

Financial Year: 2024-25 to 2028-29

Department Name: Technical

Contact details: 011 243 43364 and Email: techchq@aai.aero

Sr. No.	Item Description		Quantity (Nos)	Performance Standards/ Technical Specifications and Scope of Work
1	Airfield Crash Fire Tender (ACFT) of 10 KL Water Capacity	Replacement of ACFTs procured vide P.O. dated 22.08.2008	19	Technical Specification, performance standards and Scope of work in accordance with the existing TS for 10 KL water tank capacity ACFT.
		Replacement of ACFTs procured vide P.O. dated 05.08.2015	50	
		Requirement for Dholera International Airport (DIACL)	05	
		ACFTs for VVIP Aircrafts	14	
TOTAL 10KL ACFT REQUIREMENT			88	
2	Airfield Crash Fire Tender (ACFT) of 6 KL Water Capacity	Replacement of ACFTs procured vide P.O. dated 14.07.2014	04	Technical Specification, performance standards and Scope of work in accordance with the revised TS for 6 KL water tank capacity ACFT.
		Requirement for Dholera International Airport (DIACL)	01	
		New Requirement	08	
TOTAL 06KL ACFT REQUIREMENT			13	
Total (10KL +06KL) ACFT REQUIRED			101	

Technical Specifications & Methodology for Prototype Inspection as per NFPA-414

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.1	GENERAL:			
	<p>The ARFFVs/ACFTs shall be supplied as a complete built-up unit and have a minimum rated water capacity, for usable 10,000 litres or more of water through monitor, side lines and ground sweep nozzles/under truck nozzles with capability as given below. The primary extinguishing agent shall be Foam Concentrate with proportioning system. In addition to primary agent, there shall be complimentary extinguishing agent of a dry powder as indicated at item 4.18.</p> <p>ARFFV/ACFT will be in accordance with the applicable requirement as on date of DGCA's CAR, ICAO Doc-9137 AN/898, NFPA-414, FAA - AC No.: 150/5220-10E.</p>	Yes	Standard International methods.	
4.1.1(a)	Fully Loaded Vehicle Performance Parameters:			
	1. Side slope stability (degrees)	30	Yes	Practical Demonstration
	2. Dynamic balance (kmph), minimum speed on a (30m) radius circle	35.5	Yes	Practical Demonstration
	3. Angle of approach (degrees)	30	Yes	Practical Demonstration
	4. Angle of departure (degrees)	30	Yes	Practical Demonstration
	5. Interaxle clearance (degrees)	12	Yes	Practical Demonstration
	6. Underbody clearance (cm)	46	Yes	Practical Demonstration
	7. Under axle clearance at differential housing bowl (cm)	33	Yes	Practical Demonstration
	8. Diagonal opposite wheel motion (cm)	36	Yes	Practical Demonstration
	9. Wall-to-wall turning diameter	<Three times the vehicle's overall length	Yes	Practical Demonstration
	10. Maximum acceleration time from 0 to 80 kmph (seconds)	35	Yes	Practical Demonstration
	11. Top speed (kmph)	≥110	Yes	Practical Demonstration
	12. Service brake: Stopping distance			

i. From 32 kmph	□12 m	Yes	Practical Demonstration
ii. From 64 kmph	□ 49 m	Yes	Practical Demonstration

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	iii. Percent grade holding of fully loaded vehicle:			
	a. Ascending	□ 50 %	Yes	Practical Demonstration
	b. Descending	□ 50 %	Yes	Practical Demonstration
	iv. Emergency brake stopping distance at 64 kmph	□ 88 m	Yes	Practical Demonstration
	13. Parking brake			
	i. Percent grade holding for the parking brake			
	a. Ascending	□ 20 %	Yes	Practical Demonstration
	b. Descending	□ 20 %	Yes	Practical Demonstration
	14. Steering	Centre/Off Centre/Right Hand	Yes	Practical Demonstration
	15. Drive	On all wheels	Yes	OEM Certification along with Supporting Document (if any)
	16. Fordability (mm)	□ 608	Yes	OEM Certification along with Supporting Document (if any)
	17. Minimum angle of Tilt (Static)	30 ⁰	Yes	Practical Demonstration
	18.Evasive maneuver test, NATO Document AVTP 03-16W (kph)	40	Yes	Practical Demonstration
	19. “J” turn test at 46 m radius (kph)	48	Yes	Practical Demonstration
4.1.1(b)	Fully Loaded Vehicle (ARFFV/ACFT-Fire Fighting Systems) Performance Parameters			

	1. Vehicle Water Tank Capacity Minimum Usable	10,000 litres or more	Yes	Practical Demonstration along with Supporting Document (if any)
	2. Water tank: Percent of deliverable water			
	a. On level ground	100 %	Yes	Practical Demonstration
	b. On 20 percent side slope	85 %	Yes	Practical Demonstration
	c. 30 percent ascending/descending grade	85 %	Yes	Practical Demonstration
	3. Roof Turret (Monitor) discharge- at full flow			

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	a. Individual flow rate of the roof turret (L/min)	≥4,500	Yes	Practical Demonstration
	b. Stream pattern/distances:			
	i. Straight/far point (m)	□85	Yes	Practical Demonstration
	ii. Dispersed/far point (m)	□ 22	Yes	Practical Demonstration
	iii. Dispersed/width (m)	□ 11	Yes	Practical Demonstration
	4. Bumper Turret			
	a. Individual flow rate of the Bumper Turret (L/min)	> 950	Yes	Practical Demonstration
	b. Stream pattern/distances:			
	i. Straight/far point (m)	≥ 46	Yes	Practical Demonstration
	ii. Dispersed/far point (m)	≥ 15	Yes	Practical Demonstration
	iii. Dispersed/width (m)	≥ 9	Yes	Practical Demonstration
	5. Ground sweep nozzle			
	a. Number of nozzles	2	Yes	Physical Check
	b. Flow rate (L/min) Per nozzle	Refer sub Para 6 below	Yes	Practical Demonstration
	c. Dispersed pattern distances:			
	i. Far point (m)	≥ 9	Yes	Practical Demonstration

ii. Width (m)	≥ 3.5	Yes	Practical Demonstration
6. Under truck nozzle			
a. Flow rate (L/min) per nozzle	The combined flow rate of two ground sweep nozzles and four under truck nozzles should not be more than 500 liters per minute	Yes	Practical Demonstration
b. Number of nozzles	4	Yes	Physical Check
7. Number of water/foam hand lines required per vehicle			

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	Pre-Connected water/foam hand lines (numbers), with Hose dia. 63 mm, length ≥30 metre	4	Yes	Physical Check
8. hand line				
	a. Nozzle flow rate (L/min)	≥ 450 at 7 bar	Yes	Physical Check & Supporting documents
	b. Straight stream distance (m)	□ 25	Yes	Physical Check & Supporting documents
c. Dispersed stream pattern				
	i. Range (m)	□ 6	Yes	Practical Demonstration
	ii. Width (m)	□ 4.5	Yes	Practical Demonstration

d. Hose inside diameter (mm)	63	Yes	Physical Check along with Supporting Documents.
e. Hose length (m) with instantaneous coupling	≥ 30	Yes	Physical Check along with Supporting Documents.
9. Reeled water/foam hand line (first aid hose reel)			
a. Nozzle flow rate (L/min)	≥ 230 for dual agent lines	Yes	Practical Demonstration
b. Hose length (m)	≥ 30 for dual agent line	Yes	Physical Check along with Supporting Documents.
c. Straight stream distance (m)	$\square 20$	Yes	Practical Demonstration
d. Dispersed stream pattern			
i. Range (m)	$\square 6$	Yes	Practical Demonstration
ii. Width (m)	$\square 4.5$	Yes	Practical Demonstration
10. Complementary agent- Dry Chemical Powder			
a. Capacity (kg)	250	Yes	OEM Certification along with Supporting Document (if any).
11. Dry chemical hand line:			
i. Discharge rate (kg/sec)	$\square 2.5$	Yes	Practical Demonstration

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	ii. Range (m)	≥ 7.5	Yes	Practical Demonstration
	iii. Hose length (m)	≥ 30	Yes	Physical Check along with Supporting Documents.

	12. Foam Tank usable capacity (litres)	1300	Yes	Practical Demonstration & Supporting Documents.
	13. Pump capacity	6,000 L/min or more	Yes	Practical Demonstration & Supporting Documents.
	14. Foam proportionater	Automatic with 3%,6% & 8% preferably with Step less System	Yes	Practical Demonstration along with Supporting Documents.
	15. Air-Conditioned Cabin (Seating Capacity including Driver)	4+1	Yes	Physical Check along with supporting documents.
	16. Testing and acceptance procedure:	As per AAI Technical Specifications and subsequent amendments, if any.	Yes	
4.1.2.	Chassis			
	The chassis should be, customized for ARFFV/ACFT application, with specially designed axles (not off-set rims), with wider track (minimum width 3 meters) ensuring specified side slope stability, at the rated capacity of each axle, meeting the performance parameters as per 4.1.1. (a) above.		Yes	OEM Certification along with Supporting Document (if any).

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.1.3	General Requirements			

4.1.3.1(a)	The ARFFVs/ACFTs shall consist of a water tank of 10,000 litres or more of usable water capacity with necessary fittings. The primary extinguishing agent shall be foam concentrate, with 3%, 6% & 8% of foam concentrate. For this purpose, a foam concentrate tank of 1300 litres usable capacity shall have to be provided.		Yes	(a) Practical Demonstration
(b)	A midship mounted pump, either coupled with the auxiliary engine (The emission level shall be minimum Bharat Stage IV or equivalent) 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 3 metres.		Yes	(b) OEM Certification & Supporting Documents and Practical Demonstration for Pump Performance.
(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 (monitor), Bumper Turret/ two handline nozzles, ground sweep nozzles, and under truck nozzles discharging simultaneously at designed pressures.		Yes	(c) Practical Demonstration
4.1.3.2	The ARFFV/ACFT shall be capable of the following minimum performance with the monitor mounted on the roof of cabin and two hand lines on either side.			
	An individual output of 4,500 L/min through monitor at maximum rated pressure to give throw as per 4.1.1(b) item 3 of either water or specified quality foam concentrate.		Yes	Practical Demonstration
	A minimum output of 450 L/min of foam solution to each of the handlines on either side of the ARFFVs/ACFTs to give minimum effective throw, specified for foam concentrate, of 25 metres at nozzle pressures not exceeding 7 bar and using 30 mtrs. specified hose.		Yes	Practical Demonstration
	It shall be possible to operate the monitor and two hand lines simultaneously at pump delivery pressure suitable to the rated output and throw of monitor.		Yes	Practical Demonstration
4.1.3.3	The foam concentrate induction shall be automatic with changes in output required through a combination monitor and hand lines. The ratio of foam concentrate induction shall be within a variation \square 0.5 with an induction setting from 3%, 6% & 8% ratio preferably with Step less System. The induction ratio once fixed shall maintain this limit of variation for the entire range of inductor setting. Around the pump proportionator shall be used with clearly marked induction ratios varying from 3%, 6% & 8% preferably with Step less System.		Yes	Practical Demonstration

1 Para No.	2 Technical Specification	3 Parameter	4 Statement of Compliance	5 Methodology for Inspection
4.1.3.4	<p>The system of foam production from monitor and hand lines shall be so designed as to produce satisfactory quality of foam with the following minimum properties with the use of foam concentrate.</p> <p>a. Minimum expansion ratio - 8</p> <p>b. 25% drainage time with foam concentrate level 'A' 5 minutes minimum.</p> <p>c. 25% drainage time with foam concentrate level 'B' 3 minutes minimum.</p>		<p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>OEM Certification along with Supporting Document (if any).</p>
4.1.3.5	<p>It shall be possible for the ARFFV/ACFT to use water from a separate source from open source and/or an external source of water supply for prolonged use and foam concentrate supply through a pick-up tube from drums at ground level.</p>		<p>Yes</p>	<p>Practical Demonstration</p>
4.1.3.6	<p>The ARFFV/ACFT shall be equipped with Ground sweep nozzles and under truck nozzles for selfprotection, particularly of the wheels. This should incorporate a pressure and flow regulator as explained in Para 4.14.16.1. The angle of the front nozzle shall be so adjusted achieve performance as per 4.1.1. 5 & 6.</p>		<p>Yes</p>	<p>Practical Demonstration & Supporting Document</p>
4.1.3.7	<p>The water tank, foam concentrate tank, monitor, ground sweep nozzles and under truck nozzles shall have pneumatically controlled ball valves for operation and control from within the cabin. The hand lines should have pneumatic as well as manual control. All pneumatic control system shall be used with air supply at pressures available from the vehicle air brake system. The vehicle air brake shall be tapped so that a minimum air pressure required for the operating vehicle is available all the time and the pneumatic control fire operation actuates when the air pressure in the systems exceeds this minimum level. In case of any leakage in the pneumatic control system the vehicle operation shall not be adversely affected. Opening and closing valves to the monitor and to the pump shall be achieved through operation of pneumatic/electro-pneumatic controls from the cabin as well as from Panel Board. Panel boards should be provided on both sides of the ARFFV/ACFT. Manual control should be provided for operation in case of failure in pneumatic control.</p>		<p>Yes</p>	<p>Practical Demonstration for Control from Cabin / Side Panel Boards and Manual.</p> <p>OEM Certification & Supporting Documents for type of controls (Pneumatic / Manual) and minimum air pressure of brake.</p>

4.1.3.8	The appliance shall be complete with all accessories and essential operating spares and tools. Where specific items are not required to be supplied suitable arrangement shall be made for stowage and secure location of such items to suit the ARFFV/ACFT role. All locking and securing devices shall be of sufficient strength, reliability and shall be of quick opening and closing type for removal of accessories and other items without loss of time.		Yes	Physical Check for space for towage. OEM Certification for strength and reliability of locking and
---------	---	--	-----	---

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
				securing devices.
4.1.3.9	All items where standard specification does not exist, best available commercial quality as approved by the inspection authority shall be supplied.		Yes	Physical inspection
4.1.3.10	The unit shall be designed to be as compact as possible complete with ease of accessibility to all sub systems for maintenance and repairs. The pump or foam making equipment and controls shall be so arranged that one man can operate foam concentrate, main water line, ground sweep/under truck nozzle and monitor valves from the driver's compartment and foam concentrate, main water line and side delivery from the mid-ship mounted control panel.		Yes	Practical Demonstration
4.1.4	MATERIAL SELECTION AND TREATMENT			
4.1.4.1	Material used for construction of the appliances shall be new, unused and free from all defects and imperfection that might affect the serviceability of the finished product. These shall be selected with a view to combine lightness with strength and durability.		Yes	OEM Certification and Supporting Documents.
4.1.4.2	Materials used in the assembly and components shall be of high strength to weight ratio where practicable to effect saving in dead weight and thereby increase the payload capacity. Use of dissimilar Materials in contact with each other which tends towards electrolytic corrosion shall be avoided.		Yes	OEM Certification and Supporting Documents.

4.1.4.3	The appliance is intended for use in tropical conditions with continuous high humidity and heat and also in coastal area. This fact shall be given full consideration while selecting material and for this reason use of rubber shall be avoided as far as possible. Wherever, it is unavoidable to use rubber the parts made out of it shall be readily available.		Yes	OEM Certification and Supporting Documents.
4.1.4.4	The material used for superstructure should be noncorrosive and guaranteed against any sort of deterioration, deformation, ageing and corrosion for a minimum period of twelve years . This being one of the important criteria for evaluation, the exact material to be used, its detailed technical specification and the relevant standards to which such material conforms should be clearly stated.		Yes	OEM Certification and Supporting Documents.
4.1.4.5	Timber shall not be used in body construction.		Yes	OEM Certification and

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
				Supporting Documents.
4.1.4.6	All parts, which form waterways or come into contact with foam concentrate, shall be of noncorrosive material. All metal pipelines shall be hot dip galvanized after complete fabrication. All parts exposed to atmospheres shall be made of noncorrosive material. All ferrous fasteners shall be galvanized/chrome plated to avoid rusting over prolonged use.		Yes	OEM Certification and Supporting Documents.
4.2	WEIGHTS AND DIMENSIONS:			
4.2.1	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.		Yes	Practical Demonstration
4.2.2	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.		Yes	Practical Demonstration

4.2.3	The centre of gravity of the vehicle shall be kept as low as possible under all conditions of loading.		Yes	
4.2.4	DIMENSIONS:			
4.2.4.1	Dimensions and other performance requirements are as per table 4.1.1 (a) & (b)		Yes	
4.2.4.2	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 on airports.		Yes	OEM Certification and Supporting Documents.
4.2.4.3	The vehicle shall be constructed such that a seated driver shall be able to see the ground 6 Metre 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.		Yes	Practical Demonstration
4.2.4.4	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.		Yes	OEM Certification and Supporting Documents
4.3	ENGINE:			
4.3.1	PERFORMANCE REQUIREMENTS			
4.3.1.1	The vehicle's engine (s) shall be HSD (High Speed Diesel) driven, and shall have minimum power		Yes	OEM Certification

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	output of 485 KW/650 hp , torque and speed characteristics to meet and maintain all vehicular performances specified in this standard. The vehicle's engine (s) shall be certified by the engine manufacturer for the ARFFV/ACFT application. In addition, Provision for open canopy for engines and incorporation of brushless alternator should be made.			and Supporting Documents
4.3.1.2	Fully laden vehicle shall consistently be able to accelerate maximum speed, as specified, with the engine and transmission at their normal operating temperature at any ambient temperature varying from 0 ^o C to 50 ^o C and at elevation up to 600 metres above mean sea level.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.1.3	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.		Yes	Practical Demonstration

4.3.1.4	<p>The emission level shall be minimum Bharat Stage IV or equivalent.</p> <p>Type approval certificate or equivalent certificate relevant to emission norms of engine offered, issued by any regulatory authority with up to date amendments shall be submitted by the bidder.</p> <p>OEM of engine(s) shall submit a certificate conforming emission level meets minimum Bharat Stage BS IV or equivalent.</p> <p><i>Note:</i> The Engine offered should comply the emission norms prescribed by Govt. of India with up to date amendments.</p>		Yes	OEM Certification and Supporting Documents.
4.3.1.5	<p>The ARFFV/ACFT 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 ARFFVs/ACFTs shall certify the achievable acceleration of 80 kmph in < 35 seconds up to minimum 12 years of use of ARFFVs/ACFTs.</p>		Yes	OEM Certification along with Supporting Documents (if any).

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.3.1.6	<p>The vehicle will 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_{rms} acceleration at the driver's seat of the vehicle when traversing an 8-inch (20 cm) diameter half round at 35 mph (56 kph) must be provided. The suspension design by which the manufacturer meets the suspension performance requirements is at the manufacturer's discretion.</p>		Yes	OEM Certification along with Supporting Documents (if any).
4.3.2	ENGINE COOLING:			
4.3.2.1	<p>Engine shall be liquid 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 0⁰ (degree) Centigrade and 50⁰ C.</p>		Yes	OEM Certification along with Supporting Documents (if any).
4.3.3	FUEL SYSTEM:			

4.3.3.1	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.3.2	Accessible filtration shall be provided for each fuel supply line and a drain shall be provided at the bottom of the fuel tank.		Yes	Physical Check
4.3.3.3	Gravity feed fuel tanks are not acceptable.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.3.4	Fuel tank capacity shall be 200 litres 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.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.4	EXHAUST SYSTEM:			
	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.4.1	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		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	discharge upwards or to the rear of the vehicle and not towards ground nor towards panel operator.			
4.3.4.2	The exhaust system shall include a muffler to reduce engine noise.		Yes	Physical Check
4.3.5	VEHICLE ELECTRICAL SYSTEM:			
4.3.5.1	The vehicle shall be provided with 12/24 volts electrical system and starting.		Yes	OEM Certification along with Supporting Documents (if any).

