, which Prospective Collaborator sources from other vendors (as these are not manufactured by the Prospective Collaborator) for use in Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) Chassis for Indian Air Force (IAF), Indian Navy (IN) and Airport Authority of India (AAI).

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k)	Deputation of BEML Limited engineers to work with collaborator design team in order to absorb the technology/process being followed for licensed products.
l)	Collaborator should enter in to a joint agreement on Intellectual Property Rights (IPR) with BEML Limited, if any arising out as a result of joint work / development.

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**Annexure-2**

**Prospective Collaborator's Experience in the field of Airfield Crash Fire  
Tender(ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) Chassis**

<b><u>Sl.No.</u></b>	<b><u>Description</u></b>	<b>Prospective Collaborator's response YES/NO and remarks, if any</b>
a)	Whether the Prospective Collaborator is an Original Equipment Manufacturer (OEM) of proposed Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis for Airport/ Airfield.	
b)	Whether documentary evidence to substantiate the below PQRs has been submitted by Prospective Collaborator:	
c)	The Prospective Collaborator should have designed, engineered, manufactured, tested, supplied and commissioned similar vehicle (broad technical specifications at Annexure-3 & 4) and such equipment should have completed at least three (03) years of service within India at Civil Aviation /Military Aviation or Armed Services as on date of closing of this Eol.  OR  The Prospective Collaborator should have designed similar vehicles (broad technical specifications at Annexure-3 & 4) and their designed equipment should have completed at least three (03) years of service as on date of closing of this Eol.	
d)	Whether information on market share has been enclosed.	
e)	Whether Prospective Collaborator's detailed reference list have been enclosed.	
f)	Whether Prospective Collaborator's annual audited financial reports for last 3 years have been enclosed.	
g)	Whether the Airfield Crash Fire Tender (ACFT) / Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis of 6x6 and 8x8 configuration offered for technology collaboration is the latest being marketed by the Prospective Collaborator.	
h)	Whether customers (end users) letters / documentary evidence for satisfactory operation of model for Airfield Crash	

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	Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) chassis which is being offered to BEML Limited under this Eol have been enclosed.	
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**Signature & Seal:**

Authorised Signatory of the Prospective Collaborator

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**Annexure-3**

**General technical specifications of Airfield Crash Fire Tender (ACFT) / Aircraft  
Rescue Fire Fighting Truck (ARFFT) chassis for 6500L capacity**

The brief Technical Specifications of the chassis (6x6 or 8x8) including cabin for manufacturing ACFT/ARFFT with capacity of 6500 litres targeting requirements of the Indian Military & Civilian Aviation market is given in below table

Sl. No.	Technical Specification of ACFT/ARFFT mounted on 6x6 or 8x8 chassis	Parameter
<b>1.</b>	<b>Fully Loaded - Chassis Performance Parameters:</b>	
	1. Side slope stability (degrees)	28° Minimum
	2. Dynamic balance (kmph), minimum speed on a (30m) radius circle	35.5 kmph Minimum
	3. Angle of approach (degrees)	30° Minimum
	4. Angle of departure (degrees)	30° Minimum
	5. Inter axle clearance (degrees)	12° Minimum
	6. Underbody clearance (cm)	46 ~ 49 cm
	7. Under axle clearance at differential housing bowl (cm)	33 ~ 38 cm
	8. Diagonal opposite wheel motion (cm)	36 cm
	9. Wall-to-wall turning diameter	< Three times of the vehicle's overall length
	10. Maximum acceleration time from 0 to 80 kmph (seconds)	Within 40 seconds
	11. Top speed (kmph)	> 115 kmph
	<b>12. Service brake: Stopping distance</b>	
	i. From 33 kmph	≤ 9 m
	ii. From 64 kmph	≤ 40 m
	iii. Percent grade holding of fully loaded vehicle:	
	a) Ascending	≥ 50 %
	b) Descending	≥ 50 %
	iv. Emergency brake stopping distance at 64 kmph	≤ 88 m
	<b>13. Parking brake</b>	
	i. Percent grade holding for the parking brake	
	a) Ascending	≥ 20 %
	b) Descending	≥ 20 %
	14. Steering	Centre / Off Centre / Right Hand
	15. Drive	On all wheels
	16. Fordability (mm)	≥ 600 mm
	17. Minimum angle of Tilt (Static)	30° Minimum



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	18. Evasive manoeuvre test, NATO Document, Dynamic Stability Report- Allied Vehicle Testing Publication (AVTP), 03-16W (kmph)	40 kmph Minimum
	19. "J" turn test at 46 m radius (kmph)	48 kmph Minimum
<b>2.</b>	<b>General Requirements</b>	
	a) The ACFT/ARFFT will consist of a water tank of 6,500 Liters or more of usable water capacity with necessary fittings. The primary extinguishing agent to be foam concentrate of 3% 6% & 8% of foam concentrate. A foam concentrate tank of 800 Liters usable capacity shall have to be provided.	
	b) A midship mounted pump, either coupled with the auxiliary engine (The emission level shall be equal to or below than, the prescribed limits of Bharat Stage IV/ Euro IV levels) or Driven of the vehicle PTO mechanically, shall be fitted, having a minimum output of 4000 L/min at a delivery pressure of 8.5 kg/cm <sup>2</sup> and suction lift of 3 meters. The pump shall also capable of minimum output of 3000 litre / minute at higher pressure of 12.5 kg/cm <sup>2</sup> to suit the monitor output for the same suction lift.	
	c) When discharging foam solution, the pumping system shall be capable of discharging at a rate equal to or exceeding the total requirements of the Roof Turret, Bumper Turret or two handline nozzles, ground sweep nozzles, and under truck nozzles discharging simultaneously at designed pressures.	
<b>3.</b>	<b>Engine Performance Requirements:</b>	
	a) The vehicle's engine (s) shall be have torque and speed characteristics suitable to meet and maintain all vehicular performances. The vehicle's engine (s) shall be certified by the engine manufacturer for the ACFT/ARFFT application. In addition, provision for open canopy for engines and incorporation of brushed or brushless alternator should be incorporated.	
	b) Fully laden vehicle shall consistently be able to accelerate maximum speed, as specified, with the engine and transmission at their normal operating temperature at their normal operating temperature at any ambient temperature varying from - 25° C / 0° C to 50° C and at elevation up to 600 mtrs. above mean sea level.	
	c) The vehicle shall also be capable of ascending, stopping, starting and continued ascent on a 40% grade on dry pavement at a minimum speed of 1.6 kmph with extinguishing agents being discharged at maximum rated capacity from the turret.	
	d) The emission level shall be minimum Bharat Stage IV or equivalent / norms for emission.	
	e) In case of non-road engines, the emission levels shall be equal to or below than the prescribed limits for Bharat Stage IV/ Euro IV levels. The test certificate (EC Type/equivalent Approval Certificate), indicating emission levels, from official certification authority to be submitted.	
	f) The ACFT/ARFFT weight (kg) to engine power ratio (kW) plays an important role, in achieving response time of two minutes, as specified in ICAO documents.	