4.3.5.2	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.5.3	The curb idle minimum-charging rate of the alternator shall be 30 Amps.		Yes	OEM or his Authorized vendors Certification.
4.3.5.4	Batteries shall be secured and well protected from against physical injury, vibration, and water sprays and 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.		Yes	Physical Check
4.3.5.5	The circuits shall be so designed that at no stage of operation overloading, overheating or shortcircuiting and fluctuation of voltage is experienced.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.5.6	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.5.7	An engine coolant/preheating device shall be provided as an aid to rapid starting and high initial engine performance.		Yes	Physical Check
4.3.5.8	The electrical system shall be insulated, waterproofed and protected against exposure from ground fires.		Yes	OEM Certification along with Supporting Documents (if any).
4.3.5.9	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.		Yes	Practical Demonstration

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.4	VEHICLE DRIVE:			

4.4.1	Transmission of power from engine to wheels shall be through a torque converter and fully automatic transmission, having designed input rating parameters to maintain the operational performance during minimum period of 10 years of use, with provision of crawling as per Para 4.12.5.2, 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.		Yes	OEM Certification along with Supporting Documents (if any).
4.4.2	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.4.3	The transmission shall be matched to the engine properly, and shall be approved by transmission manufacturer, for the ARFFV/ACFT application.		Yes	Transmission Manufacturer Certification along with Supporting Documents (if any).
4.4.4	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.4.5	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.4.6	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.5	SUSPENSION: The suspension system shall be designed to permit the loaded vehicle to:			

1	2	3	4	5
----------	----------	----------	----------	----------

Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	a) Travel at the specified speeds over improved surface;		Yes	Practical Demonstration
	b) Travel at moderate speeds over unimproved surface;		Yes	Practical Demonstration
	c) Provide diagonally opposite wheel motion 360 mm above ground obstacles without raising the remaining wheels from the ground.		Yes	Practical Demonstration
	d) Provide at least 50mm of axle motion before bottoming of the suspension on level ground;		Yes	OEM Certification along with Supporting Documents (if any).
	e) Prevent damage to the vehicle caused by wheel movement; and		Yes	OEM Certification along with Supporting Documents (if any).
	f) Provide a good environment for the crew when traveling over all surfaces.		Yes	Practical Demonstration
4.5.1	RIMS, TYRES AND Wheels:			
4.5.1.1	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/ outside the airport boundary.		Yes	OEM Certification along with Supporting Documents (if any).
4.5.1.2	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 as specified in table 4.1.1 (a) & (b)		Yes	OEM Certification along with Supporting Documents (if any).
4.5.1.3	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.		Yes	Physical Check along with supporting documents.
4.5.1.4	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 (60 mph) at normal operating pressure.		Yes	OEM Certification along with Supporting Documents (if any).

4.5.1.5	Size of tyre should be such to meet all vehicular performances.		Yes	OEM Certification along with Supporting
---------	---	--	-----	---

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
				Documents (if any).
4.6	TOWING CONNECTIONS:			
4.6.1	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)		Yes	Physical Check.
4.7	BRAKES			
4.7.1	The braking system shall feature service, emergency and parking brake systems. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. Calliper 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. ABS (Antilocking Brake System) braking system shall be provided.		Yes	OEM Certification along with Supporting Documents (if any).
4.7.2	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.		Yes	Practical Demonstration
4.7.3	The service brakes shall have stopping distances as per 4.1.1. (a) on a dry hard appropriately level road way, free from loose materials, and sufficiently wide roadway without any part of vehicle leaving roadway.		Yes	Practical Demonstration
4.7.4	The service brakes shall provide one power assisted stop with the vehicle engine inoperative, for the stopping distances specified above.		Yes	OEM Certification along with Supporting Documents (if any).
4.7.5	An emergency brake system shall be provided which is applied and released by the driver from the cab and is capable for modulation, by means of the service brake control.		Yes	Physical Demonstration
4.7.6	The parking brake shall be capable of holding the fully loaded vehicle on a 20% grade without air or hydraulic assistance.		Yes	Practical Demonstration
4.7.7	Brakes–Air System			
4.7.7.1	When the vehicle is supplied with air brakes, air compressor shall meet following criteria:		Yes	

	The compressor shall be engine driven;		Yes	Physical Check
	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.		Yes	OEM Certification along with Supporting Documents (if any).
	The compressor shall have the capacity for quick build-up from 0 kPa (0 psi) to release spring brakes,		Yes	Practical Demonstration

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	and this build-up in pressure shall be accomplished within 15 seconds.			
	The compressor shall incorporate an automatic airdrying system immediately downstream from the compressor to prevent condensation build-up in all pneumatic lines.		Yes	OEM Certification along with Supporting Documents (if any).
4.7.7.2	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; <i>Actual reservoir capacity X 25</i> <i>Required reservoir capacity</i>		Yes	OEM Certification along with Supporting Documents (if any).
4.7.7.3	Reservoirs shall be equipped with air pressure regulator, drain and safety valves.		Yes	Physical Check
4.7.7.4	Provision for charging of air tanks by a drive away electrical connection used to power a vehicle mounted auxiliary compressor would be provided.		Yes	Physical Check
4.7.7.5	A drive away air connection for charging of air tanks from an external air source shall be provided.		Yes	Physical Check
4.7.7.6	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.		Yes	Practical Demonstration
4.7.7.7	Provision of pneumatic service outlets for inflating tyres shall be made from air compressor of ARFFV/ACFT, 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 ARFFV/ACFT.		Yes	Physical Check

4.7.7.8	Air leakage from pressure system shall not exceed 0.5 Kg. /sq. cm. per hour so that at no stage the air pressure should reduce less than brake operating pressure in 8 hours.		Yes	Practical Demonstration
4.8	STEERING			
4.8.1	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.8.2	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.		Yes	OEM Certification along with Supporting Documents (if any).

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.8.3	The wall-to-wall turning diameter of the fully laden vehicle shall be less than three times the vehicle length.		Yes	Practical Demonstration
4.8.4	Vehicle shall be designed for Centre/Off Centre Right/Right Hand Drive system so that driver's Left hand is free for operations controls.		Yes	Physical Check
4.9	CABIN			
4.9.1	The cabin shall be mounted on the forward part of the vehicle and shall provide seating for 5 persons including Driver. The seating arrangement shall be; 2 adjustable seats and a long or separate seat (s) for three 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.		Yes	Physical Check

4.9.2	<p>The cab shall meet the visibility requirements of 4.2.4.3. The windshield (single piece) 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. Two doors (01 doors each on LHS & RHS respectively) are to be provided to the cabin, with ECE R29 or equivalent test compliance which should be openable at 90 degrees 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 quickaccess passage to the turret (monitor). Time required for mounting of the crews into the cabin from closeup position shall be less than or equal to 10 Seconds.</p>		Yes	<p>Physical Check for Cabin Space, Doors, Rear View Camera & Monitor, Housing of Engine and Manual Control of Turret.</p> <p>OEM Certificate along with supporting Documents for Glass, ECE R29 test.</p> <p>Practical Demonstration for time of mounting of crew.</p>
4.9.3	<p>The cab shall be weatherproof, and shall be fully insulated thermally and acoustically with a fireresistant material. The cab may be of the unitized</p>		Yes	<p>OEM Certification along with</p>

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	<p>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 noncorrosive 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 twelve years.</p>			<p>Supporting Documents (if any).</p>
4.9.4	INSTRUMENTS, WARNING LIGHTS AND CONTROLS			

4.9.4.1	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 have pneumatic and/or manual override wherever possible.		Yes	Physical Check
4.9.4.2	All instruments and controls shall be illuminated, with back lighting to be used where to be demonstrated Practically.		Yes	Physical check
4.9.4.3	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 fittings for all electrical, air and hydraulic circuits.		Yes	Physical Check
4.9.4.4	The following instruments, or warning lights, or both shall be provided as a minimum;			
	a. Speedometer/Odometer		Yes	Physical Check
	b. Engine(s) tachometer		Yes	Physical Check
	c. Fuel level with audio warning		Yes	Physical Check
	d. Air pressure		Yes	Physical Check
	e. Engine(s) temperature		Yes	Physical Check
	f. Engine(s) oil pressure		Yes	Physical Check
	g. Voltmeter(s)		Yes	Physical Check
	h. Oil temp. gauge light		Yes	Physical Check
	i. Transmission(s) oil temp.		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	j. Pump(s)pressure,		Yes	Physical Check
	k. Water tank level Gauge		Yes	Physical Check
	l. Foam tank level Gauge		Yes	Physical Check

	m. Low air pressure warning		Yes	Physical Check
	n. Headlight beam indicator		Yes	Physical Check
	o. Trafficator light		Yes	Physical Check
	p. Hazard warning light		Yes	Physical Check
	q. PTO engagement light.		Yes	Physical Check
	r. Pump hour meter		Yes	Physical Check
	s. Water control Valve		Yes	Physical Check
4.9.4.5	The cab shall have all the necessary controls within easy reach of the driver for the full operation of the vehicle and the pumping system. The following cab controls shall be provided.			
	a. Accelerator		Yes	Physical Check
	b. Parking brake control		Yes	Physical Check
	c. Steering wheel, with directional signal control & horn		Yes	Physical Check
	d. Brake pedal		Yes	Physical Check
	e. Transmission range selector		Yes	Physical Check
	f. Pump control or selector/P.T.O.		Yes	Physical Check
	g. Foam control		Yes	Physical Check
	h. Siren switch(es)		Yes	Physical Check
	i. Auxiliary agent control		Yes	Physical Check
	j. Ground Sweep/ Under truck nozzle control		Yes	Physical Check
	k. Roof Turret controls		Yes	Physical Check
	l. Bumper Turret Controls		Yes	Physical Check
	m. Light switches		Yes	Physical Check
	n. Windshield wiper and washer controls		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection

	o. Heater-defroster controls		Yes	Physical Check
	p. Master electrical switch (Isolator Switch)		Yes	Physical Check
	q. Engine start/stop control		Yes	Physical Check
	r. Windshield deluge system switch.		Yes	Physical Check
	s. Water Tank Main valve control		Yes	Physical Check
	t. Side delivery ON/OFF valve		Yes	Physical Check
4.9.5	EQUIPMENT			
4.9.5.1	The following minimum equipment shall be provided in or on the cab.			
	a. Heater/defroster		Yes	Physical Check
	b. Driver's suspension seat with vertical, fore and aft adjustment, with seat belt		Yes	Physical Check
	c. Crew seats with individual retractable seat belts and grip hand rails.		Yes	Physical Check
	d. Windshield washers appropriate for removing foam		Yes	Physical Check
	e. Windshield wipers appropriate for removing foam		Yes	Physical Check
	f. Siren		Yes	Physical Check
	g. Horn		Yes	Physical Check
	h. Sun visors, interior transparent		Yes	Physical Check
	i. Outside rear view mirrors, as specified in 4.2.4.4		Yes	Physical Check
	j. Interior lighting		Yes	Physical Check
	k. P.A. System with Microphone as per 4.20.1		Yes	Physical Check
	l. R.T. Set (VHF-AM) as per 4.17		Yes	Physical Check
	m. Self-Contained Breathing Apparatus (SCBA) mounting bracket for crew members excluding driver.		Yes	Physical Check
	n. Wind shield deluge system.		Yes	Physical Check
	o. Storage space for four Nos. of Proximity suit boxes in driver's cabin.		Yes	Physical Check
	p. DEVS as per 4.10		Yes	Physical Check
	q. Rear view camera with a monitor at the panel.		Yes	Physical Check
4.10	DRIVER'S ENHANCED VISION SYSTEM			

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.10.1	Provision for future installation, for a driver's enhanced vision system (DEVS), in the Cab, for ARFFV/ACFT position on a moving map display.		Yes	Physical Check
4.10.2	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 lowvisibility conditions, shall be made in the ARFFVs/ACFTs.		Yes	Physical Check
4.10.3	The installation should not obstruct driver view or hamper any other ARFFV/ACFT vehicle system including Monitor System. The system also be installed without any extensive vehicle modification and should include a dedicated vehicle voltage spikes & surge.		Yes	Physical Check
4.11	BODY			
4.11.1	The body shall be constructed of non-corrosive materials that provide the lightest weight consistent with the strength necessary for off pavement operation over rough terrain and when exposed to excess heat. The material should also be guaranteed against any sort of deterioration, deformation, ageing and corrosion for a minimum period of twelve years . The body may be of the unitized with chassis rigid structure type or it may be flexibly mounted on the vehicle chassis. It shall also include front and rear fenders or wheel wells; body panels shall be removable where necessary to provide access to the interior of the vehicle.		Yes	OEM Certification along with Supporting Documents (if any).
4.11.2	Access doors shall be provided for those areas of the interior of the vehicle, which must be frequently inspected. In particular, access doors of sufficient size and number shall be provided for access to;			
	a. Engine		Yes	Physical Check
	b. Pump		Yes	Physical Check
	c. Fluid reservoirs		Yes	Physical Check
	d. Foam proportioning system		Yes	Physical Check
	e. Battery storage		Yes	Physical Check
	f. Engine oil level indicator(dipstick)		Yes	Physical Check

4.11.3	Suitable, lighted compartments shall be provided for storage of equipment and tools to be carried on the vehicle. Compartments shall be watertight and selfdraining. The compartments shall not house any other equipment and shall be free from projections. (List of equipments is enclosed in Appendix – A)		Yes	Physical Check
4.11.4	The working deck of the vehicle shall be adequately reinforced to permit the crew to perform their duties in the turret area, water tank top fill area, foam liquid		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	top fill area, and in other areas where access to auxiliary or installed equipment is necessary.			
4.11.5	Handrails or bulwarks shall be provided where necessary for the safety and convenience of the crew. Rails and stanchions shall be strongly braced and constructed of a material which is durable and resists corrosion.		Yes	Physical Check and OEM Certification for type of material and corrosion resistance.
4.11.6	Steps or ladders shall be provided for access to the top fill area. The lowermost step(s) may extend below the angle of approach or departure or ground clearance limits if it (they) is/are designed to swing clear. All other steps shall be rigidly constructed. All steps shall have a non-skid surface with at least 150 mm toe room. Lowermost step(s) shall be not more than 558 mm above level ground when the vehicle is fully laden. Adequate lighting shall be provided to illuminate steps and walkways.		Yes	Physical Check
4.11.7	A heavy-duty front bumper shall be mounted on the vehicle and secured to the frame structure.		Yes	Physical Check
4.11.8	Paint finish shall be 'FIRE-RED' in colour and shall be resistant to damage from firefighting agents.		Yes	Physical Check for colour and OEM Certification along with Supporting Documents (if any) for resistant to damage from firefighting agents.
4.12	FIRE FIGHTING SYSTEMS AND AGENTS			

4.12.1	Foam concentrate shall be used as primary extinguishing agent and dry powder (Class B and Class C Type fire) as complimentary agent.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.2	Foam system shall be proportioning type system and the separate foam concentrate tank shall be provided on the vehicle.		Yes	Physical Check
4.12.3	All components of foam system including liquid tank, piping fill troughs screens, valves and delivery connections shall be made of non-corrosive material.		Yes	OEM Certification along with Supporting

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
				Documents (if any).
4.12.4	Agent Pump and Drives			
4.12.4.1	The water pump shall be made up of corrosion resistant material/suitable alloy compatible with foam concentrate with stainless steel shaft suitable for use with Brackish Water and shall be single or multiple stage centrifugal type, designed for dependable emergency service. The vehicles tank and the piping shall be designed to eliminate entrapment of air. The pump shall also be supported with independent automatic priming system. It shall be accessible and readily removable for repair and maintenance. Drain valves shall be provided at suitable location for draining water from the pump casing and piping.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.4.2	While discharging foam solution, the pumping system shall be capable of discharging at a rate equal to or exceeding the requirements of the roof turret (Monitor), ground sweep nozzles, hand line nozzles, and under truck nozzles, discharging simultaneously at designed pressures.		Yes	Practical Demonstration
4.12.4.3	Pump shall be single/double/multistage and closed impeller type where impeller(s) is dynamically balanced to reduce end thrust. Appropriate seal shall be provided capable of running dry for minimum 01 minute without damage.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.4.4	The pump shall be mid ship mounted. Pump control panel shall be located on either side of appliance in addition to that positioned at the cab.		Yes	Physical Check
4.12.5	Pump Drive			

4.12.5.1	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.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.5.2	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 pre-set discharge pressure.		Yes	Practical Demonstration
4.12.6	SUCTION AND DELIVERY CONNECTION			

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.12.6.1	The suction inlet and delivery outlets of the pump shall be fitted on the pump control panels side on both sides of the appliance.		Yes	Physical Check
4.12.6.2	The suction connection shall be provided at suitable location in standard round thread of 125 mm diameter and shall be corrosion resistant. The location of suction inlet should be at lowest possible height preferably not exceeding one meter from ground level. The inlet shall be provided with Chromium plated brass blank cap.		Yes	Physical Check for location and OEM Certificate along with Supporting Documents (if any) for material type and corrosion resistant.
4.12.6.3	Delivery outlet connection shall be provided at suitable locations, operable from panel board in standard 63 mm female instantaneous standard couplings.		Yes	Physical Check
4.12.7	PIPING, COUPLING AND VALVES			
4.12.7.1	All piping, couplings and valves shall be made of material, conforming to relevant international standard, to prevent corrosive and galvanic action.		Yes	OEM Certification along with

				Supporting Documents (if any).
4.12.7.2	All valves shall be quarter-turn-type in manual operation and shall be easy in operation and free from leakage.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.7.3	All piping shall be tested for leakage at 50% above the maximum pressure developed by the pump in no flow condition.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.7.4	Arrangement should be made to prevent overheating of pump at zero discharge.		Yes	OEM Certification along with Supporting Documents (if any).
4.12.7.5	A drainage system with collector tubing from the low points on pump and piping shall be provided, operable with quarter turn valve.		Yes	Physical Check
4.12.7.6	All plumbing shall be reasonably accessible for maintenance purposes. Drain cocks shall be provided where necessary and controls for these shall be readily accessible and so arranged as to prevent the cocks from being opened by vibration.		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	The direction in which the valve/cock opens/closed shall clearly be marked near each valve/cock.			
4.13	WATER TANK			
4.13.1	Water tank shall have capacity as per 4.1.1(b). The tank outlets shall be arranged in such a way that Water tank percent of deliverable water is available as per 4.1.1(b)-2		Yes	OEM Certification along with Supporting Documents (if any).

4.13.2	The tank shall be constructed to resist all forms of deterioration that could be caused by the water and the foam concentrate while affording the structural integrity necessary for off-road operation. Tank shall be made of Glass fibre Reinforced Polyester (GRP)/ Glass Reinforced Plastic/ Polypropylene conforming to relevant international standard with suitable longitudinal and traverse baffles to prevent surging, which shall permit easy access for internal inspection.		Yes	OEM Certification along with Supporting Documents (if any).
4.13.3	The tank shall be provided with hinged lid, a top filling hole with filter of 450 mm size and a drain hole at the bottom.		Yes	Physical Check
4.13.4	Over flow piping shall be arranged in such a way that it releases pressure on overfilling without wasting water during vehicles manoeuvres.		Yes	Physical Check
4.13.5	The water tank shall be separate from crew compartment, chassis, engine, and easily removable, and shall be mounted on chassis in a manner that the torsional strains during movement are minimum.		Yes	Physical Check for Position. OEM Certificate along with Supporting Documents (if any) for torsional strain.
4.13.6	Two external tank fill connection shall be provided both side near operating panel, in standard 63 mm instantaneous coupling, with strainers and ball valve. The filling connection inside the tank shall discharge water just below the upper plate of the water tank.		Yes	Physical Check
4.13.7	A direct filling (pump to tank using own pump) connection shall also be provided to fill the tank from open source of supply and shall be sized so as to fill the tank at 5 bar pressure.		Yes	Physical Check
4.13.8	Arrangement for lifting the tank without damage should be provided for repair and maintenance etc.		Yes	OEM Certificate along with Supporting

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
				Documents (if any).

4.13.9	Main tank valve shall be operated from cabin as well as from control panel. In addition, manual override shall be provided for tank opening valve at side control panel. This valve shall have accessible control.		Yes	Physical Check
4.14	FOAM TANK			
4.14.1	Foam concentrate tank shall have usable capacity of not less than 1300 litres or sufficient for more than two refills for water tank.		Yes	OEM Certificate along with Supporting Documents (if any).
4.14.2	Tank shall be made Glass fibre Reinforced Polyester (GRP)/ Glass Reinforced Plastic/ Polypropylene conforming to relevant international standard.		Yes	OEM Certificate along with Supporting Documents (if any).
4.14.3	The tank shall be separate and distinct from the body flexibly mounted on chassis to receive minimum torsional forces during vehicles movements and easily removable as a unit and should be suitably baffled to prevent surging. (The water and foam tank can be together with compartments or separate as per standard design of the manufacturer)		Yes	Physical Check for Position. OEM Certificate along with Supporting Documents (if any) for torsional strain and baffles.
4.14.4	The manhole of the tank size not less than 250 mm size shall be used for foam concentrate filling and shall be clearly marked ' FOAM CONCENTRATE '. The tank shall be vented adequately to allow rapid and complete filling without the build-up of excessive pressure and to allow emptying of the tank at the maximum design flow rate without danger of collapse. The vent outlets shall be directed to the ground to prevent spillage of foam concentrate on vehicle components.		Yes	Physical Check for size of man hole, Marking emptying rate and direction of outlet. OEM Certificate along with Supporting Documents (if any) for 'no build-up of excessive pressure'.
4.14.5	The foam concentrate draw off tube shall be positioned in such a manner that foreign matter or sludge shall not pass into the compound lines. The		Yes	OEM Certificate along with

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	draw off tube shall be fitted with gauge strainer of corrosion resistant material.			Supporting Documents (if any).
4.14.6	Drain hole at the bottom of sump and a liquid induction connection shall be provided in the tank.		Yes	Physical Check
4.14.7	Filling hole with a trough on top shall be connected with a pipe reaching at the bottom to avoid aeration in the liquid.		Yes	Physical Check
4.14.8	FOAM FILLING			
4.14.8.1	The tank fill connection(s) shall be provided in a position where it can be reached easily from the ground to allow the pumping of foam-liquid compound into the storage tank. The connection(s) shall be provided with strainers of 6.4 mm mesh and shall have check valves or shall be constructed so that foam is not lost from the tank when connection or disconnection is made.		Yes	Physical Check
4.14.8.2	Provision of foam concentrate filling from open source at ground level by foam concentrate filling pump shall be available with independent power drive.		Yes	Practical Demonstration
4.14.9	All pipe lines shall be made of non-corrosive material and dissimilar materials that produce galvanic corrosion shall not be selected. Where plastic piping is used, it shall be fabricated from unplasticised resins unless the plasticizer has been provided not to adversely affect the performance characteristics of foam.		Yes	OEM Certificate along with Supporting Documents (if any).
4.14.10	All foam concentrate piping shall be adequately sized to permit flow and shall be arranged to prevent water entering the foam tank.		Yes	OEM Certificate along with Supporting Documents (if any).
4.14.11	Automatic foam concentrate proportioning arrangements shall be provided with 3%, 6% and 8% induction ratio preferably with Stepless System, for varying discharge rates and shall not require frequent calibration.		Yes	Practical Demonstration
4.14.12	FOAM PROPORTIONING SYSTEM			

4.14.12.1	The foam concentrate proportioning system shall provide a means of controlling the ratio of foam concentrate to the quantity of water in the foam solution being discharged from all orifices normally used for aircraft fire-fighting operations.		Yes	Physical Check
4.14.12.2	The proportioning system shall be sufficiently accurate to provide for the discharge of finished foam concentrate within the range specified in		Yes	OEM Certificate along with Supporting

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	Standard for Evaluating Aircraft Rescue and Fire Fighting Foam Equipment.			Documents (if any).
4.14.12.3	Control shall be provided at suitable location to open the foam concentrate tank from cabin as well from control panel operated pneumatically with manual override. This valve shall have accessible control.		Yes	Physical Check
4.14.13	ROOF TURRET (MONITOR)			
4.14.13.1	One power driven Roof Turret (Monitor) shall be provided on the rooftop of cabin so that it can be operated by a member of crew from within the cabin of ARFFV/ACFT. The system should be capable of being operated manually from within the cabin or rooftop in case of failure in power assisting mechanism. Where equipped with a turret (monitor) having manual controls above the cab roof, the cab shall be designed with a quick-access passage to the turret (monitor). The monitor should have dual flow rate i.e. 100% and 50% with a suitable selecting mechanism at the monitor control and easily operable by the operator. The size of the manual override wheel of roof turret should be adequate for easy access.		Yes	Practical Demonstration along with Supporting Documents.
4.14.13.2	Monitor shall be capable of traversing 270 ⁰ horizontally and elevating not less than 45 ⁰ from horizontal axis and depression of 15 ⁰ to deliver foam at ground level not more than 12m ahead of the vehicle. The locking position shall be facing front side. The monitor should not lose control in case assistance is lost during the operation and should remain in operation at same position awaiting manual operation.		Yes	Practical Demonstration for Movement of turret and OEM Certificate along with Supporting Documents (if any) for compliance of not losing control in case assistance is lost.

4.14.13.3	Monitor shall be capable of discharging total rated water tank quantity in not more than two and half minute and shall have a means provided for deflective pattern of foam dispersal. The discharge rate of monitor shall not be less than 4500 L/min at maximum rated pressure with expansion ratio of minimum 1:8 by using foam concentrate.		Yes	Practical Demonstration
4.14.13.4	Range of throw shall be as per 4.1.1 (b) 3 - roof turret discharge.		Yes	Practical Demonstration
4.14.14	HAND LINES			
4.14.14.1	In addition, one first aid hose reel connection shall also be provided with ≥ 30 mtrs rubber hose with a pistol grip type nozzle conforming to JCDD 25 (which can be used as spray and hollow jet), with		Yes	Physical Check and OEM Certificate along with

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	discharge capacity of 230 L/min at operating pressure.			Supporting Documents (if any) for JCDD 25 and discharge rate.
4.14.14.2	Each side line shall have minimum discharge capacity of 450 L/min at 7 bar pressure on FB 10 EX branch with an expansion of not less than 8 and minimum throw of 25 mtrs when either, all foam hand lines are used simultaneously (with monitor not operating) or two of them are used in combination with monitor.		Yes	Practical Demonstration for throw. OEM Certificate along with Supporting Documents (if any) for discharge rate and FB 10 EX.
4.14.14.3	Complementary agent (Dry Powder) hand lines shall have open/close nozzle discharge rate of more than 2.5 kg/second with 7.5 mtrs range. The nozzle should be made of non-ferrous metal or stainless steel.		Yes	Practical Demonstration for throw range. OEM Certificate along with Supporting Documents (if any) for discharge rate and material.

4.14.14.4	An automatic Pressure & Flow regulator shall be provided for the side line to enable the monitor to operate at the optimum pressure to give rated capacity for delivery, throw and expansion etc while maintaining the pressure of 7 bar pressure at the side line delivery. A bypass valve operable by 90 ⁰ turn of a lever shall be provided to the automatic pressure regulator to facilitate availability of higher delivery pressure and flow whenever needed.		Yes	Physical Check for Position. OEM Certificate along with Supporting Documents (if any) for compliance of maintaining 7 bar.
4.14.14.5	The monitor shall operate at the optimum rated capacity for delivery, throw and expansion etc. while operated in combination with:			
	All the ground sweep nozzles and under truck nozzles		Yes	Practical Demonstration
	Two side delivery		Yes	Practical Demonstration
4.14.14.6	ARFFV/ACFT shall have two side lines on each side, operational from cabin and panel both with manual override.		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
4.14.15	FOAM CONCENTRATE QUALITY: Turret (Monitor) and hand lines shall be capable of producing foam from foam concentrate solution in the specified ratio of 3%, 6% & 8% preferably with Stepless System.		Yes	Practical Demonstration
4.14.16	GROUND SWEEP AND UNDER TRUCK NOZZELS			
4.14.16.1	Two Ground Sweep nozzles shall be provided at the front having performance as per 4.1.1(b)- 5&6 Optimum working pressure 6 bar. Four under truck nozzles shall be provided to protect under side of vehicles, tyres and wheels. Ground sweep/ Under truck Nozzles valve shall be controlled from cabin interior within easy reach of driver and a crewmember. An automatic Pressure & Flow regulator shall be provided for the ground sweep/ Under truck Nozzles to enable the monitor to operate at the optimum pressure to give rated capacity for delivery, throw and expansion etc., while maintaining the required pressure and flow for the ground sweep/Under truck nozzles.		Yes	Physical check for location of nozzles and their control. OEM Certificate along with Supporting Documents (if any) for automatic pressure and flow regulator.
4.14.17	BUMPER TURRET			

4.14.17.1	A power-driven bumper turret shall be provided. Flow rate shall not be less than 950 L/min. The throw range shall not be less than 46 metres. An aspiration barrel and deflector shall be provided. A foam expansion of not less than 1:8 with foam concentrate shall be achieved. The monitor shall be electronically controlled by a joystick within reach from driver and co-driver.		Yes	Practical Demonstration along with Supporting Documents.
4.14.17.2	An automatic oscillating mode shall be provided, horizontal and vertical range shall be programmable. When bumper monitor is in operation simultaneously with roof monitor, roof monitor flow rate shall automatically reduce to 70% of full flow rate.		Yes	Practical Demonstration
4.15	PRIMER			
4.15.1	A suitable primer shall be provided along with pump, which shall have both automatic and manual engagement/ disengagement provisions		Yes	Physical check
4.15.2	Primer shall be capable of priming a suction column with 7.3 mtrs lift in less than 30 second with indicator, with 125 mm suction hose diameter .		Yes	OEM Certificate along with Supporting Documents (if any).
4.16	LIGHTS AND ELECTRICAL SYSTEM			
4.16.1	Following electrical gadgets shall be provided:			
	a. Siren of □ 95 decibel sound output at 100 feet ahead and not less than 90 decibels at 90 degree		Yes	OEM Certificate

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	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.			along with Supporting Documents (if any).
	b. A flashing red and revolving blue beacon on cab roof top		Yes	Physical Check
	c. An Air horn		Yes	Physical Check
	d. Headlights with selective pattern for High beam light		Yes	Physical Check
	e. Dual tail lights and stop lights		Yes	Physical Check
	f. Signal lights for turning at four corners of vehicles with visual and audible signals.		Yes	Physical Check
	g. Spot light, at both ends of windshield glass, hand adjustable with 152 mm diameter.		Yes	Physical Check

	h. Adequate reflector and markers to indicate overall dimensions of vehicle.		Yes	Physical Check
	i. One reverse light with audible warning at the rear of vehicle.		Yes	Physical Check
	j. Panel lights, top deck light, cabin lights, engine compartment lights, tools and equipment compartment lights, shall also be provided.		Yes	Physical Check
	k. Two inspection lamps shall also be provided and provision of additional connection to use these lamps shall be made in various compartments.		Yes	Physical Check
	l. Two fog lamps. These shall be low mounted in front of the appliance.		Yes	Physical Check
	m. Equipment storage compartment lights shall glow on opening of the door/shutter, even when the ignition switch is turned off.		Yes	Physical Check
4.16.2	All appropriate lights and gadgets detailed above shall be operable from driver's cabin.		Yes	Physical Check
4.16.3	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 electro-magnetic switch or over flow modules.		Yes	Physical Check
4.17	RADIO TELEPHONE (R.T.)			
4.17.1	One VHF Radio telephone operable on frequency range between 118 to 136 MHz- 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. 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 ARFFV/ACFT		Yes	OEM Certificate along with Supporting Documents (if any) for technical parameters. Physical Check for quantity.

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	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 R T Set should be provided at the midship panel. The set shall be suitably mounted to resist vehicles vibration and suppress engine noise or any other vehicular electromagnetic induction.			

4.17.2	Adequate spares for 12 years and service/repair and spares manual along with circuit diagrams should be provided. All manuals and diagrams should be in English language with standardized international symbols.		Yes	Undertaking from ARFFV/ ACFTs Manufacturers
4.17.3	The system protection fuse shall be located in an easily accessible location for quick replacement.		Yes	Physical Check
4.18	DRY CHEMICAL SYSTEM			
4.18.1	One unit of 250 kg each dry chemical powder (foam compatible) shall be provided, using dry nitrogen as propellant gas so as to achieve performance as specified in 4.1.1 (b). The dry chemical container shall be constructed in accordance with the ASME Boiler and Pressure Vessel Code, Section 8, or equivalent, and shall be so stamped.		Yes	OEM Certificate along with Supporting Documents (if any) for Compliance to ASME Boiler and Pressure Vessel Code).
4.18.2	All piping and fittings shall conform to the appropriate ASME, or equivalent, code and shall be designed to withstand the working pressure of the system. The design of the piping and valves shall provide the desired flow of gas into the system and the minimum amount of restriction from the chemical container(s) to the hose connection. Where more than one hose line is provided, piping and fittings shall be sized and designed so that there is equal flow to each line, regardless of the number of lines placed in operation.		Yes	OEM Certificate along with Supporting Documents (if any).
4.18.3	Nitrogen cylinders shall be certified from Department of Explosive (Government of India) and shall have universal filling connections. The cylinder shall be manufactured in the year of delivery and have clearance from Explosive Department, Nagpur (India) for re-filling, storing and operation.		Yes	Certificate from Department of Explosives (Govt. of India). OEM Certificate along with Supporting Documents (if any) for other technical Parameters.

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection

4.18.4	Provisions shall be made for purging all piping and hose of dry chemical after use without discharging the dry chemical remaining in the dry chemical container(s). Provisions also shall be made for the depressurization of the dry chemical container(s) without the loss of the remainder of the dry chemical. A pressure gauge shall be provided that indicates the internal pressure of the agent storage container(s) at all times.		Yes	Practical Demonstration
4.18.5	A means of pressure release in situation of over pressure shall be provided with filling opening and suitable tight-fitting cap.		Yes	OEM Certificate along with Supporting Documents (if any)
4.19	PROVISION FOR STORAGE of additional extinguishing media in future shall be made.		Yes	OEM Certificate along with Supporting Documents (if any) and Physical Check.
4.20	OTHER EQUIPMENT			
4.20.1	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 Metres. All PA system receivers shall be tuned to the frequency of wireless microphone.		Yes	Physical Check.
4.20.2	A spare battery charger. There should be adequate space provision for battery compartment and polarity of line.		Yes	Physical Check
4.20.3	Instruction book, spare parts catalogue and repair manual.		Yes	Physical Check
4.20.4	All tools and accessories/equipment as per Appendix-A		Yes	
4.20.5	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 ARFFV / ACFT engine should have Engine Informative System (EIS) so as to obtain		Yes	Physical Check and OEM Certificate along with Supporting Documents (if any).

	data about various parameters of the engine such as maintenance schedules, service alerts,			
--	---	--	--	--

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	performance alerts, errors etc. and history sheet of maintenance.			
4.21	Factory Acceptance Test – as per Annexure-V		Yes	As per NFPA-414.
4.22	MANUFACTURE CERTIFICATE AND GUARANTEE			
4.22.1	Manufacturer shall provide a certificate for the appliances conforming to all specifications.		Yes	On Company's letter head duly signed by authorized person.
4.22.2	A guarantee shall be furnished by manufacturer for a period of 24 months for material workmanship and smooth functioning of vehicles from the date of commissioning at consignee's place.		Yes	OEM Certificate along with Supporting Documents (if any).
4.22.3	The manufacturer shall provide maintenance services as recommended by OEM for total period of Ten years including two years of guarantee period. All the charges in respect of maintenance / repair service shall be covered under para 2.12.1 of section C-1.		Yes	OEM Certificate along with Supporting Documents (if any).
4.22.4	The manufacturer shall be responsible for replacing any parts, which may become unserviceable due to the use of defective and sub-standard materials and bad workmanship during the period of guarantee free of all charges.		Yes	OEM Certificate along with Supporting Documents (if any).
4.23	MARKINGS			
	Following markings shall be made on the body of the vehicles:			
	a. Manufacturer's name and trade mark		Yes	Physical Check

b. "Airport Fire and Emergency Service".		Yes	Physical Check
c. Year of manufacture		Yes	Physical Check
d. Engine and Chassis numbers		Yes	Physical Check
e. AAI Emblem		Yes	Physical Check
f. Job or Serial No.		Yes	Physical Check
g. Capacity of pump, water tank, foam tank		Yes	Physical Check
h. Pump serial number		Yes	Physical Check
i. Chassis supplier name and country of origin		Yes	Physical Check

1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	j. Luminous strips to be provided at the rear and both sides of the vehicle		Yes	Physical Check
4.24	PRODUCT SUPPORT			
	Manufacturer shall ensure:			
	a. Availability and supply of spares at very short notice, for at least 10 years, after expiry of guarantee.		Yes	Undertaking on Letter head
	b. Induction Training for selected staff at consignee place or mutually agreed place at supplier's cost.		Yes	Undertaking on Letter head
	c. Any other Technical helps that may be required at the time of Induction.		Yes	Undertaking on Letter head
	d. After sales service.		Yes	Undertaking on Letter head
	e. One set of workshop major repair and maintenance tools required for ARFFV/ACFT shall be supplied for each consignee.		Yes	Undertaking on Letter head
4.25	MANUALS: The following literature/manuals along with soft copy shall be provided (one set with each equipment/ARFFV/ACFT). In addition, 10 sets of literature are to be provided for inspection and training purpose. All manuals should be in English language:			

	a. OPERATIONAL MANUAL: This manual should contain technical description of the equipment with lay out drawings, illustration and performance capabilities with instruction to user for commissioning the equipment for use, and use operation with limitations and precautions to be observed normal maintenance and field repairs, lubrication schedule with grades of lubricants to be used, fault finding guide, storage instructions and warning plates against possible wrong use.		Yes	Undertaking on Letter head
	b. PARTS MANNUAL: This manual shall contain fully exploded and illustrated details of the entire Chassis, superstructure and all carried subassemblies, suitably grouped for easy identification of each and separately demandable spare for replacement as required, will include details of brought out items with part numbers of source of supply.		Yes	Undertaking on Letter head
	c. WORKSHOP REPAIRS MANNUAL: The manual shall contain fully illustrated instructions on repair and overhaul of all items supplied against this specification including proprietary items fitted/supplied with details of fitment tolerances, special tools to be used, procedure for dismantling major assemblies.		Yes	Undertaking on Letter head
	d. DRAWINGS: A complete set of general arrangement drawings showing layout of equipment, piping and fluid flow controls, electrical and		Yes	Undertaking on Letter head
1	2	3	4	5
Para No.	Technical Specification	Parameter	Statement of Compliance	Methodology for Inspection
	structural design shall be submitted along with the ARFFV/ACFT.			
	e. PRICE LIST: Price list for complete range of spares/components for Chassis and Superstructure with current price list for future requirement on FOB basis for imported spares and Ex-factory for indigenous spares as the case may be.		Yes	Undertaking on Letter head
4.26	ITEMS SUPPLIED IN INDIA/WORKS OF SUPPLIER: Items required as per Appendix-A under category A-Items supplied in India shall be conforming to Bureau of Indian Standards (BIS) wherever the standards exist or from works of supplier. All other equipment and accessories forming part of superstructure fabrication shall be provided at the place of fabrication.		Yes	Undertaking on Letter head

4.27	<p>MANUAL OVERDRIVE FOR POWER ASSISTED OPERATION: All power assisted controls and operation should have suitable manual operation to ensure the operation in case of any failure in the power assisting mechanism. Such arrangements shall be easily accessible to the operator facilitating quick changeover.</p> <p>NOTE: Bidder must give detailed technical information in the Questionnaire (Annexure- VI) enclosed regarding the ARFFV/ACFT quoted by them.</p>		Yes	OEM Certificate along with Supporting Documents (if any).
------	--	--	-----	---

Note:

The firm should have adequate infrastructure, equipment and tools for practically demonstrating the technical Specifications as mentioned above.