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	g) The vehicle shall be capable of operating safely on paved roads, graded gravel roads, cross country terrain, and sandy soil environments. Cross country terrain consists of open fields, broken ground, and uneven terrain.
<b>3.1</b>	<b>Engine Cooling:</b>
	Engine shall be air / water cooled so that stabilized cylinder head and oil temperature remain within the engine manufacturer's prescribed limits under all operational conditions and all ambient temperatures between -25° C to 50°C.
<b>3.2</b>	<b>Fuel System:</b>
	a) Fuel system shall qualify engine manufacturer's requirements and shall include fuel pump, fuel filtration and flexible fuel lines, well protected from damage, exhaust heat and ground fires.
	b) Accessible filtration shall be provided for each fuel supply line and a drain shall be provided at the bottom of the fuel tank
	c) Gravity feed fuel tanks are not acceptable.
	d) Fuel tank capacity shall be 150 Liters or for travelling not less than 500 km on hard surface without refuelling.
<b>3.3</b>	<b>Exhaust System:</b>
	a) The size of exhaust system shall be such that undue back pressure is not generated and under no circumstances exhaust gases enter the cabin. The system shall be of high grade, rust resistant material.
	b) Exhaust system shall be designed so as to protect it from damage that could result from rough terrain. Tailpipe of exhaust system shall be designed to discharge upwards or to the rear of the vehicle and neither towards ground nor towards panel operator.
	c) The exhaust system shall include a muffler to reduce engine noise
<b>4.</b>	<b>Vehicle Electrical System:</b>
	a) The vehicle shall be provided with 12/24 volts electrical system and 24 volts starting.
	b) The electrical system shall have negative ground including alternator and voltage regulator. Alternator shall be at 100% of anticipated load at 50% engine speed, and shall be of belt driven.
	c) The curb idle minimum-charging rate of the alternator shall be 30 Amps.
	d) Batteries shall be secured and well protected from physical injury, vibration, water sprays, engine and exhaust heat. When an enclosed compartment is provided for batteries, it shall be well ventilated and batteries shall be easily accessible for examination, test and maintenance.
	e) The circuits shall be so designed that at no stage of operation overloading, overheating, short-circuiting and fluctuation of voltage is experienced.
	f) A built-in battery charger shall be provided on the vehicle to maintain full charge on all batteries. Grounded AC receptacle shall be provided to permit a drive away plug connection from external electric power supply to battery charger.

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	g) An engine coolant/preheating device shall be provided as an aid to rapid starting and high initial engine performance.
	h) The electrical system shall be insulated, waterproofed and protected against exposure from ground fires.
	i) The effect of electromagnetic field of all electrical systems of Radio sets shall be suppressed so that it does not interfere with functioning of radio sets.
<b>5.</b>	<b>Vehicle Drive:</b>
	a) Transmission of power from engine to wheels shall be through a torque converter and fully automatic transmission, having designed input higher than output power of main engine with provision of crawling (The drive shall permit discharge at rated capacity of pump during vehicular speed from 0 kmph to a maximum of 16.1 kmph in forward and 0 kmph to a maximum of 8 kmph in rearward direction. During shifting from forward to rearward drive, the pumping system shall maintain the pre-set discharge pressure) without application of brakes. The entire drive train shall be designed to have sufficient capacity to slip the wheels of the static loaded vehicle on surface having a coefficient of friction 0.8. A range of gears providing the specified top speed and a grade-ability of 50% shall be provided with sufficient intermediate gears to achieve the specified acceleration.
	b) A transmission cooling system shall be provided and designed so that the stabilized transmission oil temperature remains within the transmission conditions and at all ambient temperatures.
<b>5.1</b>	<b>The transmission shall be matched to the engine properly and shall be approved by transmission manufacturer for the ACFT/ARFFT application.</b>
	a) The provision of positive drive to each wheel by means of a fully locked drive line shall be required in order to maximize traction on low friction surfaces. Positive drive may be achieved either by the use of automatic locking and torque proportioning differentials, or may be manually selectable by the seated driver, while the vehicle is in motion, by use of a single control
	b) All wheel drive on these vehicles shall incorporate a drive to the front and rear axles, which are engaged at all times during use. An interaxle differential shall be installed with automatic or driver selected means of differential locking.
	c) Front and rear axles shall have adequate capacity to carry the maximum imposed load under all intended operating conditions. The variations in axle track shall not exceed 20% of the tyre sectional width at rated load
<b>6.</b>	<b>Suspension:</b>
	The suspension system shall be designed to permit the loaded vehicle to :
	a) Travel at the specified speeds over improved surface;
	b) Travel at moderate speeds over unimproved surface;

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	c) Provide diagonally opposite wheel motion 360 mm above ground obstacles without raising the remaining wheels from the ground.
	d) Provide at least 50mm of axle motion before bottoming of the suspension on level ground;
	e) Prevent damage to the vehicle caused by wheel movement; and
	f) Provide a good environment for the crew when traveling over all surfaces.
<b>6.1</b>	<b>Rims, Tyres and Wheels:</b>
	a) Tyres shall be selected to maximize the acceleration speed, braking and manoeuvring capabilities of the vehicle on paved surfaces without sacrificing performance on all reasonable terrains found within the airport boundary.
	b) Tyres size shall be suitable to optimize floatation under soft ground conditions. The lowest tyre pressure shall be compatible with the high- speed performance requirement.
	c) All wheels on the vehicle shall be of the single wheel type with all rims, tyres and wheels of identical size and same tread design.
	d) Rims, tyres, wheels, and inflation pressures shall be approved by the respective manufacturers as having sufficient capacity to meet the specified performance, and shall be certified for not less than 40 Kms of continuous operation at 96 Km/h at normal operating pressure.
	e) Size of tyre should be such to meet all vehicular performances and the tyre should be preferably available in India.
<b>7.</b>	<b>Towing Connections:</b>
	Four large tow eyes or tow hooks, capable of towing the vehicle without damage, shall be mounted, two at the front and two at the rear of the truck and attached directly to the frame structure (chassis)
<b>8.</b>	<b>Brakes:</b>
	a) The braking system shall feature service, emergency and parking brake systems. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. Expanding shoe and drum brakes or caliper disc brakes shall be furnished. A brake chamber shall be provided for each wheel and shall be mounted so that no part of the brake chamber projects below the axle. Anti-lock Braking System (ABS) shall be provided.
	b) Service brakes shall be of the 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% grade.
	c) The service brakes shall have stopping distances on a dry hard appropriately level road way, free from loose materials, and sufficiently wide roadway without any part of vehicle leaving roadway.
	d) The service brakes shall provide one power assisted stop when the vehicle engine inoperative, for the stopping distances specified above.
	e) Emergency brakes: This is included in service brakes and activated in a such a