Appendix-A

Following Vehicle mounted Equipment's are to be supplied along with the ARFFV/ACFTs in properly stored Lockers with designated places and appropriate Quick-release Clippings:

Sl. No.	Equipment for Rescue Operation	Quantity	Appendix/ Standard	Statement of Compliance
A.	ITEMS TO BE SUPPLIED FROM INDIA/ WORKS OF SUPPLIER			
1.*	Aluminium Extension Ladder, 13.5M Length (Approx.)	1 No.	Appendix-I /NFPA	Yes
2.	Universal Branch Pipe (Diffuser Branch), 63 mm Male Instantaneous Inlet, Gunmetal Material.	1 No.	IS:2871/ Equivalent applicable standard	

3.	Standard Branch Pipe with 19 mm Nozzle, 63 mm Male Instantaneous Inlet, Gunmetal Material.	2 Nos.	IS:903/ Equivalent applicable standard
4.	Nozzles for Standard Branch Sizes: (a) 12 mm (b) 19 mm	1 No. each	IS:903/ Equivalent applicable standard
5.	Nozzle Spanner, Material Steel.	1 No.	IS:903/ Equivalent applicable standard
6.	Foam Making Branch, FB 5X type with Pick-up Tube.	2 Nos.	IS:2097/ Equivalent applicable standard
7.	Foam Making Branch, FB 10X type with Pick-up Tube.	2 Nos.	IS:2097/ Equivalent applicable standard
8.	Portable LED Emergency Light with Accessories	1 No.	Appendix-II
9.	Safety Goggles	4 Pairs	Appendix-III
10.	Reusable Ear Plug	25 Pairs	Appendix-IV
11.	Chocks	1 Pair	Appendix-V
12. #	Suction Hose for Pump complete with Round thread Gunmetal Couplings, 2.5 Meter	4 Lengths	IS:2410/ Equivalent applicable standard
13.	Suction Strainer for Pump, Gunmetal	1 No.	IS:907/ Equivalent applicable standard
14.	Suction wrench for 125 mm suction hose coupling	2 Nos.	IS:4643/ Equivalent applicable standard
15.	Suction adopter GM 125 mm female x 63 mm male with lugs.	1 No.	IS/ Equivalent applicable standard
16.	Jack Hydraulic for 20 Ton capacity with handle	1 No.	IS /Equivalent applicable standard
17.	Branch with revolving head, GM 63 mm	1 No.	IS:906/ Equivalent applicable standard
18.	RRL Hose Type "B" 63 mm dia & 30 meters length	4 Nos.	IS:903/ Equivalent applicable standard
19.	Fireman Axe with belt & pouch.	3 Nos.	EN/Equivalent
20.	Hydraulic Spreader & Cutter with Pump & Accessories	1 No.	Appendix-VI/NFPA
21.	Power Driven Circular Saw with Accessories.	1 No.	Appendix-VII/NFPA
22.	Pneumatic Lifting Airbag with Accessories	1 No.	Appendix-VIII/NFPA
23.	Zero-torque Nozzle with Hand-Control, 63 mm Male Instantaneous Inlet, Discharge 750 LPM @ 7 Bar Pr.	1 No.	Appendix-IX
24.	Seat Belt/Harness Cutting Tool	3 Nos.	Reputed Make
25.	Gloves, Fire Resistant with Anti-skid Palm`	8 Nos.	EN/Equivalent
26.	Fog/Jet Nozzle with Hand-Control, 63 mm Male Instantaneous Inlet, Discharge 750 LPM @ 7 Bar Pr.	1 No.	NFPA1964/Equivalent
27.	Penetrating /Pinch ring Nozzle with 63 mm Male Instantaneous Inlet, Stainless Steel Material.	1 No.	NFPA1964/Equivalent
28.	Quick Release knife with pouch to be worn with fireman's belt.	5 Nos.	Reputed Make
29.	Hand Held Forcible Entry Tool Kit (1 no.)	1 No.	Appendix-X

30.	Hand line Nozzle with selectable flow, pistol grip and shut-off with double stops.	1 No.	NFPA1964/Equivalent
31.	Fireman Axe with belt & pouch.	3 Nos.	EN/Equivalent

* to be stowed at the top of the vehicle with gallows. Rollers are to be provided for single man mounting / dismounting of ladder.

to be stowed at the hose tunnels provided at the top of the vehicle.

□ Test Certificates in respect of equipment's shall be submitted before prototype test of Successful bidder as stated in clause 17.3.9 of Section-A.

Sl. No.	Equipment for Rescue Operation	Quantity	Statement of Compliance
B.	SPARE LOCKERS HAVING DESIGNATED PLACE AND APPROPRIATE QUICKRELEASE CLIPPING ARE TO BE PROVIDED FOR THE FOLLOWING EQUIPEMNTS:		
1.	Adjustable Wrench	1 No.	Yes
2.	Axe, Rescue, Large, Non-wedge Type	2 Nos.	
3.	Axe, Rescue, Small, Non-wedge Type	2 Nos.	
4.	Cutter Bolt, 61cm	1 No.	
5.	Crowbar, 95cm	1 No.	
6.	Chisel, Cold, 2.5cm	1 No.	
7.	Sledge Hammer, 1.8kg	1 No.	
8.	Hook, Grab or Salving	3 Nos.	
9.	Blanket, Fire Resisting	3 Nos.	
10.	Short Rope Line, 15M length, 50mm Circumference, Hemp/manila	3 Nos.	
11.	Long Rope Line, 30M length, 50mm Circumference, Hemp/manila	3 Nos.	
12.	Piers, 17.8cm, Side-cutting	1 No.	
13.	Piers, Slip joint, 25cm	1 No.	
14.	Screwdrivers, Assorted (Set)	1 No.	
15.	Snipers, Tin	1 No.	
16.	Collecting Breeching, 63 mm Instantaneous Gunmetal	1 No.	
17.	Medical First-aid Kit	1 No.	
18.	Non-percolating Firefighting Delivery Hose, Synthetic Jacketed with Elastomeric Outer Covering, 63mm Instantaneous couplings, 30M Length	8 Nos.	
19.	Hose Bandages	12 Nos.	
20.	Hose Clamps	6 Nos.	
21.	Dividing Breeching, 63 mm Instantaneous Gunmetal	1 No.	
22.	Insulated Pliers with Rubber Gloves Pairs Tested to 20 KV	1 No.	
23.	Cropper Bolt (1 no.)	1 No.	
24.	Kinetic Cutter	1 No.	
25.	Hack Saw, 300mm x 12.5 mm x 0.63 mm approx. Size of Blades with 6 nos. of Spares Blade	1 No.	
26.	Crow Bar, 6' Length, 25mm Diameter	1 No.	
27.	Axe, Drift & Rescue	1 No.	
28.	Double Female Coupling	2 Nos.	
29.	Double Male Coupling	2 Nos.	

30	Space for Emergency Inflatable Lighting Tower with Electric Generator of 3.5 BHP (4-stroke Petrol driven) & Alternator of 1.2 KVA (Synthetic Illuminating Tube)	1 No.
31.	Adapter 63 mm male to 38 mm female GM	2 Nos.
32.	Adapter 63 mm female to 63 mm female GM	2 Nos.
33.	Crosslays for storing delivery hoses diameter 63 mm-30 mtrs. length on the ARFFV/ACFT	4 Nos.

TECHNICAL SPECIFICATIONS FOR ALUMINIUM EXTENSION LADDER 13.5 METRES LENGTH

Offered Make & Model (To be filled by the bidder)

Para No.	Technical Specifications	Statement of Compliance	Methodology for Inspection
1.	GENERAL		OEM's Certificate, Physical Check and Practical Demonstration.
	The ladder shall be made with a view to combine lightness with strength and durability; all metal parts must be either corrosion resistant. When fully extended the ladder shall be 13.5 Meters (Approx.) long overall and so constructed that it is reasonably rigid, strong and free from sway when pitched against the wall with the base of the ladder at 6 feet 6 inches/2.5 Meters from it and two or three men are ascending the ladder at speed or one or two men is carrying another while descending the ladder.	Yes	
2.	MATERIALS		
2.1	String & Rounds		
	The choice of the materials to be used in the construction of the ladder shall be such that it is made with a view to combine lightness with strength and durability, aluminium alloy strings and rounds used in the ladder must be light in weight, rust proof, fire proof & rot proof. All metal parts either shall be treated to resist corrosion or must be corrosion resistant; stainless steel component shall not be less than 316 qualities.	Yes	
2.2	Rope		
	Rope fitted for extending & lowering the ladder to be manufactured from polyamide and multifilament hawser laid yarn twisted together with Z twist, the number of rope yarn and strands shall not be more than three. The strands must be continuous with splice. The finished rope shall be flexible, well laid and free from defects in yarn, strands and finish, the breaking load of the rope shall not be less than 2200 kg.	Yes	
2.3	Pawl		
	The locking pawls shall be made from aluminium alloy chilled casting to make material of solid strength for rigid use. Special steel springs shall be fitted to manage materials of 3 mm thickness of H-1 sheets and length of the boxes shall extend on the round so that there is no gap between strings & pawl. Width of pawl shall be as short as possible so that it does not cause obstruction.	Yes	
2.4	HEAL & HEAD CAP		

	The heels of the stiles or strings of the lower section must be fitted with rubber feet to avoid slipping and these rubber feet shall have shearing hardness of 80. Head cap on extension portion shall cover up to top one round.	Yes
2.5	Bushes	

	Bushes used in the friction parts shall be made from extruded gun-metal rods only, outer part of the bushes shall be made from extruded corrosion resistant bar rod to guide the polyamide line, aluminium round head rivets shall be used for the construction of the ladder units, no flat head rivets to be used for the construction of the ladder, head wheels of fiber shall be fitted at the top of the ladder to avoid friction or damage while extending or lowering the ladder, the method of fixing the head wheels shall be with single rod to hold the same while in rescue operations.	Yes
3.	CONSTRUCTION	
3.1	The truss construction using aircraft industry technique of riveting combines with the high tensile aluminium extrusions to give strength rigidity and light in weight aspects, the rounds are square sections at attachment points to strings, to prevent turning and the tread surface is ribbed to give excellent non-slip properties, the guides form an integral part of the stiles.	Yes
3.2	Dual action long and short pawls are fitted to ensure negative actions, the top section is extended by a line with rot proof and non-hardening features for ease of handling, wheels assembly fitted to the head to facilitate easy running against uneven wall surfaces, footing spigots must be fitted for slip proof on smooth surfaces. Rungs to be fitted by one pin punch clip rivet system to strengthen the structure and not any other method, sides of the ladder to be fully packed from outside to avoid weakening and to improve the strength and stability of the product structure	
4.	DESCRIPTION	
4.1	The ladder shall consist of two/ three sections, one main and one/ two extending sections the width of the narrowest section being more than 16 inches, the strings shall be of built-up constructions with trussing.	Yes
4.2	All the hollow sections shall be reinforced with bulbs made of aluminium to be fitted from the outside for further strengthen the structure for rigid use of the ladder, the design of the ladder be such that it ensures easy sliding of the extending section without excessive clearance in the guidelines, no lubricants shall be used for extension or sliding of the ladder sections, accurate safety aluminium bar fitments to be provided in the ladder, the extending section shall be guided throughout the full range of extension in such a manner that it cannot separate, no plastic or other fitments to be fitted for preventing over extension/ depression of the ladder.	

4.3	The ladder shall be capable of being fully extended by two men by means for effortless lifting and lowering the ladder.	
4.4	The rope shall be of 12 mm dia./ 36 mm circumference to provide a convenient grip and shall be reasonably flexible when wet; the end of the rope shall be attached to the bottom of the main section so as to leave the minimum amount of slack when the ladder is fully housed.	
4.5	Interlocking shall be fitted to avoid accidents while in use, automatic locking device in a set of two shall be fitted to hold the ladder in any position of extension. The two sections shall coincide with each other so perfectly so that they engage automatically, release being affected by still further extending the sections before lowering the pawls. Both sections are set for	

	engagement with one another until they are rested and trip to clear immediately.	
4.6	As per Manufacturer Design & guidelines suitable in case of firefighting tender.	
4.7	Special aluminium rectangular bar locks to be fitted to the integral parts of the ladder for safety and security to avoid accidents, which forms a safety device, similar bar strings are to be fitted to the base of the ladder for better rigidity and support.	
4.8	Weight of the ladder shall be as light as possible and its weight shall not exceed 88 kgs.	
5.	OTHER DIMENSIONS	
	a) Extended length - 13.5 metres/45 feet (Approx.)	Yes
	b) Closed length – 5.80 metres/19 feet (Approx.)	
	c) Overall width – 650mm/26inch (Approx.)	
	d) Weight – ≤88 kilograms	
	e) Steps spacing	As per Manufacturer Design & guidelines suitable in case of ARFF V/ACFT.
	f) Number of steps in each section	
	g) Number of steps in full ladder	
	h) Number of overlapping rounds	
	i) Overall height of ladder	
	j) Height distance between rungs	
6.	WORKMANSHIP & FINISH	
	It is essential that the standard of workmanship and finish be good and any surface of the ladder shall not be buffed as it will reflect light and thus cause difficulty in fire and rescue operations. Flat head rivet construction shall not be accepted in any case and no cracked or bend section to be used for manufacturing of the ladders.	Yes
7.	ACCEPTANCE TESTS	
	The acceptance tests to which the ladder shall be subjected to are given below, these tests shall be carried out at the	Yes

	manufacturer's work, all the equipment's required shall be arranged by the Supplier.	
7.1	<p>Deflection Test</p> <p>The fully extended ladder shall be placed across trestles positioned at 50 cm from each end, on a 30 cm wide board placed across the trestles/strings at the center of the span load of 38 kilograms shall be applied and be allowed to remain there for not less than a minute and then be removed, A load of 76 kilograms is then to be gradually applied and the deflection due to this load shall not exceed 4 inches (100 mm) from the original position, the load shall then be gradually increased to 114 kilograms and the additional deflection shall not exceed 50% of that obtained for 76 Kg. load. There shall be no sign of stress in any part of the ladder which when the load is removed and shall return to a position not lower than that taken after removal of 38 kilograms load, i.e. show no sign of permanent set.</p>	Yes
7.2	<p>Round Set (1)</p> <p>The fully extended ladder placed across the trestles horizontally with support, two man weighting 150 kilograms shall walk over the rounds, no sign of failure shall be apparent on the rounds or its junction with the strings during this test.</p>	Yes
7.3	<p>Round Test (2)</p>	Yes
	The fully extended ladder shall be placed vertically and two man weighing 150 kilograms shall jump on rounds from the round above, no sign of failure must be apparent on the rounds or its junction with the strings during this test.	
7.4	<p>Round Test (3)</p> <p>With the feet of the ladder at a distance of 6'-feet from the wall the ladder shall be fully extended and its head rested against the wall, a load of 320 kilograms shall then be gradually applied to the middle of one round in each section by means of metal hook having a bearing surface of 5 cm wide and suitably lined to prevent brushing of the round, no sign of failure must be apparent either on the round or at its junction with the strings during this test.</p>	Yes
7.5	<p>Side Test</p> <p>After completion of the deflection test, the ladder still resting on the two trestles it is to be turned trough 90 degree on to one. In this position, the deflection of the ladder under its own weight is to be measured from the centre of the round at the point of maximum deflection to a line drawn between the centre of the top and bottom rounds of the ladder. The deflection shall not exceed 3 inches, the ladder is then to be turned over and tested on the other side.</p>	Yes

7.6	Swing Test When pitched against a wall with the base of the ladder at 6 feet, one man weighing 75 kilograms to ascend the ladder and descend the same the ladder shall not bend or weaken after the test and shall show no sign of failure at the rounds or its junction with the strings.	Yes
7.7	Extension Test The ladder shall be capable of being fully extended by two men by a line on the main section to the required length; the ladder shall also be not over extended.	Yes
8.	DRAWING	
	The general schematic drawing and catalogue must be submitted before prototype test of successful bidder.	Yes
9.	MARKINGS	
	Each extension ladder shall be clearly and permanently marked with the following information. a. Manufacturer's name or trademark, if any. b. The size of the ladder. c. The serial No. of the ladder & year of manufacturer. d. EN/CE/NFPA/BIS/ equivalent.	Yes
10.	TEST CERTIFICATE	
	Aluminium materials, fitments, Rope & S. S. materials test reports to be provided on inspection of the ladders.	Yes
11.	GANTRY	
	These are the gallows for mounting the product on the Crash Fire Tender, which is to be provided with the ladder.	Yes
12.	DEVIATIONS	
	No deviations will be accepted from the above or no changes to be allowed as this is an important lifesaving and fire rescue device.	Yes

Appendix-II

TECHNICAL SPECIFICATIONS OF PORTABLE LED EMERGENCY LIGHT WITH ACCESSORIES Offered Make & Model (To be filled by the bidder)

Para No.	Technical Specification	Statement of Compliance	Methodology for Inspection
1.	GENERAL		OEM's Certificate, Physical Check and Practical Demonstration.
	It shall be an all-weather lighting system for the purpose of use in inspection, maintenance or surveillance of an equipment or small area.	Yes	
2.	DESIGN		OEM's Certificate, Physical Check and Practical Demonstration.
2.1	High Flux LED light source providing clear white light.	Yes	
2.2	It shall have 360-degree swivel light head with a telescopic tower. Light Head shall be detachable for mobility.		

2.3	Battery status indicator shall be provided on the Body and giving "LOW" Battery warning with reserve time of at least 10 minutes.	
2.4	It shall have a port for recharging laptop or other such portable devices.	
3.	PERFORMANCE REQUIREMENT	
3.1	It shall have low and high brightness setting with capable of 8 hrs. of continuous operation on high brightness setting.	Yes
3.2	It shall have the following Lumens Values: a. High Brightness:2000 b. Low Brightness:1000	
4.	CONSTRUCTION AND MATERIAL	
4.1	It must be made of flame-retardant material and shall have low operating temperature.	Yes
4.2	It shall also be shock resistant.	
5.	BATTERY TYPE	
5.1	12V Rechargeable Sealed Lead-acid type of reputed branded having life of 500 cycles or more.	Yes
5.2	Battery charging time shall not be more than 8 hrs. on full discharge.	
5.3	The unit shall be provided with 12V/24V vehicle charger.	
6.	WEIGHT & DIMENSIONS	
	Total weight shall not exceed 12 kgs and dimensions shall be as compact as possible.	Yes
7.	OPERATIONAL AND MAINTENANCE MANUAL	
	The bidder should supply operation and maintenance manual with each set in English language.	Yes
8.	CERTIFICATION	
	The unit shall have CE or equivalent certification.	Yes

Appendix-III

TECHNICAL SPECIFICATIONS FOR SAFETY GOGGLES

Offered Make & Model (To be filled by the bidder)

Sl. No.	ITEM	DESCRIPTION	Statement of Compliance	Methodology for Inspection
---------	------	-------------	-------------------------	----------------------------

1.	Application	Safety goggles shall primarily provide optimum vision in indoor and outdoor applications and protection against impact & optical radiation by reducing glare and bright light.	Yes	OEM's Certificate, Physical Check and Practical Demonstration.
2.	Lens Quality & Material	<ul style="list-style-type: none"> a. It shall have clear dual-aspheric plan polycarbonate lenses with prescription quality clarity. b. Lenses shall provide 99.99% U.V. protection, excellent sharpness and contrast. 	Yes	
3.	Lens Coating	Lens shall have coatings to provide properties of anti-fog, anti-scratch, anti-chemical and anti-static.	Yes	
4.	Frame Design & Construction	<ul style="list-style-type: none"> a. It shall have a lightweight a dual-injected moulded frame. b. It shall have the facility to change the lens as and when required by keeping the same frame. 	Yes	
5.	Safety & Ergonomics	<ul style="list-style-type: none"> a. Dual-injected cushion brow guard and universal fit nose-bridge pivots. b. It shall have a wrap-around design for superior orbital eye socket coverage. c. There shall be ventilation channel that helps prevent fog and heat by channelling warm/moist air out and cool air in for added comfort. d. It shall have adjustable temple lengths to help wearers get the best possible comfort and slipproof fit. e. It shall have a pantoscopic lens adjustment to move lens up and down on the face for optimum fit and sightline. 	Yes	
6.	Packing	It shall be supplied with a lanyard and a storage bag.	Yes	
7.	Certification	The eyewear shall be approved to ANSI Z87.1/EN or equivalent.	Yes	

Offered Make & Model (To be filled by the bidder)

Sl. No.	ITEM	DESCRIPTION	Statement of Compliance	Methodology for Inspection
1.	Design & Construction	It shall be of pre-moulded, 3-flanged design. It shall be washable to promote work hygiene.	Yes	OEM's Certificate, Physical Check and Practical Demonstration.
2.	Ergonomic	It shall be comfortable fitted to wide variety of ear canal sizes and there shall not be any touching of plug portion during insertion.	Yes	
3.	Packing	Each pair shall be supplied with a breakaway cord. The packing shall be a convenient carrying case to keep plugs clean when not in use.	Yes	
4.	Attenuation	It shall have a Mean Attenuation of NRR 25 db and SNR of 32 db measured as per ANSI S3.19/ EN or equivalent.	Yes	

TECHNICAL SPECIFICATIONS FOR CHOCKS

Offered Make & Model (To be filled by the bidder)

Sl. No.	ITEM	DESCRIPTION	Statement of Compliance	Methodology for Inspection
1.	Size	15" (Approx.)	Yes	OEM's Certificate, Physical Check and Practical Demonstration.
2.	Material	Polyethylene/ Polypropylene/ Polyurethane	Yes	
3.	Design & Construction	One-piece moulding, Non-slip, water & oilresistant, Lightweight, floats on water, Having high friction factor.	Yes	
4.	Allowable Strength	100 kg/cm ² in all directions.	Yes	
5.	Certification	Confirming to International Standard.	Yes	

TECHNICAL SPECIFICATIONS FOR HYDRAULIC SPREADER AND CUTTER WITH PUMP & ACCESSORIES

Offered Make & Model (To be filled by the bidder)

Sl. No.	TECHNICAL SPECIFICATIONS FOR HYDRAULIC SPREADER AND CUTTER WITH PUMP & ACCESSORIES	Statement of Compliance	Methodology for Inspection
1	General		OEM's Certificate, Physical Check and Practical Demonstration.
	The unit shall be safer for heavy duty performance during rescue and salvage operation. It should be certified as per EN 13204/NFPA 1936/equivalent (latest version).	Yes	
2	Pump Driven by Petrol Engine		
2.1	Should be able to operate cutter and spreader at the same time at their maximum performance level.	Yes	
2.2	Weight not more than 25 KG, fully / ready for operation as per EN 13204 /NFPA 1936/ equivalent (incl. couplings, engine oil, hydraulic oil and fuel).	Yes	
2.3	Fuel Tank: Suitable for minimum 01 (One) hour operation in one fill.	Yes	
2.4	Oil Tank: Having usable oil content capacity as per OEM's Design.	Yes	
2.5	Output: Should be capable of giving adequate output at each stage and desired working pressure.	Yes	
2.6	Noise Level: Less than or equal to 85 dB (A) at distance of 1 mtr. (EN: 13204) / NFPA 1936/ equivalent.	Yes	
2.7	Safety: Provision of safety valves at each stage is essential in addition to excess pressure release valve. The system shall comply with all safety requirements specified in EN: 982. and EN: 60204-1/equivalent.	Yes	
2.8	The pump shall be 4-stroke air-cooled petrol engine with minimum 2.2 K /, working with mineral non-toxic oil and should have following additional features:		
	i. Single switch operation	Yes	
	ii. Protection cap for spark plug	Yes	
	iii. Easy excess for filing of fuel and oil	Yes	
	iv. The hydraulic fuel reservoir shall be provided with a means to visually determine the Fluid level. Such means shall include but not limited to dip stick type indicator, sight gauges or remote fluid level gauges.	Yes	
	v. Handles and controls shall be located on the power unit to allow the power unit to be safely carried and operated by personnel.	Yes	

	vi. Electronic/Suitable Speed control Mechanism.	Yes
3	Hose	
3.1	The pump shall be supplied with a heavy duty hydraulic co-axial (High Pressure hose within return hose) suitable for operating all the tools having a working pressure of not more than 750 bar and tested to a pressure of not less than 2 times the working pressure coupled with single hose coupler.	Yes
3.2	The bursting pressure shall be 4 times the working pressure.	Yes
3.3	The hose and hose assembly shall have minimum resistance against abrasion, fluids and ozone as stated in EN: 853, 855, 856 and 857/equivalent.	Yes
3.4	The quantity of hose with instantaneous couplers preferably mounted on hose reel shall be as follows:	
	a. 10 mtrs: 2 nos.	Yes
	b. 20 mtrs: 2 nos.	Yes
3.5	Hose shall be made of suitable components and design to perform the task without any personal safety hazard. The hose shall confirm to EN: 13204/NFPA 1936/equivalent.	Yes
3.6	Color code as per international code.	Yes
3.7	Shall have quick coupler to prevent inadvertent disconnection.	Yes
4	Cutter for Rescue (as per EN: 13204 / NFPA 1936 / equivalent)	
4.1	Shall be made of anticorrosive material with the provision of carrying handles for operating the cutter in all directions for safe and easy operation.	Yes
4.2	The equipment shall be capable for using under water.	Yes
4.3	Weight shall not exceed more than 20 kg.	Yes
4.4	Cutting force not less than 100 tons and shall be able to cut A-36 Hot Rolled steel round bar of 40 mm.	Yes
4.5	Jaw width not less than 180 mm	Yes
4.6	Blade design: Any design certified by EN/NFPA/ equivalent for the desired level of performance.	Yes
4.7	Anodized for corrosion resistance.	Yes
4.8	Maximum Working Pressure: 750 bar	Yes
4.9	Testing pressure shall be 1.5 times of working pressure.	Yes
4.10	The equipment shall comply with the requirement of operating temperature as per the provisions of NFPA 1936.	Yes
5	Spreader for Rescue (as per EN: 13204/ NFPA 1936/ equivalent)	
5.1	Should be made of anticorrosive material with the provision of carrying handles for operating the spreader in all directions for safe and easy operation.	Yes
5.2	Spreading force not less than 32 tons and not less than 4 tons measured at 25 mm from the tips as per EN 13204/NFPA 1936/equivalent.	Yes
5.3	Weight should not exceed more than 20 kgs	Yes
5.4	Spreading distance not less than 650 mm	Yes
5.5	Pulling force not less than 6.5 tons.	Yes
5.6	The equipment shall be capable for using under water.	Yes
5.7	Teeth double edged, should be capable of spreading & squeezing. Tips must have possibility to be changed without the use of tools.	Yes
5.8	Check valves for all operating parameters	Yes
5.9	Maximum working pressure 750 Bars	Yes
5.10	Testing pressure shall be 1.5 times of working pressure.	Yes
5.11	Quick lock system for tips & chain pulling set and adaptors	Yes
6	Chains	
6.1	Metallic provided with suitable eye and hook for the spreader.	Yes

6.2	Length: 02 Nos. of chain having minimum total length of 4.5 metres. However, none of the two chains should be less than 1.5 metres.	Yes
6.3	Strength: Shall be capable of working at more than the force exerted by spreader.	Yes
7	Telescopic RAM (as per EN: 13204/ NFPA 1936/equivalent)	
7.1	The ram cylinder shall be double acting hydraulically operated device of lightweight construction suitable for manual application with ease.	Yes
7.2	The telescopic ram shall be capable of lifting and spreading operation. Built in speed valve for faster operation.	Yes
7.3	The telescopic ram shall have following specification:	Yes
7.3.1.	Max. Spreading force 1st plug - Not less than 20 Ton	Yes
7.3.2.	Max. Spreading force 2nd plug - Not less than 08 Ton	Yes
7.3.3.	Length retracted - Not more than 575 mm	Yes
7.3.4.	Length extended - Minimum 1250 mm	Yes
7.3.5.	Stroke 1st plug – As per OEM’s Design	Yes
7.3.6.	Stroke 2nd plug - As per OEM’s Design	Yes
7.3.7.	Total stroke – Minimum 700 mm	Yes
7.3.8.	Weight - Not more than 22 kgs	Yes
7.4	Maximum working pressure 750 bars	Yes
7.5	Testing pressure shall be 1.5 times of working pressure.	Yes
8	Other Requirements	
8.1	Technical and Operational Manual: One set each of Technical and Operational Manuals shall be with each equipment.	Yes

Appendix-VII

**TECHNICAL SPECIFICATION FOR POWER DRIVEN CIRCULAR SAW WITH ACCESSORIES
Offered Make & Model (To be filled by the bidder)**

S. No	ITEM	DESCRIPTION	Statement of Compliance	Methodology for Inspection
1.	Engine	2/4 Stroke single cylinder petrol Engine 4.5 HP with Electronics Ignition system & Recoil Starter along with air-cooled having diaphragm carburettor. SelfCompensating carburettor that maintains continuous and regular full power in any conditions.	Yes	OEM’s Certificate, Physical Check and Practical Demonstration.
2.	Engine Speed	Min-2500 RPM Max- 10,550 RPM	Yes	
3.	Fuel	Petrol start & petrol run		
4.	Fuel Tank Capacity	Not less than 0.5 litres and not more than 1.5 litres		
5.	Power Transmission system	Automatic centrifugal clutch, V-Ribbed belt type Driven system Heavy Duty sealed Multi V Ribbed belt for constant grip which reduces the slippage and indicator is fitted on the external side which is helpful in maintaining the convenient belt tensioning.	Yes	
6.	Power Output	Not less than 3 KW	Yes	

7.	Safety Device	a) Wheel Guard Equipped with Spring-Loaded Stainless-steel Wheel Guard while the operator is cutting a material it will adjust itself automatically and hence reducing the pressure on the operator. b) Throttle Lock-out having throttle lock-out.	Yes
8.	Handle	Handle should be full wrap for ease of use with gloves and large rubber coated secured grip & also work as anti-vibration.	Yes
9.	Stopping	There should be momentary contact switch which is always in 'On Position" ready to start with just starter Handle within seconds.	Yes
10.	Anti-Vibration	There should be anti-vibration System, which reduces the fatigue for the Operator with T-point support and isolating the handle as much as possible from the engine and cutting blade.	Yes
11.	Cutting Depth	Not less than 3 inches.	Yes
12.	Noise Power Level	Max 105 dBA.	Yes
13.	Vibration Level	Vibration Level a) Front Handle – As per Manufacturer standard design b) Rear Handle – As per Manufacturer standard design	Yes
14.	Cut-off wheel Blade	Circular Saw with Diamond Blade in which Diamonds are fused on the Blade Size 14 Inch.	Yes
15.	Cutting parameters	Metals, Security Bars, Iron Rods, Iron Chain, Reinforced Concrete, Stones, Rock, Block Steel, Auto Body, Glass, Cock pit, Bullet Proof Glass, Hurricane Glass, Rubber, Plastic & More etc.	Yes
16.	Typographic test	Circular saw working temperature range from -10° to 50° Celsius.	Yes
17.	Dimension (LxWxH)	Not exceeding 825 x 390 x 390 (mm)	Yes
18.	Weight	Not more than 13 kgs.	Yes
19.	Applications	It should cut any material found at Fires, Building Collapses, natural Disasters, Terrorist Attacks, Car Accidents & other Rescues etc.	Yes
20.	Reversible Cutting Arm	It should be provided with Reversible cutting Arm so that, it allows the user to cut any material in the "outboard" position, to allows the user to make a "flush" cut e.g. this feature is useful for cutting security bars off a window of rail coach in outboard position and to allow the user to cut the bars at the level of the window frame.	Yes
21.	Priming bulb	Priming bulb should be provided to make smooth and easier starting by pressing the priming bulb few times, to clean the bad gasoline out from the cylinder and clean gasoline into the cylinder which makes it easier for the engine to start.	Yes

22.	Stable Base	It should be provided with stable base designed to keep system straight on the ground which maintains distance/ gap between the blade and ground and it doesn't harm the blade.	Yes
23.	Endurance	The machine should be capable of operating continuously not less than one hour without overheating.	Yes
24.	Spares	One set of 1. Fast moving spares must be supplied with machine. 2. Tool kit also be supplied with machine.	Yes
25.	Training	Operation and maintenance staff shall be trained on machine for operation and repair.	Yes
26.	Spares & Technical Manual	The sets of Technical Manuals and essential spares shall also be supplied.	Yes

Appendix-VIII

**TECHNICAL SPECIFICATION FOR PNEUMATIC LIFTING AIRBAG WITH ACCESSORIES
Offered Make & Model (To be filled by the bidder)**

Para No.	Technical Specifications	Statement of Compliance	Methodology for Inspection
1.	GENERAL		OEM's Certificate, Physical Check and Practical Demonstration.
	High pressure pneumatic rescue bags capable of lifting heavy loads in harsh environment and with standing rough uses of fire brigade/ rescue operation.	Yes	
2.	DESIGN		

	The Pneumatic Lifting Airbags should be able to stack to make modular system to achieve greater height and lifting capacity without skidding. The connection of bags should be through open or closed connectors allow all the bags together or separately. Bags should also have an integrated hand point.	Yes
3.	CONSTRUCTION & MATERIAL	
	Pneumatic Lifting Bag should be constructed of Kevlar reinforced nitrile rubber with 3 layers aramide reinforcement covering the entire top and bottom surface of lifting bag with highly tear proof polyamide fabric. Each Pneumatic Lifting Bags should be equipped with a brass valve connection 1/8" NPT internal thread and vulcanized into the reinforced corner of bag to which a male connector of quick connect coupling should be threaded in. This male connector should be replaceable if it is damaged. The colour of Airlifting shall be fluorescent type for better visibility during night operations.	Yes
4.	LIFTING CAPACITY	
4.1	Working Pressure: minimum 8 bar.	Yes
4.2	Capacity: minimum 40 ton	
4.3	Insertion height: Max. 25mm	
4.4	Lifting height: Min. 400mm	
4.5	Dimensions: Minimum 700mm X 700mm	
4.6	Weight: Not more than 16kg.	
4.7	Water capacity: Not more than 80 liters	
4.8	Minimum bursting pressure: 32 bar.	
5.	HOSES	
5.1	All the hoses should be equipped with a quick connect/disconnecting male and female couplings, compatible with entire air lifting bag system. The colour of hoses should be black/yellow/ Red.	Yes
5.2	The hoses should have minimum working pressure of 16 bar and should be capable of using in temp range of -20° C to + 80° C.	
5.3	The hoses should be either of polyester or thermo plastic material.	
5.4	The hoses should be resistant to Ultra Violet Light, change of colour, stress or cracking.	
5.5	Two shut off hoses with built in safely valve should be provided to release the pressure between 8.5 bar and 10 bar.	
6.	PERFORMANCE REQUIREMENT	
6.1	Inflation should be pneumatic.	Yes
6.2	Insertion thickness not more than 25 MM.	
6.3	Working pressure not more than 10 bars.	

6.4	Safety factor > 4	
6.5	Dead Man space – NIL	
6.6	Working Temperature – 50°C to 65°C.	
6.7	Point loading should be possible. There should not be any stress point.	
6.8	Lifting should be continuous, Noiseless & jolt free. The surface of bags should be inter locking non-skid surface moulded into each side of the bags. A separate non-skid ply that has been vulcanized separately is not acceptable.	
6.9	Inflation should be through single regulator 200/300 bars with Quick Connection.	
6.10	The Pneumatic Lifting Bags should be portable and light-weight, and should be in set form, consisting of bags, hose assemblies, Pressure gauges, pressure reducers, safety valve, Air bottle connector and controller.	
6.11	The air bags should be chemical and some ozone resistant with carrying straps attached to 40-ton bags.	
6.12	The Pneumatic lifting bags and its accessories should comply all the requirement stipulated under latest EN 13731 / equivalent.	
7.	PRESSURE REGULATOR	
7.1	The pressure Regulator should be capable of reducing the pressure from 300 bar to 8 bar.	Yes
7.2	The pressure regulator should be provided with threaded quick connect couplings suitable to fit to normal BA air cylinder by hand without the use of any spanner.	
7.3	The pressure regulator should be provided with two pressure gauges of suitable capacity to show the air pressure in the cylinder and set pressure.	
7.4	The pressure regulator should be provided with pressure setting knob and safety valve with 2 mtrs. Hose with couplings to connect to Dual Dead man controller.	
8.	ONE SET OF AIRBAGS WILL COMPRISE OF THE FOLLOWING:	
8.1	Lifting Bag 40 tons capacity: 1 no.	Yes
8.2	Pressure reducer 300 bar to 8 bar: 1 no.	
8.3	Dual Controller with pressure gauges: 1 no.	
8.4	Air Hose 5 mtrs. With couplings: 2 nos.	
8.5	Air Hose 10 mtrs. With couplings: 2 nos.	
8.6	Single control Unit: 2 nos.	
8.7	Shut off hose with safety valve: 4 nos.	
8.8	Connection piece to connect two air cylinders: 2 nos.	
9.	MARKING	
9.1	Bags should have proper colour to be visible in dark smoky condition. It should have reflective markings on the corners for easy identification when operating in the dark areas.	Yes

9.2	The lifting bags should be provided with a warning and information labels. The information and the warning labels must be in English language and in pictograms for clear understanding. Also, it should be marked with date of manufacturer and serial number in such a way that they cannot be erased without damaging the surface.		
10.	TESTING		
10.1	Artificial ageing	Yes	
10.2	Impulse loading with drop weight.		
10.3	Dynamic fatigue loading with 16-ton weight.		
10.4	Leakage test with sharp drop weight (50 No.) at 600 and 900 from a height of 7 mtrs. Pressure Tests.		
11.	MAINTENANCE		
11.1	The system should be maintenance free.	Yes	
11.2	There should be provision of draining out moisture after every use.		
11.3	Cleaning /Washing should be possible with ordinary detergent.		
12.	OPERATION AND MAINTENANCE MANUAL: The bidder should supply operation and maintenance manual with each set in English language.	Yes	

SPECIFICATION FOR ZERO TORQUE NOZZLES Offered Make & Model
. (To be filled by the bidder)

Para No.	Technical Specifications	Statement of Compliance	Methodology for Inspection
1.	GENERAL		OEM's Certificate, Physical Check and Practical Demonstration.
	The equipment shall be ergonomically designed to reduce firefighting fatigue and better handling & control of firefighting.	Yes	
2.	MATERIALS		
	The material to be used in the construction shall be pyrolite and one-piece solid nozzle hard coated with multiple pattern detents and designed with better ergonomics to reduce the fatigue of fire fighter.	Yes	
3.	DIMENSIONS		
3.1	Swivel Inlet: 63 mm approx.	Yes	
3.2	Weight: 4.30 kg. approx.		
3.3	Length: Minimum 310 mm		
3.4	Type of coupling instantaneous		
4.	OPERATING		
4.1	Quick shut off Valve.	Yes	
4.2	Flush arrangement without shutting down.		
4.3	Fog pattern with spinning teeth.		
4.4	Handle grip with pistol type.		
5.	PERFORMANCE		
5.1	Discharge rate 200-450 LPM or more	Yes	
5.2	Water Supply: Controlled		
5.3	Jet Reaction: Very Low		
5.4	Water Hammer: Very Low		
5.5	Working Model: Jet & Spray		
5.6	Grip: Free Position		
5.7	Spray Pattern: Minimum 120 Degree		
6.	ATTACHMENT		
	The equipment shall be attached with Zero Torque and quick attack foam tube.	Yes	
7.	OPERATION AND MAINTENANCE MANUAL		
	The bidder should supply operation and maintenance manual with each set in English language.	Yes	
8.	CERTIFICATION		

	The unit shall have CE/EN/NFPA/BIS or equivalent certification.	Yes
--	---	-----

Appendix-X

TECHNICAL SPECIFICATIONS FOR HANDHELD FORCIBLE ENTRY TOOL KIT Offered Make & Model (To be filled by the bidder)

Para No.	Technical Specifications	Statement of Compliance	Methodology for Inspection
1.	GENERAL		OEM's Certificate, Physical Check and Practical Demonstration.
	The equipment is to be use for the purpose of forcible entry, prying, enlarging openings, cutting sheets and twisting off lock and latches. The tool shall enable easy, fast and single person operation.	Yes	
2.	DESIGN		
	a) The complete equipment shall comprise of one compact ram bar and a tool bit set of various bits. The ram bar shall be able to connect the interchangeable bits for added versatility. b) The arm bar shall have a locking device that can lock the ram bar at any length for added leverage and safety for storage. The ram bar shall have an easy sliding action that can direct all its forces directly at the pint of impact for maximum effect.	Yes	
3.	MATERIAL & CONSTRUCTION	Yes	
	a) Ram bar shall be made of hard-coated aluminium's alloy tube body. The tube body and handle shall be machined grooved for non-slip grip. The ram bar shall have hard coated aluminium alloy tool bit retainer and a locking ring. b) The tool bits shall be made of forged & heat-treated steel alloy.		
4.	TOOL BIT SET: The tool bit shall be of the following types:		
4.1	Bull point tool bit for breaking concrete and masonry walls, Minimum Length 14" (Inch)	Yes	
4.2	Chisel of approx. 25 mm width for breaking concrete, prying and breaking bolts and brick walls, Minimum Length 14" (Inch)		
4.3	Chisel of approx. 75 mm width for breaking concrete, prying and breaking bolts, breaking bricks and block walls, Minimum Length 14" (Inch)		
4.4	Metal cutting claw for punching and cutting sheet metal and work like a manual can opener, Approx. Length 250 mm		
4.5	Lock breaker claw for prying or force open doors, windows, twisting hasps and breaking locks, Approx. Length 250 mm		

5.	OPERATION AND MAINTENANCE MANUAL	
	The bidder should supply operation and maintenance manual with each set in English language.	Yes