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	way that if defect is detected in braking system, the braking on two axles is always insured. So it is integrated into chassis and chassis for ACFT/ARFFT is having this feature. This is controlled by electronic brake system.
	f) The parking brake shall be capable of holding the fully loaded vehicle on a 20% grade without air or hydraulic assistance.
<b>8.1</b>	<b>Brakes-Air System</b>
	a) When the vehicle is supplied with air brakes, air compressor shall meet following criteria:
	1. The compressor shall be engine driven;
	2. The compressor shall have sufficient capacity to increase air pressure in the supply and service reservoirs from 586.1 kPa to 689.5 kPa (85 psi to 100 psi) when the engine is operating at the vehicle manufacturer's maximum recommended revolutions per minute (rpm) in a maximum of 25 seconds.
	3. The compressor shall have the capacity for quick build-up from 0 kPa (0 psi) to release spring brakes, and this build-up in pressure shall be accomplished within 15 seconds.
	4. The compressor shall incorporate an automatic air-drying system immediately downstream from the compressor to prevent condensation build-up in all pneumatic lines.
	b) Service reservoirs shall be provided. The total of the service reservoir volume shall be at least 12 times the total combined brake chamber volume at full stroke. If the reservoir volume is greater than the minimum required, proportionately longer build-up time shall be allowed using the following formula:  $\frac{\text{Actual reservoir capacity} \times 25}{\text{Required reservoir capacity}}$
	c) Reservoirs shall be equipped with air pressure regulator, drain and safety valves.
	d) Provision for charging of air tanks by a drive away electrical connection used to power a vehicle mounted auxiliary air compressor shall be provided.
	e) A drive away air connection for charging of air tanks from an external air source shall be provided
	f) Visual and audible low air pressure warning devices shall be provided. The low-pressure warning device shall be visual and audible from the inside, and audible outside of the vehicle
	g) Provision of pneumatic service outlets for inflating tyres shall be made from air compressor of ACFT/ARFFT, with a high-pressure charging tube of 30 mtrs. and nozzle. A separate provision of pneumatic service outlet for inflating pneumatic bags shall also be made from air compressor of ACFT/ARFFT.
	h) Air leakage from pressure system shall not exceed 0.3 Kg. /sq. cm. per hour so that at no stage the air pressure should reduce less than brake operating pressure in 8 hours.

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<b>9.</b>	<b>Steering:</b>
	a) The chassis shall be equipped with power assisted steering with direct mechanical linkage from the steering wheel to the steered axle(s) to permit the possibility of manual control in the event of power assist failure.
	b) The power steering shall have sufficient capacity to allow turning the tyres stop to stop with the vehicle stationary on a dry level, paved surface and fully loaded, with not more than 7 kg. pull on wheel.
	c) The wall-to-wall turning diameter of the fully laden vehicle shall be less than three times the vehicle length.
	d) Vehicle shall be designed preferably for Centre/Off Centre Right/Right Hand Drive system so that driver's left hand is free for operation of controls.
	e) Rear Axle Steering: The vehicle should have rear wheel steering for quick and sharp turning Circle radius. An electro-hydraulic steering system on second rear axle for improved manoeuvrability of the vehicle and reduction of tyre wear shall be provided. This shall ensure safe driving at all speeds.
<b>10.</b>	<b>Cabin:</b>
	a) The cabin shall be mounted on the forward part of the vehicle and shall provide seating for maximum 6 persons including Driver. The seating arrangement shall be; 2 adjustable seats and a long or separate seat (s) for three / four crewmembers with provision of stowage of fully assembled BA set suitably located to the backrest with quick release system so that it can be worn in running vehicle. In addition, there shall be instrument panel and equipment as specified without any hindrance to crew.  b) The cabin shall have 2.0 mm Aluminium chequered plate on top and support the weight of two men without damage and deflection. All structure shall be of Stainless Steel of AISI 304.
	c) The cab shall meet the visibility requirements (The vehicle shall be constructed such that a seated driver shall be able to see the ground 6 Meter ahead of the vehicle and minimum 15 degrees above the horizontal plane without leaving seat. The vision in the horizontal plane shall be 90 degrees on each side from the straight position on a full forward control). The windshield shall be shatterproof safety glass, and all other windows shall be constructed of approved safety glass. The cab shall be provided with wide gutters to prevent foam and water dripping on the windshield and side windows. There shall be enough space to keep and to enable the crew except driver to put on protective clothing and B.A. set while on way to a call. Four (02 doors each on LHS and RHS respectively) / Two doors are to be provided to the cabin based on customer requirements, with ECE R29 or equivalent test compliance as per which should be openable at 90° for easy ingress and egress of crew. In case of specially designed cabin with two doors the design should allow easy entry and exit of the crews in the rear row(s) without disturbing the crews of front row and a Centre / Off Centre Right/Right Hand

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	steering system shall be provided. A rear-view camera with a monitor at the panel shall be provided. The cab design shall take into consideration the provision of ample space for the crew to enter and exit the cab and carry out normal operations while wearing full protective equipment. This design will be considered only in case of engine is not housed within the cabin. In case the turret (monitor) having manual controls above the cab roof is provided, the cab shall be designed with a quick-access passage to the turret (monitor). Time required for mounting of the crews into the cabin from close-up position shall be less than or equal to 10 Seconds.
	d) The cab shall be weatherproof, and shall be fully insulated thermally and acoustically with a fire-resistant material. The cab may be of the unitized rigid body and frame structure type or it may be a separate unit flexibly mounted on the main vehicle frame. The cab shall be constructed from non-corrosive materials that provide lightest weight consistent with adequate strength to ensure a high degree of safety for the crew under all operating conditions including excess heat exposure, and in the event of a vehicle rollover accident. The material should also be guaranteed against any sort of deterioration, deformation, ageing and corrosion for a minimum period of fifteen years.
<b>10.1</b>	<b>Instruments, Warning Lights And Controls</b>
	a) The minimum number of instruments, warning lights and controls consistent with safe and efficient operation of the vehicle, chassis, and firefighting system shall be provided. All chassis instruments and warning lights shall be grouped together on a panel in front of the driver. All firefighting system instruments, warning lights, and controls shall be grouped together by function so as to provide ready accessibility as well as high visibility for the driver as well as a crewmember sitting in the co-driver seat. Electronic controls shall have pneumatic and/or manual override wherever possible.
	b) All instruments and controls shall be illuminated, with back lighting to be used wherever practically possible.
	c) Groupings of both the chassis and firefighting system instruments, warning lights and controls shall be easily removable as a unit or be on a panel hinged for back access by the use of quick disconnecting fitting for all electrical, air and hydraulic circuits.
<b>10.2</b>	<b>The following instruments, or warning lights, or both shall be provided as a minimum;</b>
	a) Speedometer/Odometer
	b) Engine(s) tachometer
	c) Fuel level with audio warning
	d) Air pressure
	e) Engine(s) temperature
	f) Engine(s) oil pressure
	g) Voltmeter(s)
	h) Oil temp. gauge light

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	i) Transmission(s) oil temperature
	j) Pump(s) pressure
	k) Water tank level Gauge
	l) Foam tank level Gauge
	m) Low air pressure warning
	n) Headlight beam indicator
	o) Trafficator light
	p) Hazard warning light
	q) PTO engagement light
	r) Pump hour meter
	s) Water control valve
<b>10.3</b>	The cab shall have all the necessary controls within easy reach of the driver for the full operation of the ACFT/ARFFT and the pumping system. The following cab controls shall be provided:
	a) Accelerator
	b) Parking brake control
	c) Steering wheel, with directional signal control & horn
	d) Brake pedal
	e) Transmission range selector
	f) Pump control or selector/P.T.O.
	g) Foam control
	h) Siren switch(es)
	i) Auxiliary agent control
	j) Ground Sweep/ Under truck nozzle control
	k) Turret (Monitor) controls
	l) Light switches
	m) m. Windshield wiper and washer controls
	n) Heater-defroster controls
	o) Master electrical switch
	p) Engine start/stop control
	q) Windshield deluge system switch.
	r) Water Tank Main valve control
	s) Side delivery ON/OFF valve
<b>10.4</b>	<b>Equipment:</b>
	The following minimum equipment shall be provided in or on the cab.
	a) Heater/defroster
	b) Driver's suspension seat with vertical, fore and aft adjustment, with seat belt
	c) Crew seats with individual retractable seat belts and grip hand rails.
	d) Windshield washers appropriate for removing foam
	e) Windshield wipers appropriate for removing foam
	f) Siren



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	g) Horn
	h) Sun visors, interior transparent
	i) Outside rear view mirrors (Adjustable rear-view mirrors with a glass area of not less than 385 cm <sup>2</sup> shall be provided on each side of vehicle. Each shall be provided with a minimum of 45 cm <sup>2</sup> area wide-angle convex mirrors)
	j) Interior lighting
	k) P.A. System with Microphone (Public Address (P.A.) equipment, battery operated, with wireless and cable connected microphone fitted in the cabin and loudspeaker fitted on the rooftop of cabin capable of being operated from cabin. PA system receiver should have a provision to connect one wireless microphone and one microphone with cable connection. The wireless microphone shall be of FM (Frequency Modulation) with a range of minimum 100 Meters. All PA system receivers shall be tuned to the frequency of wireless microphone)
	l) R.T. Set (VHF-AM)
	m) Self-Contained Breathing Apparatus (SCBA) mounting bracket for crew members excluding driver.
	n) Wind shield deluge system.
	o) Storage space for four Nos. of Proximity suit boxes in driver's cabin.
	p) Provision for Fire protection suit to be provided in driver's cabin
	q) Driver's Enhanced Vision System (DEVS)
	r) Rear view camera with a monitor at the panel.
	s) Hands free Intercom for five / six crew including the driver
	t) Battery Charger
	u) Data recorder
<b>11.</b>	<b>DRIVER'S ENHANCED VISION SYSTEM:</b>
	a) Provision for future installation, for a driver's enhanced vision system (DEVS), in the cab, for ACFT's/ARFFT's position on a moving map display.
	b) Provision for future installation of Low Visibility Enhanced Vision System consisting of a FLIR camera, monitor, and controlling devices so as to provide assistance to operator in driving under low-visibility conditions, shall be made in the ACFT/ARFFT.
	c) The installation should not obstruct driver view or hamper any other ACFT/ARFFT vehicle system including Monitor System. The system also be installed without any extensive vehicle modification and should include a dedicated vehicle voltage spikes and surges.
<b>12.</b>	<b>Pump &amp; Roll</b>
	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 to the pump under all speeds of engine and vehicle, without

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	causing any stalling of engine and fluctuation of pressure. A separate modules / Fuse box to avoid any malfunctioning in pump compartment to be provided.
	b) The drive shall permit discharge at rated capacity of pump during vehicular speed from 0 kmph to a minimum of 16.1 kmph in forward and 0 kmph to a minimum of 8 kmph in rearward direction. During shifting from forward to rearward drive, the pumping system shall maintain the preset discharge pressure.
<b>13.</b>	<b>Lights and Electrical System:</b>
	Following electrical gadgets shall be provided:
	a) Siren $\geq$ 90 decibels sound output at 100 feet ahead and not less than 90 decibels at 90 degree either side at a distance of 100 feet, 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.
	b) A flashing red and revolving blue beacon on cab roof top
	c) An Air horn
	d) Headlights with selective pattern for High beam light
	e) Dual tail lights and stop lights
	f) Signal lights for turning at four corners of vehicles with visual and audible signals.
	g) Spot light at both ends of windshield glass, hand adjustable.
	h) Adequate reflector and markers to indicate overall dimensions of vehicle.
	i) One reverse light with audible warning at the rear of vehicle.
	j) Panel lights, top deck light, cabin lights, engine compartment lights, tools and equipment compartment lights, shall also be provided.
	k) Two inspection lamps shall also be provided and provision of additional connection to use these lamps shall be made in various compartments.
	l) Two fog lamps. These shall be low mounted in front of the appliance.
	m) Equipment storage compartment lights shall glow on opening of the door/shutter, even when the ignition switch is turned off.
	n) All appropriate lights and gadgets detailed above shall be operable from driver's cabin.
	o) Visual indication for different functions of engine, P.T.O. pump, and pneumatic circuits by means of lamps in driver's cabin shall be preferred with provision of extra electromagnetic switch or over flow modules.
<b>14.</b>	<b>Radio Telephone (R.T.)</b>
	a) One / Two VHF / UHF Radio telephone based on customer requirement operable on frequency range between 118 to 136 MHz- i.e. (121.625 MHz 1 no. and 118.450 MHz 1 no. (only receiver)) AM (Amplitude Modulation) synthesized at the airport SMC frequency and another operable on Frequency Modulation (FM) with a range between 136 to 174 MHz-FM (UHF 225-339.95 MHz). These will be a self-contained transmitting/receiving set, with Transmitting power of approximately 5 watts unmodulated and intrinsically safe. The equipment shall be suitable for use in all-weather condition and shall be provided at suitable location in cabin. It should

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	be operable at 12V/24V power supply system of ACFT/ARFFT and should be made of waterproof construction. The RT set should also have an adjustable head set in addition to the speakers. Sockets for connecting the headset to the RT Set should be provided at the mid-ship panel. (Base set 2 Nos.+01 hand set).
	b) Adequate spares for 15 years and service/repair and spares parts manual along with circuit diagrams should be provided. All manuals and diagrams should be in English language with standardized international symbols. The set shall be suitably mounted to resist vehicles vibration and suppress engine noise or any other vehicular electromagnetic induction.
	c) The system protection fuse shall be located in an easily accessible location for quick replacement.
	d) Provision of global positioning system (GPS) is considered desirable for satellite communication and route navigation followed by ACFT/ARFFT.
<b>15.</b>	<b>Other Equipment</b>
	a) Public Address (P.A.) equipment, battery operated, with wireless and cable connected microphone fitted in the cabin and loudspeaker fitted on the rooftop of cabin capable of being operated from cabin. PA system receiver should have a provision to connect one wireless microphone and one microphone with cable connection. The wireless microphone shall be of FM (Frequency Modulation) with a range of minimum 100 Meters. All PA system receivers shall be tuned to the frequency of wireless microphone.
	b) A spare battery charger. There should adequate spare provision for battery compartment and polarity of line.
	c) Instruction book, spare parts catalogue, and repair manual.
	d) All tools and accessories / equipment as per the requirement.
	e) Event (Electronic) Data Recorder: The vehicle should have a real time event (electronic) data recorder to record the performance parameters like vehicle speed, gear position, PTO on/off, engine temperature, engine RPM etc. The recorder shall be tamper proof with provision for data transfer to PC with suitable software for data interpretation. In addition, the ACFT/ARFFT engine should have Engine Informative System (EIS) so as to obtain data about various parameters of the engine such as maintenance schedules, service alerts, performance alerts, errors, etc. and history sheet of maintenance.
	f) 360° surround View Camera System: The vehicle should be provided with 360° surround view camera system or high resolution for assistance of the operator.
	g) Video recording camera is to be installed. The camera and Network Video Recorder (NVR) equipment are to be installed in such a way that the camera could capture the probable incidence without any hindrance to the ACFT/ARFFT Roof Turret movement from a distance to record the rescue operation being carried out.