TECHNICAL SPECIFICATIONS OF AFFRVs/ ACFTs of 06 kL Water Tank Capacity

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.1	GENERAL:	
	The AFFRV/ACFT shall be supplied as a complete built-up unit having minimum rated water capacity of usable 6,000 liters of water through roof turret, side lines/bumper turret, ground sweep nozzles and under truck nozzles with capability as given below. The primary extinguishing agent shall be Foam Concentrate with proportioning system. In addition to primary agent, there shall be complimentary extinguishing agent of a dry chemical powder as indicated at para no. 4.18.	
4.1.1(a)	Fully Loaded AFFRV/ACFT- Chassis Performance Parameters:	
	1. Side slope stability (degrees)	30°
	2. Dynamic balance (kmph), minimum speed on a (30m) radius circle	35.5 kmph
	3. Angle of approach (degrees)	30°
	4. Angle of departure (degrees)	30°
	5. Interaxle clearance (degrees)	12°
	6. Underbody clearance (cm)	46 cm
	7. Under axle clearance at differential housing bowl (cm)	33 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)	40 seconds
	11. Top speed (kmph)	> 115 kmph
	12. Service brake: Stopping distance	
	i. From 33 kmph	≤ 11 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
	13. Parking brake	
	i. Percent grade holding for the parking brake	
	a. Ascending	≥ 20 %
	b. Descending	≥ 20 %
	14. Steering	Right Hand
	15. Drive	On all wheels
	16. Fordability (mm)	≥ 608 mm
	17. Minimum angle of Tilt (Static)	30°
	18. Evasive maneuver test, NATO Document, Dynamic Stability Report- Allied Vehicle Testing Publication (AVTP), 03-16W (kmph)	40 kmph
	19. "J" turn test at 46 m radius (kmph)	48 kmph
4.1.1(b)	Fully Loaded AFFRV/ACFT- Fire Fighting System Performance Parameters:	
	1. Vehicle Water Tank Capacity Minimum Usable	6000 liters
	2. Water tank: Percent of deliverable water	
	a. On level ground	100 %
	b. On 20 percent side slope	85 %
	c. On 30 percent ascending/descending grade	85 %
	3. Roof turret discharge –at full flow	
	a. Individual flow rate of the roof turret (L/min)	≥3,000 L/min
	b. Stream pattern/distances:	
	i. Straight/far point (m)	≥65 m
	ii. Dispersed/far point (m)	≥ 20 m
	iii. Dispersed/width (m)	≥ 11 m
	4. Bumper Turret	
	a. Individual flow rate of the Bumper Turret (L/min)	≥ 950 L/min
	b. Stream pattern/distances:	
	i. Straight/far point (m)	≥ 46 m

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	ii. Dispersed/far point (m)	≥ 15 m
	iii. Dispersed/width (m)	≥ 9 m
	iv. Dispersed Near Point	Within 9m of front bumper
	5. Ground sweep nozzle	
	a. Number of nozzles	2 Nos.
	b. Flow rate (L/min) Per nozzle	Refer sub Para 6(b) below
	c. Dispersed pattern distances:	
	i. Far point (m)	≥ 9 m
	ii. Width (m)	≥ 3.5 m
	6. Under truck nozzle	
	a. Number of nozzles	4 Nos.
	b. Flow rate (L/min) per nozzle (Dispersed Pattern)	The combined flow rate of two ground sweep nozzles and four under Truck nozzles should not be more than 500 liters per minute
	7. Number of water-foam hand lines required per vehicle	
	Pre-Connected water-foam hand lines (2 Nos. on both side)	4 Nos.
	8. Water-Foam hand line	
	a. Flow rate (L/min)	≥ 450 at 7 bar
	b. Straight stream distance (m)	≥ 25 m
	c. Dispersed stream pattern	
	i. Range (m)	≥ 6 m
	ii. Width (m)	≥ 4.5 m
	d. Hose inside diameter (mm)	63 mm
	e. Hose length (m) with instantaneous coupling	≥ 30 m
	9. Reeled water-foam hand line (first aid hose reel)	
	a. Nozzle Flow rate (L/min)	≥ 230 L/min for dual agent lines
	b. Hose length (m)	≥ 30 m for dual agent line
	c. Straight stream distance (m)	≥ 20 m
	d. Dispersed stream pattern	
	i. Range (m)	≥ 6 m
	ii. Width (m)	≥ 4.5 m
	10. Complementary agent- Dry Chemical Powder	
	a. Capacity (kg)	250 kg
	11. Dry chemical hand line:	
	i. Discharge rate (kg/sec)	≥ 2.5 kg/sec
	ii. Range (m)	≥ 7.5 m
	iii. Hose length (m)	≥ 30 m
	12. Foam Tank usable capacity (liters)	800 liters
	13. Pump capacity (LPM)	≥ 4,500 L/min
	14. Foam proportionator	Automatic 3%, 6% & 8% with Step less System
	15. Seating Capacity including Driver of Air-Conditioned Cabin	1+1+3 Nos.