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**Annexure-4**

**General technical specifications of Airfield Crash Fire Tender (ACFT) /  
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The brief Technical Specifications of the chassis (6x6 or 8x8) including cabin for manufacturing ACFT/ARFFT with capacity of 10,000 litres targeting requirements of the Indian Military & Civilian Aviation market is given in table below

Sl. No.	Technical Specification of ACFT/ARFFT mounted on 6x6 or 8x8 chassis	Parameter
<b>1.</b>	<b>Fully Loaded - Chassis Performance Parameters:</b>	
	1. Side slope stability (degrees)	30° Minimum
	2. Dynamic balance (kmph), minimum speed on a (30m) radius circle	35.5 kmph Minimum
	3. Angle of approach (degrees)	30° Minimum
	4. Angle of departure (degrees)	30° Minimum
	5. Inter axle clearance (degrees)	12° Minimum
	6. Underbody clearance (cm)	46 ~ 49 cm
	7. Under axle clearance at differential housing bowl (cm)	33 ~ 38 cm
	8. Diagonal opposite wheel motion (cm)	36 cm
	9. Wall-to-wall turning diameter	< Three times of the vehicle's overall length
	10. Maximum acceleration time from 0 to 80 kmph (seconds)	Within 35 seconds
	11. Top speed (kmph)	> 110 kmph
	<b>12. Service brake: Stopping distance</b>	
	i. From 33 kmph	≤ 12 m
	ii. From 64 kmph	≤ 49 m
	iii. Percent grade holding of fully loaded vehicle:	
	a) Ascending	≥ 50 %
	b) Descending	≥ 50 %
	iv. Emergency brake stopping distance at 64 kmph	≤ 88 m
	<b>13. Parking brake</b>	
	i. Percent grade holding for the parking brake	
	a) Ascending	≥ 20 %
	b) Descending	≥ 20 %
	14. Steering	Centre / Off Centre / Right Hand
	15. Drive	On all wheels
	16. Fordability (mm)	≥ 608 mm
	17. Minimum angle of Tilt (Static)	30°

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	18. Evasive maneuver test, NATO Document, Dynamic Stability Report- Allied Vehicle Testing Publication (AVTP), 03-16W (kmph)	40 kmph Minimum
	19. "J" turn test at 46 m radius (kmph)	48 kmph Minimum
<b>2.</b>	<b>General Requirements</b>	
	a) The ACFT/ARFFT shall consist of a water tank of 10,000 Liters or more of usable water capacity with necessary fittings. The primary extinguishing agent shall be foam concentrate of 1%, 3% 6% & 8% of foam concentrate. A foam concentrate tank of 1300 Liters usable capacity shall have to be provided.	
	b) A midship mounted pump, either coupled with the auxiliary engine (The emission level shall be equal to or below than, the prescribed limits of Bharat Stage IV/ Euro IV levels) or Driven of the vehicle PTO mechanically, shall be fitted, having a minimum output of 6000 L/min at suitable delivery pressure and suction lift of 3 meters.	
	c) When discharging foam solution, the pumping system shall be capable of discharging at a rate equal to or exceeding the total requirements of the Roof Turret, Bumper Turret or two handline nozzles, ground sweep nozzles, and under truck nozzles discharging simultaneously at designed pressures.	
<b>3.</b>	<b>Weights and Dimensions</b>	
	a) The actual gross vehicle weight (weight of fully staffed, loaded and equipped vehicle) shall not exceed maximum permissible limit weight of chassis specified by the manufacturer.	
	b) The weight shall be distributed as equally as to be Demonstrated practically over the axles and tyres of the vehicle. The difference of weight between tyres on any axle shall not exceed 5% of the average weight on tyre for that axle, and the difference in weight between axles shall not exceed 10% of the weight of the heaviest axle. Under no circumstances shall axle and tyre manufacturers rating be exceeded.	
	c) The centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading.	
<b>4.</b>	<b>Dimensions</b>	
	a) Dimensions are: Max Length - 12m, Max Width - 3m and Max Height - 3.8m (inclusive of monitor and equipment on top of vehicle) and other performance requirements.	
	b) Overall height, length and width shall be kept to a minimum consistent with the best operational performance of the vehicle and the design concept needed to achieve this performance and to provide optimum manoeuvrability and facilitate movement in Airfield area.	
	c) The vehicle shall be constructed such that a seated driver shall be able to see the ground 6 meter ahead of the vehicle and minimum 15 degree above the horizontal without leaving seat. The vision in the horizontal plane shall be 90 degree on each side from the straight position on a full forward control.	

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	d) Adjustable rear-view mirrors with a glass area of not less than 385 sq. cm. shall be provided on each side of vehicle. Each shall be provided with a minimum of 45 sq. cm area wide-angle convex mirrors
<b>5.</b>	<b>Engine Performance Requirements:</b>
	a) The vehicle's engine (s) shall be HSD (High Speed Diesel) driven, and have minimum 485 KW (485 KW/0.746 = 650 hp), torque and speed characteristics suitable to meet and maintain all vehicular performances. The vehicle's engine (s) shall be certified by the engine manufacturer for the ACFT/ARFFT application. In addition, provision for open canopy for engines and incorporation of brushed or brushless alternator should be incorporated.
	b) Fully laden vehicle shall consistently be able to accelerate maximum speed, as specified, with the engine and transmission at their normal operating temperature at their normal operating temperature at any ambient temperature varying from - 25° C to 50° C and at elevation up to 600 mtrs. above mean sea level.
	c) The vehicle shall also be capable of ascending, stopping, starting and continued ascent on a 40% grade on dry pavement at a minimum speed of 1.6 kmph with extinguishing agents being discharged at maximum rated capacity from the turret.
	d) The emission level shall be minimum Bharat Stage IV or equivalent / norms for emission.  In case of non-road engines, the emission levels shall be equal to or below than the prescribed limits for Bharat Stage IV/ Euro IV levels. The test certificate (EC Type/equivalent Approval Certificate) , indicating emission levels, from official certification authority to be submitted.
	e) The ACFT/ARFFT weight (kg) to engine power ratio (kW) plays an important role, in achieving response time of two minutes, as specified in ICAO documents. The constructor of ACFT/ARFFT shall certify the achievable acceleration of 80 kmph within 35 seconds, during minimum 15 years of use of ACFT/ARFFT.
	f) The vehicle shall be capable of operating safely on paved roads, graded gravel roads, cross country terrain, and sandy soil environments. Cross country terrain consists of open fields, broken ground, and uneven terrain. An off-road, high mobility suspension system resulting in no more than 0.5 G acceleration at the driver's seat of the vehicle when traversing an 8-inch (20 cm) diameter half round at 35 mph (56 kmph) must be provided. The suspension design by which the manufacturer meets the suspension performance requirements are at manufacturer's discretion.
<b>5.1</b>	<b>Engine Cooling:</b>
	a) Engine shall be air / water cooled so that stabilized cylinder head and oil temperature remain within the engine manufacturer's prescribed limits under all operational conditions and all ambient temperatures between -25° C to 50°C.
<b>5.2</b>	<b>Fuel System:</b>

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	a) Fuel system shall qualify engine manufacturer's requirements and shall include fuel pump, fuel filtration and flexible fuel lines, well protected from damage, exhaust heat and ground fires.
	b) Accessible filtration shall be provided for each fuel supply line and a drain shall be provided at the bottom of the fuel tank
	c) Gravity feed fuel tanks are not acceptable.
	d) Fuel tank capacity shall be 200 liters or more to achieve a minimum of 48 km of highway travel at 90 Kmph plus 2 hours of pumping at the full rated discharge.
<b>5.3</b>	<b>Exhaust System:</b>
	a) The size of exhaust system shall be such that undue back pressure is not generated and under no circumstances exhaust gases enter the cabin. The system shall be of high grade, rust resistant material.
	b) Exhaust system shall be designed so as to protect it from damage that could result from rough terrain. Tailpipe of exhaust system shall be designed to discharge upwards or to the rear of the vehicle and neither towards ground nor towards panel operator.
	c) The exhaust system shall include a muffler to reduce engine noise
<b>6.</b>	<b>Vehicle Electrical System:</b>
	a) The vehicle shall be provided with 12/24 volts electrical system and 24 volts starting.
	b) The electrical system shall have negative ground including alternator and voltage regulator. Alternator shall be at 100% of anticipated load at 50% engine speed, and shall be of belt driven.
	c) The curb idle minimum-charging rate of the alternator shall be 30 Amps.
	d) Batteries shall be <b>secured</b> and well protected from physical injury, vibration, water sprays, engine and exhaust heat. When an enclosed compartment is provided for batteries, it shall be well ventilated and batteries shall be easily accessible for examination, test and maintenance.
	e) The circuits shall be so designed that at no stage of operation overloading, overheating, short-circuiting and fluctuation of voltage is experienced.
	f) A built-in battery charger shall be provided on the vehicle to maintain full charge on all batteries. Grounded AC receptacle shall be provided to permit a drive away plug connection from external electric power supply to battery charger.
	g) An engine coolant/preheating device shall be provided as an aid to rapid starting and high initial engine performance.
	h) The electrical system shall be insulated, waterproofed and protected against exposure from ground fires.
	i) The effect of electromagnetic field of all electrical systems of Radio sets shall be suppressed so that it does not interfere with functioning of radio sets.
<b>7.</b>	<b>Vehicle Drive:</b>
	a) Transmission of power from engine to wheels shall be through a torque converter

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	and fully automatic transmission, having designed input higher than output power of main engine with provision of crawling (The drive shall permit discharge at rated capacity of pump during vehicular speed from 0 kmph to a maximum of 16.1 kmph in forward and 0 kmph to a maximum of 8 kmph in rearward direction. During shifting from forward to rearward drive, the pumping system shall maintain the pre-set discharge pressure) without application of brakes. The entire drive train shall be designed to have sufficient capacity to slip the wheels of the static loaded vehicle on surface having a coefficient of friction 0.8. A range of gears providing the specified top speed and a grade-ability of 50% shall be provided with sufficient intermediate gears to achieve the specified acceleration.
	b) A transmission cooling system shall be provided and designed so that the stabilized transmission oil temperature remains within the transmission conditions and at all ambient temperatures.
<b>7.1</b>	<b>The transmission shall be matched to the engine properly and shall be approved by transmission manufacturer for the ACFT/ARFFT application.</b>
	a) The provision of positive drive to each wheel by means of a fully locked drive line shall be required in order to maximize traction on low friction surfaces. Positive drive may be achieved either by the use of automatic locking and torque proportioning differentials, or may be manually selectable by the seated driver, while the vehicle is in motion, by use of a single control
	b) All wheel drive on these vehicles shall incorporate a drive to the front and rear axles, which are engaged at all times during use. An interaxle differential shall be installed with automatic or driver selected means of differential locking.
	c) Front and rear axles shall have adequate capacity to carry the maximum imposed load under all intended operating conditions. The variations in axle track shall not exceed 20% of the tyre sectional width at rated load
<b>8.</b>	<b>Suspension:</b>
	The suspension system shall be designed to permit the loaded vehicle to
	g) Travel at the specified speeds over improved surface;
	h) Travel at moderate speeds over unimproved surface;
	i) Provide diagonally opposite wheel motion 360 mm above ground obstacles without raising the remaining wheels from the ground.
	j) Provide at least 50mm of axle motion before bottoming of the suspension on level ground;
	k) Prevent damage to the vehicle caused by wheel movement; and
	l) Provide a good environment for the crew when traveling over all surfaces.
<b>8.1</b>	<b>Rims, Tyres and Wheels:</b>



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	a) Tyres shall be selected to maximize the acceleration speed, braking and maneuvering capabilities of the vehicle on paved surfaces without sacrificing performance on all reasonable terrains found within the airport boundary.
	b) Tyres size shall be suitable to optimize floatation under soft ground conditions. The lowest tyre pressure shall be compatible with the high- speed performance requirement.
	c) All wheels on the vehicle shall be of the single wheel type with all rims, tyres and wheels of identical size and same tread design.
	d) Rims, tyres, wheels, and inflation pressures shall be approved by the respective manufacturers as having sufficient capacity to meet the specified performance, and shall be certified for not less than 45 Kms of continuous operation at 100 Kmph at normal operating pressure.
	e) Size of tyre should be such to meet all vehicular performances and the tyre should be preferably available in India.
<b>9.</b>	<b>Towing Connections:</b>
	Four large tow eyes or tow hooks, capable of towing the vehicle without damage, shall be mounted, two at the front and two at the rear of the truck and attached directly to the frame structure (chassis)
<b>10.</b>	<b>Brakes:</b>
	a) The braking system shall feature service, emergency and parking brake systems. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. Expanding shoe and drum brakes or caliper disc brakes shall be furnished. A brake chamber shall be provided for each wheel and shall be mounted so that no part of the brake chamber projects below the axle. Anti-lock Braking System (ABS) shall be provided.
	b) Service brakes shall be of the 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% grade.
	c) The service brakes shall have stopping distances on a dry hard appropriately level road way, free from loose materials, and sufficiently wide roadway without any part of vehicle leaving roadway.
	d) The service brakes shall provide one power assisted stop when the vehicle engine inoperative, for the stopping distances specified above.
	e) Emergency brakes: This is included in service brakes and activated in a such a way that if defect is detected in braking system, the braking on two axles is always insured. So it is integrated into chassis and chassis for CFT is having this feature. This is controlled by electronic brake system.
	f) The parking brake shall be capable of holding the fully loaded vehicle on a 20% grade without air or hydraulic assistance.
<b>10.1</b>	<b>Brakes Air System</b>
	a) When the vehicle is supplied with air brakes, air compressor shall meet following