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.1.2.	Chassis	
	The chassis shall be of 6x6 configuration, customized for AFFRV/ACFT application, with specially designed axles (not off-set rims), ensuring specified side slope stability, at the rated capacity of each axle, meeting the performance parameters as per para no. 4.1.1 (a) above.	
4.1.3	General Requirements	
4.1.3.1(a)	The AFFRV/ACFT shall consist of a water tank of 6,000 liters or more of usable water capacity with necessary fittings. The primary extinguishing agent shall be foam concentrate of 3%, 6% & 8% ratio with Step less System. 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 minimum Bharat Stage IV or equivalent) Or Driven of the vehicle PTO mechanically, shall be fitted, having a minimum output of 4500 L/min at suitable delivery pressure and suction lift of 7.3 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.	
4.1.3.2	The AFFRV/ACFT shall be capable of the following minimum performance with Roof Turret mounted on the roof of cabin and two hand lines on either side.	
a.	An individual output of 3000 L/min through roof turret at maximum rated pressure to give throw as per para no. 4.1.1(b) 3 above, of either water or specified quality foam concentrate.	
b.	A minimum output of 450 L/min of foam solution to each of the handlines on either side of the AFFRV/ACFT to give minimum effective throw, specified for foam concentrate of 25 meters at nozzle pressures not exceeding 7 bar and using 30 meters specified hose.	
c.	It shall be possible to operate the roof turret and two hand lines simultaneously at pump delivery pressure suitable to the rated output and throw of roof turret.	
4.1.3.3	The foam concentrate induction shall be automatic with changes in output required through a combination of roof turret and hand lines. The ratio of foam concentrate induction shall be within a variation of $\pm 0.5\%$ with an induction setting from 3%, 6% & 8% ratio with Step less System. The induction ratio once fixed shall maintain this limit of variation for the entire range of inductor setting. Around the pump proportionator shall be used with clearly marked induction ratios varying from 3%, 6% & 8% with Step less System.	
4.1.3.4	The system of foam production from roof turret and hand lines shall be so designed as to produce satisfactory quality of foam with the following minimum properties with the use of foam concentrate.	
a.	Minimum expansion ratio – 1:8.	
b.	25% drainage time with foam concentrate level 'C' 3 minutes minimum.	
4.1.3.5	It shall be possible for the AFFRV/ACFT to use water from a separate source i.e. open source and/or an external source of water supply for prolonged use and foam concentrate supply through a pick-up tube from drums at ground level.	
4.1.3.6	The AFFRV/ACFT shall be equipped with Ground sweep nozzles and under truck nozzles for self-protection, particularly of the wheels. This should incorporate a pressure and flow regulator as explained in Para	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	4.14.16.1. The angle of the front nozzle shall be so adjusted to achieve performance as per para no. 4.1.1(b) -5 & 6 above.	
4.1.3.7	The water tank, foam concentrate tank, roof turret, ground sweep nozzles and under truck nozzles shall have pneumatically controlled ball valves for operation and control from within the cabin. The hand lines should have pneumatic as well as manual control. All pneumatic control system shall be used with air supply at pressures available from the vehicle air brake system. The vehicle air brake shall be tapped so that a minimum air pressure required for the operating vehicle is available all the time and the pneumatic control fire operation actuates when the air pressure in the systems exceeds the minimum level. In case of any leakage in the pneumatic control system the vehicle operation shall not be adversely affected. Opening and closing of valves of the roof turret and tank to pump shall be achieved through operation of pneumatic/electro-pneumatic controls from the cabin as well as from Control Panels. Control Panel should be provided on both sides of the AFFRV/ACFT. Manual control should be provided for operation in case of failure of pneumatic control.	
4.1.3.8	The appliance shall be complete with all accessories and essential operating spares and tools. All locking and securing devices shall be of sufficient strength, reliability and shall be of quick opening and closing type for removal of accessories and other items without loss of time.	
4.1.3.9	The unit shall be designed as compact as possible, complete with ease of accessibility to all sub systems for maintenance and repairs. The pump or foam making equipment and controls shall be so arranged that one man can operate foam concentrate, main water line, ground sweep/under truck nozzle and roof turret & bumper turret valves from the driver's compartment and foam concentrate, main water line and side delivery from the mid-ship mounted control panel.	
4.1.4 MATERIAL SELECTION AND TREATMENT:		
4.1.4.1	Material used for construction of the appliances shall be new and free from all defects and imperfection that might affect the serviceability of the finished product. These shall be selected with a view to combine lightness with strength and durability.	
4.1.4.2	Material used in the assembly and components shall be of high strength to weight ratio where practicable to effect saving in dead weight and thereby increase the payload capacity. Use of dissimilar Material in contact with each other which tends towards Galvanic / electrolytic corrosion shall be avoided.	
4.1.4.3	The appliance is intended for use in tropical conditions with continuous high humidity and heat and also in coastal area. This fact shall be given full consideration while selecting material and for this reason use of rubber shall be avoided as far as possible. Wherever, it is unavoidable to use rubber the parts made out of it shall be readily available.	
4.1.4.4	The material used for superstructure should be non-corrosive and guaranteed against any sort of deterioration, deformation, ageing and corrosion for a minimum period of twelve years.	
4.1.4.5	Timber shall not be used in body construction.	
4.1.4.6	All parts, which form waterways or come into contact with foam concentrate, shall be of non-corrosive material. All metal pipelines shall be hot dip galvanized after complete fabrication. All parts exposed to atmospheres shall be made of non-corrosive material. All ferrous fasteners shall be galvanized/chrome plated to avoid rusting over prolonged use.	
4.2 WEIGHTS AND DIMENSIONS:		
4.2.1	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.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.2.2	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.	
4.2.3	The center of gravity of the vehicle shall be kept as low as possible under all conditions of loading.	
4.2.4	DIMENSIONS:	
4.2.4.1	Dimensions and other performance requirements are as per para no. 4.1.1 (a) & (b) above.	
4.2.4.2	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 maneuverability and facilitate movement at airports.	
4.2.4.3	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 plane 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.	
4.2.4.4	Adjustable rear-view mirrors with a glass area of not less than 385 cm ² shall be provided on each side of vehicle. Each shall be provided with a minimum of 45 cm ² area wide-angle convex mirrors.	
4.3	ENGINE:	
4.3.1	PERFORMANCE REQUIREMENTS	
4.3.1.1	The vehicle's engine (s) shall be HSD (High Speed Diesel) driven, and shall have power output, 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 AFFRV/ACFT application. In addition, Provision for open canopy for engines should be made.	
4.3.1.2	Fully laden vehicle shall consistently be able to accelerate maximum speed, as specified, with the engine and transmission at all the consignee Airports at their normal operating temperature at any ambient temperature varying from 0 ^o C to 50 ^o C.	
4.3.1.3	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.	
4.3.1.4	The emission level shall be minimum Bharat Stage III or equivalent. Type approval certificate or equivalent certificate relevant to emission norms of engine offered, issued by any regulatory authority with up to date amendments shall be submitted by the bidder. OEM of engine(s) shall submit a certificate conforming emission level meets minimum Bharat Stage III or equivalent.	
4.3.1.5	The AFFRV/ACFT weight (kg) to engine power ratio (kW) plays an important role, in achieving response time of two minutes, as specified in ICAO documents.	
4.3.1.6	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.	
4.3.2	ENGINE COOLING:	
4.3.2.1	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 0 ^o C to 50 ^o C.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.3.3	FUEL SYSTEM:	
4.3.3.1	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.	
4.3.3.2	Accessible filtration shall be provided for each fuel supply line and a drain shall be provided at the bottom of the fuel tank.	
4.3.3.3	Gravity feed fuel tanks are not acceptable.	
4.3.3.4	Fuel tank capacity shall not be less than 150 liters or for minimum 5 hours of continuous operation of AFFRV/ACFT.	
4.3.4	EXHAUST SYSTEM:	
4.3.4.1	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.	
4.3.4.2	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.	
4.3.4.3	The exhaust system shall include a muffler to reduce engine noise.	
4.3.5	VEHICLE ELECTRICAL SYSTEM:	
4.3.5.1	The vehicle shall be provided with 12/24 volts electrical system and starting.	
4.3.5.2	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.	
4.3.5.3	The curb idle minimum-charging rate of the alternator shall be 30 Amps.	
4.3.5.4	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.	
4.3.5.5	The circuits shall be so designed that at no stage of operation overloading, overheating, short-circuiting and fluctuation of voltage is experienced.	
4.3.5.6	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.	
4.3.5.7	An engine coolant/preheating device shall be provided as an aid to rapid starting and high initial engine performance.	
4.3.5.8	The electrical system shall be insulated, waterproofed and protected against exposure from ground fires.	
4.3.5.9	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.	
4.4	VEHICLE DRIVE:	
4.4.1	Transmission of power from engine to wheels shall be through a torque converter and fully automatic transmission, having designed input rating parameters to maintain the operational performance with provision of crawling as per para no. 4.12.5.2, 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.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.4.2	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.	
4.4.3	The transmission shall be matched to the engine properly and shall be approved by transmission manufacturer for the AFFRV/ACFT application.	
4.4.4	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.	
4.4.5	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.	
4.4.6	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.	
4.5	SUSPENSION: 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; 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.	
4.5.1	RIMS, TYRES AND Wheels:	
4.5.1.1	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.	
4.5.1.2	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 as specified in para no. 4.1.1 (a) & (b)	
4.5.1.3	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.	
4.5.1.4	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 40.23 Kms (25 mi) of continuous operation at 96.5 Km/h (60 mph) at normal operating pressure.	
4.5.1.5	Size of tyre should be such to meet all vehicular performances and the tyre should be preferably available in India.	
4.6	TOWING CONNECTIONS:	
4.6.1	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)	
4.7	BRAKES	
4.7.1	The braking system shall feature service, emergency and parking brake systems. Service brakes shall have power actuation through air, hydraulic or air over hydraulic. Caliper disc brakes shall be provided. 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.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.7.2	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.	
4.7.3	The service brakes shall have stopping distances as per para no. 4.1.1. (a) on a dry hard appropriately level road way, free from loose materials, and sufficiently wide roadway without any part of vehicle leaving roadway.	
4.7.4	The service brakes shall provide one power assisted stop when the vehicle engine inoperative, for the stopping distances specified above.	
4.7.5	An emergency brake system shall be provided which is applied and released by the driver from the cab and is capable for modulation, by means of the service brake control.	
4.7.6	The parking brake shall be capable of holding the fully loaded vehicle on a 20% grade without air or hydraulic assistance.	
4.7.7	Brakes–Air System	
4.7.7.1	When the vehicle is supplied with air brakes, air compressor shall meet following criteria:	
	a. The compressor shall be engine driven;	
	b. 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.	
	c. 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.	
	d. The compressor shall incorporate an automatic air-drying system immediately downstream from the compressor to prevent condensation build-up in all pneumatic lines.	
4.7.7.2	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; $\frac{\text{Actual reservoir capacity} \times 25}{\text{Required reservoir capacity}}$	
4.7.7.3	Reservoirs shall be equipped with air pressure regulator, drain and safety valves.	
4.7.7.4	Provision for charging of air tanks by a drive away electrical connection used to power a vehicle mounted auxiliary air compressor shall be provided.	
4.7.7.5	A drive away air connection for charging of air tanks from an external air source shall be provided.	
4.7.7.6	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.	
4.7.7.7	Provision of pneumatic service outlets for inflating tyres shall be made from air compressor of AFFRV/ACFT, 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 AFFRV/ACFT.	
4.7.7.8	Air leakage from pressure system shall not exceed 0.5 Kg. /sq. cm. per hour so that at no stage the air pressure should reduce less than brake operating pressure in 8 hours.	
4.8	STEERING	
4.8.1	The chassis shall be equipped with power assisted steering with direct mechanical linkage from the steering wheel to the steered axle(s) to	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	permit the possibility of manual control in the event of power assist failure.	
4.8.2	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.	
4.8.3	The wall-to-wall turning diameter of the fully laden vehicle shall be less than three times the vehicle length.	
4.8.4	Vehicle shall be designed preferably for Right Hand Drive system so that driver's left hand is free for operation of controls.	
4.9	CABIN	
4.9.1	The cabin shall be mounted on the forward part of the vehicle and shall provide seating for 5 persons including Driver. The seating arrangement shall be; 2 adjustable seats and a long or separate seat (s) for three 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.	
4.9.2	The cab shall meet the visibility requirements as per para no. 4.2.4.3. The windshield (single piece) 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. Two doors (01 doors each on LHS & RHS respectively) are to be provided to the cabin, with ECE R29 or equivalent test compliance which should be openable at 90° for easy ingress and egress of crew. The cabin with two doors (one on each side) should be designed to allow easy entry and exit of the crews in the rear row(s) without disturbing the crews of front row and a 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. 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.	
4.9.3	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.	
4.9.4	INSTRUMENTS, WARNING LIGHTS AND CONTROLS	
4.9.4.1	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.	
4.9.4.2	All instruments and controls shall be illuminated, with back lighting to be used wherever practically possible.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.9.4.3	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 fittings for all electrical, air and hydraulic circuits.	
4.9.4.4	<p>The following instruments, or warning lights, or both shall be provided as a minimum;</p> <ul style="list-style-type: none"> a. Speedometer/Odometer b. Engine(s) tachometer c. Fuel level with audio warning d. Air pressure gauge e. Engine(s) temperature gauge f. Engine(s) oil pressure gauge g. Voltmeter(s) h. Oil temp. gauge light i. Transmission(s) oil temperature gauge j. Pump(s) pressure gauge k. Water tank level indicator l. Foam tank level indicator m. Low air pressure warning light n. Headlight beam indicator o. Trafficator light p. Hazard warning light q. PTO engagement light r. Pump hour meter s. Water control valve 	
4.9.4.5	<p>The cab shall have all the necessary controls within easy reach of the driver for the full operation of the ACFT and the pumping system. The following cab controls shall be provided.</p> <ul style="list-style-type: none"> 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. Roof Turret controls l. Bumper Turret Controls m. Light switches n. Windshield wiper and washer controls o. Heater-defroster controls p. Master electrical switch (Isolator Switch) q. Engine start/stop control r. Windshield deluge system switch. s. Water Tank Main valve control t. Side delivery ON/OFF valve u. Manual Override Switch (Gear box) v. Switches: Rear Differential Lock, Front Differential Lock and Interaxle Lock 	
4.9.5	EQUIPMENT	
4.9.5.1	<p>The following minimum equipment shall be provided in or on the cab.</p> <ul style="list-style-type: none"> 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 	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	e. Windshield wipers appropriate for removing foam f. Siren g. Horn h. Sun visors, interior transparent i. Outside rear view mirrors, as specified in para no. 4.2.4.4 j. Interior lighting k. P.A. System with Microphone as per para no. 4.20.1 l. R.T. Set (VHF-AM) as per para no. 4.17 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. DEVS as per para no. 4.10 q. Rear view camera with a monitor at the panel.	
4.10	DRIVER'S ENHANCED VISION SYSTEM	
4.10.1	Vehicles shall be equipped with the navigation system of a driver's enhanced vision system (DEVS). The ACFT's position shall be displayed on a moving map display that shall be mounted in the cab. The vehicle's position shall be displayed with an accuracy of 2m, as well as the direction of travel. The map shall automatically pan and reorient itself to show the area around the vehicle.	
4.10.2	Low Visibility Enhanced Vision System	
4.10.2.1	A low visibility enhanced vision system shall be installed in the vehicle. This system shall consist of a Forward Looking Infra-Red (FLIR) camera, monitor and controlling devices, and shall provide the operator with a thermal image to assist in driving under low-visibility conditions.	
4.10.2.2	The FLIR camera shall have automatic gain and level controls and minimum Horizontal Fields of View (HFOV) and Vertical Fields of View (VFOV) of 27 degrees (± 4 degrees) and 18 degrees (± 4 degrees), respectively. The FLIR camera shall be permitted to be a cooled or uncooled camera but shall be able to detect long wave ($8\mu\text{m}$ to $12\mu\text{m}$) infrared (IR) energy and have industry standard composite (with automatic gain and level control) or digital output.	
4.10.2.3	The installation should not obstruct driver view or hamper any other AFFRV/ACFT vehicle system including Monitor Operation. The system also be installed without any extensive vehicle modification and should include a dedicated vehicle voltage spikes and surges.	
4.11	BODY	
4.11.1	The body shall be constructed of non-corrosive materials that provide the lightest weight consistent with the strength necessary for off pavement operation over rough terrain and when exposed to excess heat. The body may be of the unitized with chassis rigid structure type or it may be flexibly mounted on the vehicle chassis. It shall also include front and rear fenders or wheel wells; body panels shall be removable where necessary to provide access to the interior of the vehicle.	
4.11.2	Access doors shall be provided for those areas of the interior of the vehicle, which must be frequently inspected. In particular, access doors of sufficient size and number shall be provided for access to; <ul style="list-style-type: none"> a. Engine b. Pump c. Fluid reservoirs d. Foam proportioning system e. Battery storage f. Engine oil level indicator(dipstick) 	
4.11.3	Suitable, lighted compartments shall be provided for storage of equipment and tools to be carried on the vehicle. Compartments shall be watertight and self-draining. The compartments shall not house any	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	other equipment and shall be free from projections. (List of equipment's is enclosed in Appendix – A)	
4.11.4	The working deck of the vehicle shall be adequately reinforced to permit the crew to perform their duties in the turret area, water tank top fill area, foam Tank top fill area and in other areas where access to auxiliary or installed equipment is necessary.	
4.11.5	Handrails or bulwarks shall be provided where necessary for the safety and convenience of the crew. Rails and stanchions shall be strongly braced and constructed of a material which is durable and resists corrosion.	
4.11.6	Steps or ladders shall be provided for access to the top fill area. The lowermost step(s) may extend below the angle of approach or departure or ground clearance limits if it (they) is/are designed to swing clear. All other steps shall be rigidly constructed. All steps shall have a non-skid surface with at least 150 mm toe room. Lowermost step(s) shall be not more than 558.8 mm (22 in) above level ground when the vehicle is fully laden. Adequate lighting shall be provided to illuminate steps and walkways.	
4.11.7	A heavy-duty front bumper shall be mounted on the vehicle and secured to the frame structure.	
4.11.8	Paint finish shall be Yellowish Green' (As per FAA AC 150/5210-5D) in colour and shall be resistant to damage from firefighting agents.	
4.12	FIRE FIGHTING SYSTEMS AND AGENTS	
4.12.1	Foam concentrate (Level C) conforming to IS 4989 shall be used as primary extinguishing agent and dry chemical powder (B and C type conforming to IS 7202) as complimentary agent.	
4.12.2	Foam system shall be proportioning type system and the separate foam concentrate tank shall be provided on the vehicle.	
4.12.3	All components of foam system including liquid tank, piping fill troughs screens, valves and delivery connections shall be made of non-corrosive material/Stainless Steel.	
4.12.4	Agent Pump and Drives	
4.12.4.1	The water pump shall be made up of corrosion resistant material/suitable alloy (bronze/gunmetal) compatible with foam concentrate with stainless steel shaft suitable for use with Brackish Water and shall be single or multiple stage centrifugal type, designed for dependable emergency service. The vehicles tank and the piping shall be designed to eliminate entrapment of air. The pump shall also be supported with independent automatic priming system. It shall be accessible and readily removable for repair and maintenance. Drain valves shall be provided at suitable location for draining water from the pump casing and piping.	
4.12.4.2	While discharging foam solution, the pumping system shall be capable of discharging at a rate equal to or exceeding the requirements of the roof turret (Monitor), ground sweep nozzles, hand line nozzles/Bumper turret and under truck nozzles, discharging simultaneously at designed pressures.	
4.12.4.3	Pump shall be single/double/multistage and closed impeller type where impeller(s) is dynamically balanced to reduce end thrust. Appropriate seal shall be provided capable of running dry pump for minimum 01 minute without damage.	
4.12.4.4	The pump shall be mid ship mounted. Pump control panel shall be located on either side of appliance in addition to that positioned in the driver's cabin.	
4.12.5	Pump Drive	
4.12.5.1	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	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	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 be provided to avoid any malfunctioning in pump compartment.	
4.12.5.2	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.	
4.12.6 SUCTION AND DELIVERY CONNECTION		
4.12.6.1	The suction inlet and two delivery outlets of the pump shall be fitted on the pump control panels side on both sides of the appliance.	
4.12.6.2	The suction connection shall be provided at suitable location in standard round thread of 125 mm diameter and shall be corrosion resistant. The location of suction inlet should be at lowest possible height preferably not exceeding one meter from ground level. The inlet shall be provided with Chromium plated brass blank cap.	
4.12.6.3	Delivery outlet connection shall be provided at suitable locations, operable from panel board in standard 63 mm female instantaneous standard couplings.	
4.12.7 PIPING, COUPLING AND VALVES		
4.12.7.1	All piping, couplings and valves shall be made of material, conforming to relevant BIS/International Standard, to prevent corrosive and galvanic action.	
4.12.7.2	All valves shall be quarter-turn-type in manual operation and shall be easy in operation and free from leakage.	
4.12.7.3	All piping shall be tested for leakage at 50% above the maximum pressure developed by the pump in no flow condition.	
4.12.7.4	Arrangement should be made to prevent overheating of pump at zero discharge.	
4.12.7.5	A drainage system with collector tubing from the low points on pump and piping shall be provided, operable with quarter turn valve.	
4.12.7.6	All plumbing shall be reasonably accessible for maintenance purposes. Drain cocks shall be provided where necessary and controls for these shall be readily accessible and so arranged as to prevent the cocks from being opened by vibration. The direction in which the valve/cock opens/closed shall clearly be marked near each valve/cock.	
4.13 WATER TANK		
4.13.1	Water tank shall have capacity as per 4.1.1(b). The tank outlets shall be arranged in such a way that Water tank percent of deliverable water is available as per 4.1.1(b)-2	
4.13.2	The tank shall be constructed to resist all forms of deterioration that could be caused by the water and the foam concentrate while affording the structural integrity necessary for off-road operation. Tank shall be made of Glass fibre Reinforced Polyester (GRP)/ Glass Reinforced Plastic/ Polypropylene conforming to relevant BIS/International Standard with suitable longitudinal and transverse baffles to prevent surging, which shall permit easy access for internal inspection.	
4.13.3	The tank shall be provided with hinged lid, a top filling hole with filter of 450 mm size and a drain hole at the bottom.	
4.13.4	Over flow piping shall be arranged in such a way that it releases pressure on overfilling without wasting water during vehicles manoeuvres.	
4.13.5	The water tank shall be separate from crew compartment, chassis, engine, and easily removable, and shall be mounted on chassis in a manner that the torsional strains during movement are minimum.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.13.6	Two external tank fill connection shall be provided both side near operating panel, in standard 63mm instantaneous coupling, with strainers and ball valve. The filling connection inside the tank shall discharge water just below the upper plate of the water tank.	
4.13.7	A direct filling (pump to tank using own pump) connection shall also be provided to fill the tank from open source of supply and shall be sized so as to fill the tank at 5 bar pressure.	
4.13.8	Arrangement for lifting of the tank without its damage should be provided for repair and maintenance etc.	
4.13.9	Main tank valve shall be operated from cabin as well as from control panel. In addition, manual override valve shall be provided for tank opening valve at side control panel. This valve shall have accessible control.	
4.14	FOAM TANK	
4.14.1	Foam concentrate tank shall have usable capacity of not less than 800 litres or sufficient for more than two refills of water tank.	
4.14.2	Tank shall be made of Glass fibre Reinforced Polyester (GRP)/ Glass Reinforced Plastic/ Polypropylene conforming to relevant BIS/International Standard.	
4.14.3	The tank shall be separate and distinct from the body and flexibly mounted on chassis to receive minimum torsional forces during vehicles movements and easily removable as a unit and should be suitably baffled to prevent surging. (The water and foam tank can be together with compartments or separate as per standard design of the manufacturer)	
4.14.4	The size of manhole of the tank shall not be less than 450 mm and shall be used for foam concentrate filling and shall be clearly marked 'FOAM CONCENTRATE'. The tank shall be vented adequately to allow rapid and complete filling without the build-up of excessive pressure and to allow emptying of the tank at the maximum design flow rate without danger of collapse. The vent outlets shall be directed to the ground to prevent spillage of foam concentrate on vehicle components.	
4.14.5	The foam concentrate draw-off tube shall be positioned in such a manner that foreign material or sludge shall not pass into the compound lines. The draw off tube shall be fitted with strainer of corrosion resistant material.	
4.14.6	Drain hole at the bottom of sump and a liquid induction connection shall be provided in the tank.	
4.14.7	Filling hole with a trough on top shall be connected with a pipe reaching at the bottom to avoid aeration in the liquid.	
4.14.8	FOAM FILLING	
4.14.8.1	The tank fill connection(s) shall be provided in a position where it can be reached easily from the ground to allow the pumping of foam-liquid compound into the storage tank. The connection(s) shall be provided with strainers of suitable non-corrosive material mesh and shall have check valves or shall be constructed so that foam is not lost from the tank when connection or disconnection is made.	
4.14.8.2	Provision of foam concentrate filling from open source at ground level by foam concentrate filling pump shall be available with independent power drive.	
4.14.9	All pipe lines shall be made of non-corrosive material. Dissimilar materials that produce galvanic corrosion shall not be selected. Where plastic piping is used, it shall be fabricated from un-plasticised resins unless the plasticizer has been provided not to adversely affect the performance characteristics of foam.	
4.14.10	All foam concentrate piping shall be adequately sized to permit flow and shall be arranged to prevent water entering in the foam tank.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.14.11	Automatic foam concentrate proportioning arrangements shall be provided with 3%, 6% and 8% induction ratio with Stepless System, for varying discharge rates and shall not require frequent calibration.	
4.14.12	FOAM PROPORTIONING SYSTEM	
4.14.12.1	The foam concentrate proportioning system shall provide a means of controlling the ratio of foam concentrate to the quantity of water in the foam solution being discharged from all orifices normally used for aircraft fire-fighting operations.	
4.14.12.2	The proportioning system shall be sufficiently accurate to provide for the discharge of finished foam concentrate within the range specified in Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment.	
4.14.12.3	Control shall be provided at suitable location to open the foam concentrate tank from cabin as well from control panel operated pneumatically with manual override valve. This valve shall have accessible control.	
4.14.13	ROOF TURRET (MONITOR)	
4.14.13.1	One power driven Roof Turret (Monitor) shall be provided on the rooftop of cabin so that it can be operated by ARFF crew member from within the cabin of ACFT. The system should be capable of being operated manually from within the cabin or rooftop in case of failure in power assisting mechanism. Where equipped with a turret (monitor) having manual controls above the cab roof, the cab shall be designed with a quick-access passage to the turret (monitor). The monitor should have dual flow rate i.e. 100% and 50% with a suitable selecting mechanism at the monitor control and easily operable by the operator. The size of the manual override wheel of roof turret should be adequate for easy access.	
4.14.13.2	Monitor shall be capable of traversing 270 ^o horizontally and elevating not less than 45 ^o from horizontal axis and depression of 15 ^o to deliver foam at ground level not more than 12m ahead of the vehicle. The locking position shall be facing front side. The monitor should not lose control in case power assisting mechanism fails during the operation and should remain in operation at same position awaiting manual operation.	
4.14.13.3	Monitor shall be capable of discharging total rated water tank quantity in not more than two and half minute and shall have a means provided for deflective pattern of foam dispersal. The discharge rate of monitor shall not be less than 3000 L/min at maximum rated pressure with expansion ratio of minimum 1:8 by using foam concentrate.	
4.14.13.4	Range of throw shall be as per 4.1.1 (b) 3 - roof turret discharge.	
4.14.14	HAND LINES	
4.14.14.1	In addition, one first aid hose reel connection shall also be provided with ≥30 mtrs rubber hose with a pistol grip type nozzle conforming to JCDD 25 (which can be used as spray and hollow jet), with discharge capacity of ≥ 230 L/min for dual agent lines at operating pressure.	
4.14.14.2	Each side line shall have minimum discharge capacity of 450 L/min at 7 bar pressure on FB 10X branch with an expansion of not less than 8 and minimum throw of 25 mtrs when either, all foam hand lines are used simultaneously (with monitor not operating) or two of them are used in combination with monitor.	
4.14.14.3	Complementary agent (Dry Chemical Powder) hand lines shall have open/close nozzle discharge rate of ≥ 2.5 kg/second with 7.5 mtrs range. The nozzle should be made of non-ferrous metal or stainless steel.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.14.14.4	An automatic Pressure & Flow regulator shall be provided for the side line to enable the monitor to operate at the optimum pressure to give rated capacity for delivery, throw and expansion etc while maintaining the pressure of 7 bar pressure at the side line delivery. A bypass valve operable by 90° turn of a lever shall be provided to the automatic pressure regulator to facilitate availability of higher delivery pressure and flow whenever needed.	
4.14.14.5	The monitor shall operate at the optimum rated capacity for delivery, throw and expansion etc. while operated in combination with:	
	a. All the ground sweep nozzles and under truck nozzles	
	b. Two side delivery/ Bumper turret	
4.14.14.6	AFFRV/ACFT shall have two side lines on each side, operatable from cabin and panel both with manual override.	
4.14.15	FOAM CONCENTRATE QUALITY: Turrets (Monitors) and hand lines shall be capable of producing foam from foam concentrate solution in the specified ratio of 3%, 6% & 8% with Stepless System.	
4.14.16	GROUND SWEEP AND UNDER TRUCK NOZZLES	
4.14.16.1	Two Ground Sweep nozzles shall be provided at the front having performance as per para no. 4.1.1(b)- 5 & 6 Optimum working pressure 6 bar. Four under truck nozzles shall be provided to protect under side of vehicles, tyres and wheels. Ground sweep/ Under truck Nozzles valve shall be controlled from cabin interior within easy reach of driver and a crewmember. An automatic Pressure & Flow regulator shall be provided for the ground sweep/ Under truck Nozzles to enable the roof turret (monitor) to operate at the optimum pressure to give rated capacity for delivery, throw and expansion etc., while maintaining the required pressure and flow for the ground sweep/Under truck nozzles.	
4.14.17	BUMPER TURRET	
4.14.17.1	A power-driven bumper turret shall be provided. Flow rate shall not be less than 950 L/min. The throw range shall not be less than 46 metres. An aspiration barrel and deflector shall be provided. A foam expansion of not less than 1:8 with foam concentrate shall be achieved. The monitor shall be electronically controlled by a joystick within reach from driver and co-driver.	
4.14.17.2	An automatic oscillating mode shall be provided, horizontal and vertical range shall be programmable. When bumper monitor is in operation simultaneously with roof monitor, roof monitor flow rate shall automatically reduce to 70% of full flow rate.	
4.15	PRIMER	
4.15.1	A suitable primer shall be provided along with pump, which shall have both automatic and manual engagement/ disengagement provisions	
4.15.2	Primer shall be capable of priming a suction column with 7.3 mtrs lift in less than 30 second with indicator, with 125 mm suction hose diameter.	
4.16	LIGHTS AND ELECTRICAL SYSTEM	
4.16.1	Following electrical gadgets shall be provided:	
	a. Siren of ≥ 95 decibel 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 of suitable size at both ends of windshield glass, hand adjustable.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	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.	
4.16.2	All appropriate lights and gadgets detailed above shall be operable from driver's cabin.	
4.16.3	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 electro-magnetic switch or over flow modules.	
4.17	RADIO TELEPHONE (R.T.)	
4.17.1	One VHF Radio telephone operable on frequency range between 118 to 136 MHz- 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. 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 AFFRV/ACFT 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 R T Set should be provided at the mid-ship panel. The set shall be suitably mounted to resist vehicles vibration and suppress engine noise or any other vehicular electromagnetic induction.	
4.17.2	Adequate spares for service/repair and spares parts catalogue along with wiring diagrams should be provided. All manuals and diagrams should be in English language with standardized international symbols.	
4.17.3	The system protection fuse shall be located in an easily accessible location for quick replacement.	
4.17.4	Provision of global positioning system (GPS) is considered desirable for satellite communication and route navigation followed by CFT	
4.18	DRY CHEMICAL POWDER SYSTEM	
4.18.1	One unit of 250 kg dry chemical powder (foam compatible) shall be provided, using dry nitrogen as propellant gas so as to achieve performance as specified in para no. 4.1.1 (b). The dry chemical container shall be constructed in accordance with the ASME Boiler and Pressure Vessel Code, Section 8, or equivalent, and shall be so stamped.	
4.18.2	All piping and fittings shall conform to the appropriate ASME, or equivalent, code and shall be designed to withstand the working pressure of the system. The design of the piping and valves shall provide the desired flow of gas into the system and the minimum amount of restriction from the chemical container(s) to the hose connection. Where more than one hose line is provided, piping and fittings shall be sized and designed so that there is equal flow to each line, regardless of the number of lines placed in operation.	
4.18.3	Nitrogen cylinders shall be certified from Department of Explosive (Government of India) and shall have universal filling connections. The cylinder shall be manufactured in the year of delivery and have clearance from Explosive Department, Nagpur (India) for re-filling, storing and operation.	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
4.18.4	Provisions shall be made for purging all piping and hose of dry chemical after use without discharging the dry chemical powder remaining in the dry chemical powder container(s). Provisions also shall be made for the depressurization of the dry chemical powder container(s) without the loss of the remainder of the dry chemical powder. A pressure gauge shall be provided that indicates the internal pressure of the agent storage container(s) at all times.	
4.18.5	A means of pressure release in situation of over pressure shall be provided with filling opening and suitable tight-fitting cap.	
4.18.6	Standby one no. of nitrogen cylinder shall be provided	
4.19	OTHER EQUIPMENT	
4.19.1	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.	
4.19.2	An auxiliary battery charger is to be provided for charging of batteries by a drive away electrical connection.	
4.19.3	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 AFFRV / ACFT 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.	
4.19.4	360° surround View Camera System: The vehicle should be provided with 360° Surround View Camera System of high resolution for assistance of the operator.	
4.19.5	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 AFFRV/ACFT Roof Turret movement from a distance to record the rescue operation being carried out. The specifications of the camera & NVR are mentioned below: (i) Minimum 4 Mega Pixel Dome Fixed Camera (having 3.6mm Fixed lens with 30 Mtr. Infra-Red Range, 80-degree angle of view and SD card/Memory Card support upto 256GB). (ii) 4 Channel Network Video recorder (with minimum 2TB Storage support and minimum 256GB SD card/Memory card support, the NVR also supports 4G and above SIM GPS & Wi Fi support).	
4.20	MARKINGS Following markings shall be made on the body of the vehicles: a. Manufacturer's name and trade mark b. "Aircraft Rescue and Fire Fighting Services". c. Year of manufacture d. Engine and Chassis numbers e. AAI Emblem f. Job or Serial No. g. Capacity of pump, water tank, foam tank h. Pump serial number i. Chassis supplier name and country of origin	

Para No.	Technical Specification of Airfield Fire Fighting & Rescue Vehicle (AFFRV)/Airfield Crash Fire Tender (ACFT)	Parameter
	j. Luminous strips to be provided at the rear and both sides of the vehicle	
	k. भारतीय विमानपत्तन प्राधिकरण Airports Authority of India	
4.21	MANUAL OVERDRIVE FOR POWER ASSISTED OPERATION: All power assisted controls and operation should have suitable manual operation to ensure the operation in case of any failure in the power assisting mechanism. Such arrangements shall be easily accessible to the operator facilitating quick changeover.	