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	criteria:
	1. The compressor shall be engine driven;
	2. The compressor shall have sufficient capacity to increase air pressure in the supply and service reservoirs from 586.1 kPa to 689.5 kPa (85 psi to 100 psi) when the engine is operating at the vehicle manufacturer's maximum recommended revolutions per minute (rpm) in a maximum of 25 seconds.
	3. The compressor shall have the capacity for quick build-up from 0 kPa (0 psi) to release spring brakes, and this build-up in pressure shall be accomplished within 15 seconds.
	4. The compressor shall incorporate an automatic air-drying system immediately downstream from the compressor to prevent condensation build-up in all pneumatic lines.
	b) Service reservoirs shall be provided. The total of the service reservoir volume shall be at least 12 times the total combined brake chamber volume at full stroke. If the reservoir volume is greater than the minimum required, proportionately longer build-up time shall be allowed using the following formula:  <b><u>Actual reservoir capacity X 25</u></b> Required reservoir capacity
	c) Reservoirs shall be equipped with air pressure regulator, drain and safety valves.
	d) Provision for charging of air tanks by a drive away electrical connection used to power a vehicle mounted auxiliary air compressor shall be provided.
	e) A drive away air connection for charging of air tanks from an external air source shall be provided
	f) Visual and audible low air pressure warning devices shall be provided. The low-pressure warning device shall be visual and audible from the inside, and audible outside of the vehicle
	g) Provision of pneumatic service outlets for inflating tyres shall be made from air compressor of ACFT/ARFFT, with a high-pressure charging tube of 30 mtrs. and nozzle. A separate provision of pneumatic service outlet for inflating pneumatic bags shall also be made from air compressor of ACFT/ARFFT.
	h) Air leakage from pressure system shall not exceed 0.3 Kg. /sq. cm. per hour so that at no stage the air pressure should reduce less than brake operating pressure in 8 hours.
<b>11.</b>	<b>Steering:</b>
	a) The chassis shall be equipped with power assisted steering with direct mechanical linkage from the steering wheel to the steered axle(s) to permit the possibility of manual control in the event of power assist failure.
	b) The power steering shall have sufficient capacity to allow turning the tyres stop to stop with the vehicle stationary on a dry level, paved surface and fully loaded, with not more than 7 kg. pull on wheel.

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	c) The wall-to-wall turning diameter of the fully laden vehicle shall be less than three times the vehicle length.
	d) Vehicle shall be designed preferably for Centre/Off Centre Right/Right Hand Drive system so that driver's left hand is free for operation of controls.
	e) Rear Axle Steering: The vehicle should have rear wheel steering for quick and sharp turning Circle radius. An electro -hydraulic steering system on second rear axle for improved manoeuvrability of the vehicle and reduction of tyre wear shall be provided. This shall ensure safe driving at all speeds.
<b>12.</b>	<b>Cabin:</b>
	a) The cabin shall be mounted on the forward part of the vehicle and shall provide seating for maximum 6 persons including Driver. The seating arrangement shall be; 2 adjustable seats and a long or separate seat (s) for three / four crewmembers with provision of stowage of fully assembled BA set suitably located to the backrest with quick release system so that it can be worn in running vehicle. In addition, there shall be instrument panel and equipment as specified without any hindrance to crew.
	b) The cab shall meet the visibility requirements (The vehicle shall be constructed such that a seated driver shall be able to see the ground 6 Meter ahead of the vehicle and minimum 15 degrees above the horizontal plane without leaving seat. The vision in the horizontal plane shall be 90 degrees on each side from the straight position on a full forward control). The windshield shall be shatterproof safety glass, and all other windows shall be constructed of approved safety glass. The cab shall be provided with wide gutters to prevent foam and water dripping on the windshield and side windows. There shall be enough space to keep and to enable the crew except driver to put on protective clothing and B.A. set while on way to a call. Four (02 doors each on LHS and RHS respectively) / Two doors are to be provided to the cabin based on customer requirements, with ECE R29 or equivalent test compliance as per which should be openable at 90° for easy ingress and egress of crew. In case of specially designed cabin with two doors the design should allow easy entry and exit of the crews in the rear row(s) without disturbing the crews of front row and a Centre / Off Centre Right/Right Hand steering system shall be provided. A rear-view camera with a monitor at the panel shall be provided. The cab design shall take into consideration the provision of ample space for the crew to enter and exit the cab and carry out normal operations while wearing full protective equipment. This design will be considered only in case of engine is not housed within the cabin. In case the turret (monitor) having manual controls above the cab roof is provided, the cab shall be designed with a quick-access passage to the turret (monitor). Time required for mounting of the crews into the cabin from close-up position shall be less than or equal to 10 Seconds.

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	<p>c) The cab shall be weatherproof, and shall be fully insulated thermally and acoustically with a fire-resistant material. The cab may be of the unitized rigid body and frame structure type or it may be a separate unit flexibly mounted on the main vehicle frame. The cab shall be constructed from non-corrosive materials that provide lightest weight consistent with adequate strength to ensure a high degree of safety for the crew under all operating conditions including excess heat exposure, and in the event of a vehicle rollover accident. The material should also be guaranteed against any sort of deterioration, deformation, ageing and corrosion for a minimum period of fifteen years.</p>
<b>12.1</b>	<b>Instruments, Warning Lights And Controls</b>
	<p>a) The minimum number of instruments, warning lights and controls consistent with safe and efficient operation of the vehicle, chassis, and firefighting system shall be provided. All chassis instruments and warning lights shall be grouped together on a panel in front of the driver. All firefighting system instruments, warning lights, and controls shall be grouped together by function so as to provide ready accessibility as well as high visibility for the driver as well as a crewmember sitting in the co-driver seat. Electronic controls shall have pneumatic and/or manual override wherever possible.</p>
	<p>b) All instruments and controls shall be illuminated, with back lighting to be used wherever practically possible.</p>
	<p>c) Groupings of both the chassis and firefighting system instruments, warning lights and controls shall be easily removable as a unit or be on a panel hinged for back access by the use of quick disconnecting fitting for all electrical, air and hydraulic circuits.</p>
<b>12.2</b>	<b>The following instruments, or warning lights, or both shall be provided as a minimum;</b>
	a) Speedometer/Odometer
	b) Engine(s) tachometer
	c) Fuel level with audio warning
	d) Air pressure
	e) Engine(s) temperature
	f) Engine(s) oil pressure
	g) Voltmeter(s)
	h) Oil temp. gauge light
	i) Transmission(s) oil temperature
	j) Pump(s) pressure
	k) Water tank level Gauge
	l) Foam tank level Gauge
	m) Low air pressure warning
	n) Headlight beam indicator
	o) Trafficator light

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	p) Hazard warning light
	q) PTO engagement light
	r) Pump hour meter
	s) Water control valve
<b>12.3</b>	The cab shall have all the necessary controls within easy reach of the driver for the full operation of the ACFT/ARFFT and the pumping system. The following cab controls shall be provided:
	a) Accelerator
	b) Parking brake control
	c) Steering wheel, with directional signal control & horn
	d) Brake pedal
	e) Transmission range selector
	f) Pump control or selector/P.T.O.
	g) Foam control
	h) Siren switch(es)
	i) Auxiliary agent control
	j) Ground Sweep/ Under truck nozzle control
	k) Turret (Monitor) controls
	l) Light switches
	m) Windshield wiper and washer controls
	n) Heater-defroster controls
	o) Master electrical switch
	p) Engine start/stop control
	q) Windshield deluge system switch.
	r) Water Tank Main valve control
	s) Side delivery ON/OFF valve
<b>12.4</b>	<b>Equipment:</b>
	The following minimum equipment shall be provided in or on the cab.
	a) Heater/defroster
	b) Driver's suspension seat with vertical, fore and aft adjustment, with seat belt
	c) Crew seats with individual retractable seat belts and grip hand rails.
	d) Windshield washers appropriate for removing foam
	e) Windshield wipers appropriate for removing foam
	f) Siren
	g) Horn
	h) Sun visors, interior transparent
	i) Outside rear view mirrors (Adjustable rear-view mirrors with a glass area of not less than 385 cm <sup>2</sup> shall be provided on each side of vehicle. Each shall be provided with a minimum of 45 cm <sup>2</sup> area wide-angle convex mirrors)
	j) Interior lighting
	k) P.A. System with Microphone (Public Address (P.A.) equipment, battery operated,

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	with wireless and cable connected microphone fitted in the cabin and loudspeaker fitted on the rooftop of cabin capable of being operated from cabin. PA system receiver should have a provision to connect one wireless microphone and one microphone with cable connection. The wireless microphone shall be of FM (Frequency Modulation) with a range of minimum 100 Meters. All PA system receivers shall be tuned to the frequency of wireless microphone)
	l) I. R.T. Set (VHF-AM)
	m) Self-Contained Breathing Apparatus (SCBA) mounting bracket for crew members excluding driver.
	n) Wind shield deluge system.
	o) Storage space for four Nos. of Proximity suit boxes in driver's cabin.
	p) Provision for Fire protection suit to be provided in driver's cabin
	q) Driver's Enhanced Vision System (DEVS)
	r) Rear view camera with a monitor at the panel.
	s) Hands free Intercom for five / six crew including the driver
	t) Battery Charger
	u) Data recorder
<b>13.</b>	<b>Driver's Enhanced Vision System:</b>
	a) Provision for future installation, for a driver's enhanced vision system (DEVS), in the cab, for ACFT's/ARFFT's position on a moving map display.
	b) Provision for future installation of Low Visibility Enhanced Vision System consisting of a FLIR camera, monitor, and controlling devices so as to provide assistance to operator in driving under low-visibility conditions, shall be made in the ACFT/ARFFT.
	c) The installation should not obstruct driver view or hamper any other ACFT/ARFFT vehicle system including Monitor System. The system also be installed without any extensive vehicle modification and should include a dedicated vehicle voltage spikes and surges.
<b>14.</b>	<b>Pump &amp; Roll</b>
	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 to the pump under all speeds of engine and vehicle, without causing any stalling of engine and fluctuation of pressure. A separate modules / Fuse box to avoid any malfunctioning in pump compartment to be provided.
	b) The drive shall permit discharge at rated capacity of pump during vehicular speed from 0 kmph to a minimum of 16.1 kmph in forward and 0 kmph to a minimum of 8 kmph in rearward direction. During shifting from forward to rearward drive, the pumping system shall maintain the preset discharge pressure.
<b>15.</b>	<b>Lights And Electrical System:</b>

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	Following electrical gadgets shall be provided:
	a) Siren $\geq$ 95 decibels sound output at 100 feet ahead and not less than 90 decibels at 90 degree either side at a distance of 100 feet, 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.
	b) A flashing red and revolving blue beacon on cab roof top
	c) An Air horn
	d) Headlights with selective pattern for High beam light
	e) Dual tail lights and stop lights
	f) Signal lights for turning at four corners of vehicles with visual and audible signals.
	g) Spot light at both ends of windshield glass, hand adjustable with 152 mm diameter.
	h) Adequate reflector and markers to indicate overall dimensions of vehicle.
	i) One reverse light with audible warning at the rear of vehicle.
	j) Panel lights, top deck light, cabin lights, engine compartment lights, tools and equipment compartment lights, shall also be provided.
	k) Two inspection lamps shall also be provided and provision of additional connection to use these lamps shall be made in various compartments.
	l) Two fog lamps. These shall be low mounted in front of the appliance.
	m) Equipment storage compartment lights shall glow on opening of the door/shutter, even when the ignition switch is turned off.
	n) All appropriate lights and gadgets detailed above shall be operable from driver's cabin.
	o) Visual indication for different functions of engine, P.T.O. pump, and pneumatic circuits by means of lamps in driver's cabin shall be preferred with provision of extra electromagnetic switch or over flow modules.
<b>16.</b>	<b>Radio Telephone (R.T.)</b>
	a) One / Two VHF / UHF Radio telephone based on customer requirement operable on frequency range between 118 to 136 MHz- i.e. (121.625 MHz 1 no. and 118.450 MHz 1 no. (only receiver)) AM (Amplitude Modulation) synthesized at the airport SMC frequency and another operable on Frequency Modulation (FM) with a range between 136 to 174 MHz-FM (UHF 225-339.95 MHz). These will be a self-contained transmitting/receiving set, with Transmitting power of approximately 5 watts unmodulated and intrinsically safe. The equipment shall be suitable for use in all-weather condition and shall be provided at suitable location in cabin. It should be operable at 12V/24V power supply system of ACFT/ARFFT and should be made of waterproof construction. The RT set should also have an adjustable head set in addition to the speakers. Sockets for connecting the headset to the RT Set should be provided at the mid-ship panel. (Base set 2 Nos.+01 hand set).

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	b) Adequate spares for 15 years and service/repair and spares parts manual along with circuit diagrams should be provided. All manuals and diagrams should be in English language with standardized international symbols. The set shall be suitably mounted to resist vehicles vibration and suppress engine noise or any other vehicular electromagnetic induction.
	c) The system protection fuse shall be located in an easily accessible location for quick replacement.
	d) Provision of global positioning system (GPS) is considered desirable for satellite communication and route navigation followed by ACFT/ARFFT
<b>17.</b>	<b>Other Equipment</b>
	a) Public Address (P.A.) equipment, battery operated, with wireless and cable connected microphone fitted in the cabin and loudspeaker fitted on the rooftop of cabin capable of being operated from cabin. PA system receiver should have a provision to connect one wireless microphone and one microphone with cable connection. The wireless microphone shall be of FM (Frequency Modulation) with a range of minimum 100 Meters. All PA system receivers shall be tuned to the frequency of wireless microphone.
	b) A spare battery charger. There should adequate spare provision for battery compartment and polarity of line.
	c) Instruction book, spare parts catalogue, and repair manual.
	d) All tools and accessories / equipment as per the requirement.
	e) Event (Electronic) Data Recorder: The vehicle should have a real time event (electronic) data recorder to record the performance parameters like vehicle speed, gear position, PTO on/off, engine temperature, engine RPM etc. The recorder shall be tamper proof with provision for data transfer to PC with suitable software for data interpretation. In addition, the ACFT/ARFFT engine should have Engine Informative System (EIS) so as to obtain data about various parameters of the engine such as maintenance schedules, service alerts, performance alerts, errors, etc. and history sheet of maintenance.



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**Annexure-5**

**Reference List: The Prospective Collaborator shall furnish a summary of their product reference as detailed below for major supplies in last 15 years**

<b>Sl. No.</b>	<b>Name of Country where Airfield Crash Fire Tender (ACFT) / Aircraft Rescue Fire Fighting Truck (ARFFT) or similar Vehicle was supplied</b>	<b>No. of unit supplied</b>	<b>Year of Supply</b>

**Signature & Seal:**

Authorised Signatory of the Prospective Collaborator

Note:

Submission of the EOI

The Eol shall be submitted **before 17:00 hours of 16.09.2024** through email only mentioning Eol reference: **CTPAM / ACFT / 2024 in Subject to bemleoi@bemltd.in**

Technical queries if any, may be forwarded to [chakrapani.m@bemltd.in](mailto:chakrapani.m@bemltd.in) with cc to [bemleoi@bemltd.in](mailto:bemleoi@bemltd.in)  
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