Appendix-A

Following Vehicle mounted Equipment are to be supplied along with the AFFRV/ACFTs in properly stored Lockers with designated places and appropriate Quick-release Clippings:

Sl. No.	Equipment for Rescue Operation	Quantity	Appendix/ Standard
A	ITEMS TO BE SUPPLIED FROM INDIA/ WORKS OF SUPPLIER :-		
1*	Aluminium Extension Ladder, 10.5 M Length (Approx.)	1 no.	Appendix-I/NFPA/Equivalent applicable standard, provided the ladder is housed within the vehicle
2	Universal Branch Pipe (Diffuser Branch), 63 mm Male Instantaneous Inlet, Gunmetal Material	1 no.	IS:2871 / Equivalent applicable standard
3	Standard Branch Pipe with 19 mm Nozzle, 63 mm Male Instantaneous Inlet, Gunmetal Material	2 nos.	IS:903 / Equivalent applicable standard
4	Nozzles for Standard Branch Sizes: a. 12 mm b. 20 mm	1 no. each	IS:903 / Equivalent applicable standard
5	Nozzle Spanner, Material Steel	1 no.	IS:903 / Equivalent applicable standard
6	Foam Making Branch, FB 5X type with Pick-up Tube	2 nos.	IS:2097 / Equivalent applicable standard
7	Foam Making Branch, FB 10X type with Pick-up Tube	2 nos.	IS:2097 / Equivalent applicable standard
8	Portable Water Mist and Fire Extinguisher Backpack Type	1 no.	Appendix-II
9	Portable LED Emergency Light with Accessories	1 no.	Appendix-III
10	Oil Sorbent Kit	1 no.	Appendix-IV
11	Safety Goggles	4 pairs	Appendix-V
12	Reusable Ear Plug	25 pairs	Appendix-VI
13	Chocks	1 pair	Appendix-VII
14#	Suction Hose for Pump complete with Round thread Gunmetal Couplings, 2.5 Meter (Length)	4 Nos.	IS:2410 / Equivalent applicable standard
15	Suction Strainer (Gunmetal) for Pump	1 no.	IS:907 / Equivalent applicable standard
16	Suction wrench for 125 mm suction hose coupling	2 nos.	IS:4643 / Equivalent applicable standard
17	Suction adopter (Gunmetal) 125 mm female x 63 mm male with lugs	1 no.	IS / Equivalent applicable standard
18	Hydraulic Door Opening Kit	1 no.	EN / Equivalent applicable standard
19	Hydraulic Jack of 20 Ton capacity with handle, wheel spanner and tyre lever.	1 no.	IS / Equivalent applicable standard
20	Branch with revolving head, Gunmetal 63 mm	1 no.	IS:906 / Equivalent applicable standard
21	RRL Hose Type "B" 63 mm dia & 30 meters length	8 Nos.	IS:903 / Equivalent applicable standard
22	Fireman Axe	3 nos.	EN / Equivalent applicable standard
23	Hydraulic Spreader & Cutter with Pump & Accessories	1 set	Appendix-VIII
24	Power Driven Circular Saw with Accessories	1 no.	Appendix-IX
25	Pneumatic Lifting Airbag with Accessories	1 no.	Appendix-X
26	Jumping Cushion	1 no.	Appendix-XI
27	Zero-torque Nozzle with Hand-Control, 63 mm Male Instantaneous Inlet, Discharge 750 LPM @ 7 Bar Pressure.	1 no.	Appendix-XII
28	Seat Belt/Harness Cutting Tool	3 nos.	EN / Equivalent applicable standard
29	Gloves, Fire Resistant with Anti-skid Palm	8 Pairs	EN / Equivalent applicable standard

30	Fog/Jet Nozzle with Hand-Control, 63 mm Male Instantaneous Inlet, Discharge 750 LPM @ 7 Bar Pressure.	1 no.	NFPA 1964 / Equivalent applicable standard
31	Penetrating /Pinch ring Nozzle with 63 mm Male Instantaneous Inlet, Stainless Steel Material	1 no.	NFPA 1964 / Equivalent applicable standard
32	Telescopic Roof Mounted Mast	1 no.	Appendix-XIII
33	Cable Winch	1 no.	Appendix-XIV
34	Quick Release knife with pouch to be worn with fireman's belt	5 nos.	EN / Equivalent applicable standard
35	Hand Held Forcible Entry Tool Kit	1 no.	Appendix-XV
36	Hand line Nozzle with selectable flow, pistol grip and shut-off with double stops	1 no.	NFPA 1964 / Equivalent applicable standard

* to be stowed at the top of the vehicle with gallows. Rollers are to be provided for single man mounting/dismounting of ladder

to be stowed in hose tunnels provided at the top of the vehicle.

Sl. No.	Equipment for Rescue Operation	Quantity
B	Following Equipment with Spare Lockers having Designated Place and appropriate Quick-Release Clipping are to be Provided:	
1	Adjustable Wrench	1 no.
2	Axe, Rescue, Large, Non-wedge Type	2 nos.
3	Axe, Rescue, Small, Non-wedge Type	2 nos.
4	Cutter Bolt, 61cm Length	1 no.
5	Crowbar, 95cm Length	1 no.
6	Chisel, Cold, 2.5cm	1 no.
7	Sledge Hammer, 1.8kg	1 no.
8	Hook, Grab or Salving	3 nos.
9	Blanket, Fire Resisting	3 nos.
10	Short Rope Line, 15M length, 50mm Circumference, Hemp/ manila	3 nos.
11	Long Rope Line, 30M length, 50mm Circumference, Hemp/ manila	3 nos.
12	Pliers, 17.8cm, Side-cutting	3 nos.
13	Pliers, Slip joint, 25cm	1 no.
14	Screwdrivers, Assorted	1 set
15	Snipers, Tin	1 no.
16	Collecting Breeching, 63 mm Instantaneous (Gunmetal)	1 no.
17	Medical First-aid Kit	1 no.
18	Non-percolating Firefighting Delivery Hose, Synthetic Jacketed with Elastomeric Outer Covering, 63mm Instantaneous couplings, 30M Length	8 nos.
19	Hose Bandages	12 nos.
20	Hose Clamps	6 nos.
21	Dividing Breeching, 63 mm Instantaneous (Gunmetal)	1 no.
22	Insulated Pliers with Rubber Gloves Pairs Tested to 20 KV	1 no.
23	Cropper Bolt	1 no.
24	Kinetic Cutter	1 no.
25	Hack Saw, 300mm x 12.5 mm x 0.63 mm approx. Size of Blades with 6 nos. of Spares Blade	1 no.
26	Crow Bar, 6' Length, 25mm Diameter	1 no.
27	Axe, Drift & Rescue	1 no.
28	Double Female Coupling for 63 mm diameter	2 nos.
29	Double Male Coupling for 63 mm diameter	2 nos.
30	Adapter 63 mm male to 38 mm female (Gunmetal)	2 nos.
31	Adapter 63 mm female to 63 mm female (Gunmetal)	2 nos.
32.	Cross lays for storing delivery hoses diameter 63 mm-30 mtrs. length on the AFFRV/ACFT	4 Nos. on each side

TECHNICAL SPECIFICATIONS FOR 10.5 METER ALUMINIUM EXTENSION LADDER

Para No.	Technical Specifications
1	GENERAL
	<p>This standard lays down the requirement regarding materials, construction, workmanship, finish and acceptance tests of aluminium extension ladder trussed type used for firefighting and rescue operations. The ladder must be made with a view to combine lightness with strength and durability; all metal parts must be corrosion resistant.</p> <p>When fully extended the ladder must be 10.5 Meters/35 Feet long overall and so constructed that it is reasonably rigid, strong and free from sway when pitched against the wall with the base of the ladder at 6 feet 6 inches/2.5 Meters from it and two men are ascending the ladder at speed or one men is carrying another while descending the ladder</p>
2	MATERIALS
2.1	String & Rounds
	i. The choice of the materials to be used in the construction of the ladder shall be such that it combines to be made with a view to combine lightness with strength and durability, Aluminium alloy strings and rounds used in the ladder must be light in weight, rust proof, fire proof & rot proof.
	ii. All metal parts must be either treated to resist corrosion or must be corrosion resistant; stainless steel component shall not be less than 316 qualities.
2.2	Rope
	Rope fitted for extending & lowering the ladder to be manufactured from polyamide and multifilament hawser laid yarn twisted together with Z twist, the number of rope yarn and strands shall not be more than three. The strands must be continuous with splice. The finished rope shall be flexible, well laid and free from defects in yarn, strands and finish, the breaking load of the rope shall not be less than 2995 Kg.
2.3	Pawl
	The locking pawls must be made from aluminium alloy chilled casting to make material of solid strength for rigid use. Special steel springs must be fitted to manage the device function controls, covers made from aluminium alloy metal 'c' shaped materials of 3 mm thickness of H-1 sheets and length of the boxes shall extend on the round so that there is no gap between strings & pawl. Width of pawl shall be as short as possible so that it does not cause obstruction.
2.4	Heal & Head Cap
	The heals of the stiles or strings of the lower section must be fitted with rubber feet to avoid slipping and these rubber feet shall have shearing hardness of 80. Head cap on extension portion shall cover up to top one round.
2.5	Bushes
	Bushes used in the friction parts shall be made from extruded gun-metal rods only, outer part of the bushes shall be made from extruded corrosion resistant bar rod to guide the polyamide line, aluminium round head rivets shall be used for the construction of the ladder units, no flat head rivets to be used for the construction of the ladder, head wheels of fibre shall be fitted at the top of the ladder to avoid friction or damage while extending or lowering the ladder, the method of fixing the head wheels shall be with single rod to hold the same while in rescue operations.
3	CONSTRUCTION
3.1	The truss construction using aircraft industry technique of riveting combines with the high tensile aluminium extrusions to give strength rigidity and light in weight aspects, the rounds are square sections at attachment points to strings, to prevent turning and the tread surface is ribbed to give excellent non-slip properties, the guides form an integral part of the stiles.
3.2	Dual action long and short pawls are fitted to ensure negative actions, the top section is extended by a line with rot proof and non-hardening features for ease of handling, wheels assembly fitted to the head to facilitate easy running against uneven wall surfaces, footing spigots must be fitted for slip proof on smooth surfaces. Rungs to be fitted by one pin punch clip rivet system to strengthen the structure and not any other method, sides of the ladder to be fully packed from outside to avoid weakening and to improve the strength and stability of the product structure.

4	DESCRIPTION
4.1	The ladder shall consist of two sections, one main and one extending section the width of the narrowest section being more than 16 inches, the strings shall be of built-up constructions with trussing.
4.2	All the hollow sections shall be reinforced with bulbs made of aluminium to be fitted from the outside for further strengthen the structure for rigid use of the ladder, the design of the ladder be such that it ensures easy sliding of the extending section without excessive clearance in the guidelines, no lubricants shall be used for extension or sliding of the ladder sections, accurate safety aluminium bar fitments to be provided in the ladder, the extending section shall be guided throughout the full range of extension in such a manner that it cannot separate, no plastic or other fitments to be fitted for preventing over extension/ depression of the ladder.
4.3	The ladder shall be capable of being fully extended by two men by means for effortless lifting and lowering the ladder.
4.4	The rope shall be of 12 mm dia/ 36 mm circumference to provide a convenient grip and shall be reasonably flexible when wet; the end of the rope shall be attached to the bottom of the main section so as to leave the minimum amount of slack when the ladder is fully housed.
4.5	Interlocking shall be fitted to avoid accidents while in use, automatic locking device in a set of two shall be fitted to hold the ladder in any position of extension. The two sections shall coincide with each other so perfectly so that they engage automatically, release being affected by still further extending the sections before lowering the pawls. Both sections are set for engagement with one another until they are rested and trip to clear immediately.
4.6	As per Manufacturer Design & guidelines suitable in case of firefighting tender.
4.7	Special aluminium rectangular bar locks to be fitted to the integral parts of the ladder for safety and security to avoid accidents, which forms a safety device, similar bar strings are to be fitted to the base of the ladder for better rigidity and support.
4.8	Weight of the ladder must be as light as possible and shall not exceed 55 Kgs.
5	OTHER DIMENSIONS
	a) Extended length: 10.5 metres /35 feet (Approx.)
	b) Closed length: 6.23 metres /20 feet (Approx.)
	c) Overall width: 525mm/ 21 inch (Approx.)
	d) Weight: ≤ 55 kilograms
	e) Steps spacing- As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
	f) Number of steps in each section - As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
	g) Number of steps in full ladder - As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
	h) Number of overlapping rounds - As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
	i) Overall height of ladder- As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
	j) Height distance between rungs - As per Manufacturer Design & guidelines suitable in case of AFFRV/ACFT.
6	WORKMANSHIP & FINISH
	It is essential that the standard of workmanship and finish be good and any surface of the ladder shall not be buffed as it will reflect light and thus cause difficulty in fire and rescue operations. Flat head rivet construction will not be accepted in any case and no cracked or bend section to be used for manufacturing of the ladders.
7	ACCEPTANCE TESTS
	The acceptance tests to which the ladder shall be subjected to are given below, these tests shall be carried out at the manufacturer's work, all the equipment's required shall be arranged by the Supplier.
7.1	Deflection Test The fully extended ladder shall be placed across trestles positioned at 60 cms from each end, on a 30 cms wide board placed across the trestles/strings at the center of the span load of 38 kilograms shall be applied and be allowed to remain there for not less than a minute and then be removed, A load of 76 kilograms is then to be gradually applied and the deflection due to this load shall not exceed 4 inches (100 mm) from the original position, the load shall then be gradually increased to 114 kilograms and the additional deflection shall not exceed 50% of that obtained for 76 Kg. load. There shall be no sign of stress in any part of the

	ladder which when the load is removed and shall return to a position not lower than that taken after removal of 38 kilograms load, i.e. show no sign of permanent set.
7.2	Round Set (1) The fully extended ladder placed across the trestles horizontally with support, two man weighting 150 kilograms shall walk over the rounds, no sign of failure shall be apparent on the rounds or its junction with the strings during this test.
7.3	Round Test (2) The fully extended ladder shall be placed vertically and two man weighing 150 kilograms shall jump on rounds from the round above, no sign of failure must be apparent on the rounds or its junction with the strings during this test.
7.4	Round Test (3) With the feet of the ladder at a distance of 6 feet from the wall the ladder shall be fully extended and its head rested against the wall, a load of 320 kilograms shall then be gradually applied to the middle of one round in each section by means of metal hook having a bearing surface of 5 cms wide and suitably lined to prevent brushing of the round, no sign of failure must be apparent either on the round or at its junction with the strings during this test
7.5	Side Test After completion of the deflection test, the ladder still resting on the two trestles it is to be turned trough 90 degree on to one. In this position the deflection of the ladder under its own weight is to be measured from the centre of the round at the point of maximum deflection to a line drawn between the centre of the top and bottom rounds of the ladder. The deflection should not exceed 3 inches, the ladder is then to be turned over and tested on the other side.
7.6	Swing Test When pitched against a wall with the base of the ladder at 6 feet, one man weighing 75 kilograms to ascend the ladder and descend the same the ladder should not bend or weaken after the test and shall show no sign of failure at the rounds or its junction with the strings.
7.7	Extension Test The ladder must be capable of being fully extended by two men by a line on the main section to the required length, the ladder shall also be not over extended.
8	DRAWING
	The general schematic drawing and catalogue must be submitted before prototype test of successful bidder.
9	MARKINGS
	Each extension ladder shall be clearly and permanently marked with the following information. a. Manufacturer's name or trademark, if any. b. The size of the ladder. c. The serial No. of the ladder & year of manufacturer. d. EN/CE/NFPA/BIS/ equivalent.
10	TEST CERTIFICATE
	Aluminium materials, fitments, Rope & S. S. materials test reports to be provided on inspection of the ladders.
11	GANTRY
	These are the gallows for mounting the product on the Crash Fire Tender, which is to be provided with the ladder
12	DEVIATIONS
	No deviations will be accepted from the above or no changes to be allowed as this is an important lifesaving and fire rescue device

TECHNICAL SPECIFICATIONS FOR PORTABLE WATER MIST AND FIRE EXTINGUISHER BACKPACK

Para No.	Technical Specifications
1	GENERAL
1.1	The specification covers the requirements of design, manufacture, testing and supply of Portable Water Mist and CAF Fire Extinguisher Backpack for meeting the exigencies at fire scenario
1.2	Backpack configuration shall be mounted on a sturdy frame suitable cushioned for comfort, provided with shoulder pads for carrying as a backpack and a handle to be carried by hand. All materials used shall be of fire retardant type. The supply shall include along with the system, a spare compressed cylinder of the same size, pressure and material, 10 nos. o-rings for pressure vessel, tool kit, manufacturer's test certificate, operational manual and spare parts list.
1.3	The same nozzle of the gun shall be suitable to fire class A and class B and also live electrical fire.
1.4	It shall be hand-held and have an option of backpack, so that it can be used either ways depending on the situation and along with breathing apparatus at the time of closed or thick smoke fire.
1.5	System shall have the feature of quick recharge without cleaning and in an emergency.
2	TECHNICAL REQUIREMENTS
2.1	Pressure Vessel: Main vessel with 9 litres filling capacity shall be made of high grade stainless steel or corrosion free light alloy with coating for longer use.
2.2	Compressed Air cylinder: 4.5 - 6.8 litres capacity at 300 bar pressure made of Carbon Composite material mounted on a universal cylinder holder capable of holding 200/300 bar cylinders.
2.3	Extinguishing Gun: The design of the gun shall be stainless steel and such that there is minimum recoil pressure during operation and shall have the locking facility to avoid misuse .The weight of the gun shall be less than 2 kg suitable for all the three class of fire.
2.4	Weight: Weight of fully charged system shall not exceed 28 kg maximum for comfortable operation.
2.5	Fire rating: The rating of the system shall be minimum A-27, A-43 and B-233 and electrical fire minimum 1000 volts with water and foam concentrate as extinguishing agent and the lancing distance for fire fighting should not be less than 10 metres in jet mode and 4 metres in Spray mode.
2.6	Depending on the situations the system shall be used as handheld or Backpack mode along with BA set with system in hand for comfortably fighting closed or thick smoke fire.
2.7	Dynamic Working Pressure: Dynamic working pressure shall be up to 15 bar.
2.8	The system shall clean automatically as the remaining air is blown out of the container and systems shall be ready for quick second recharge. The system shall be rechargeable minimum two times with the same pressure bottle.
2.9	Certificates of the OEM for Class A, Class B & live electrical fire with only water and foam solution shall be submitted. A valid CCE approval certificate/ authorization/NOC for the Cylinder and the Vessel is a must along with the tender.
2.10	Backpack/system/cylinders shall confirm to CE/EN/NFPA/BIS or equivalent standard.
2.11	Hoses: Length of hose- 1.3 metres, hose shall be high quality to withstand working pressure of gun and operate in temperature range of -40 ^o C to +100 ^o C.
2.12	Operating time/flow rate: ≥ 20 seconds, flow rate: ≤ 0.4 L/s.

TECHNICAL SPECIFICATIONS FOR PORTABLE LED EMERGENCY LIGHT WITH ACCESSORIES

Para No.	Technical Specifications
1	GENERAL
	It shall be an all-weather lighting system for the purpose of use in inspection, maintenance or surveillance of an equipment or small area.
2	DESIGN
2.1	High flux LED light source providing clear white light.
2.2	It shall have 360-degree swivel light head with a telescopic tower. Light head shall be detachable for mobility.
2.3	Battery status indicator shall be provided on the body and giving "LOW" battery warning with reserve time of at least 10 minutes.
2.4	It shall have a port for recharging laptop or other such portable devices.
3	PERFORMANCE REQUIREMENT
3.1	It shall have low and high brightness settings with capable of 8 hrs. of continuous operation on high brightness setting.
3.2	It shall have the following Lumens Values: a. High Brightness:2000 b. Low Brightness:1000
4	CONSTRUCTION & MATERIAL
4.1	It must be made of flame retardant material and shall have low operating temperature.
4.2	It shall also be shock resistant.
5	BATTERY TYPE
5.1	12V Rechargeable Sealed Lead-acid type of reputed branded having life of 500 cycles or more.
5.2	Battery charging time shall not be more than 8 hrs. on full discharge.
5.3	The unit shall be provided with 12V/24V vehicle charger.
6	WEIGHT & DIMENSIONS
	Total weight shall not exceed 12 kgs and dimensions shall be as compact as possible.
7	OPERATIONAL AND MAINTENANCE MANUAL
	The bidder should supply operation and maintenance manual with each set in English language.
8	CERTIFICATION
	The unit shall have CE or equivalent certification.

TECHNICAL SPECIFICATIONS FOR OIL SORBENT KIT

Para No.	Technical Specifications
1	GENERAL
	Sorbent shall contain and absorb spills of petroleum products like aviation fuel, diesel, petrol, lubricating oil, hydraulic oils etc. in run-off emergency. It shall be folded and able of being used as pad, roll or boom
2	MATERIAL & DESIGN
2.1	Made of inert synthetic fibers and easily torn to length.
2.2	High absorption capacity 1:10 (Minimum).
2.3	Shall be lightweight and dust free.
2.4	It shall be water repellent (hydrophobic), light weight and floating on water.
2.5	It shall resist temperature and humidity extremes.
2.6	It shall not deteriorate or disintegrate.
2.7	It shall be able to wring out and reused.
3	TYPES & CONFIGURATIONS
3.1	It shall consist of two types:
3.2	A roll having minimum length of 40 ± 2 mtrs. and width 100 ± 5 cms
3.3	A boom of minimum length of 5 ± 0.5 mtrs.
3.4	It shall be supplied in suitable sealed container/packing.
4	CERTIFICATION
	It shall conform to NFPA or equivalent standard.

TECHNICAL SPECIFICATIONS FOR SAFETY GOGGLES

Sl. No	ITEM	DESCRIPTION
1	Application	Safety goggles shall primarily provide optimum vision in indoor and outdoor applications and protection against impact & optical radiation by reducing glare and bright light.
2	Lens Quality & Material	a. It shall have clear dual-aspheric plan polycarbonate lenses with prescription-quality clarity. b. Lenses shall provide 99.99% U.V. protection, excellent sharpness and contrast.
3	Lens Coating	Lens shall have coatings to provide properties of anti-fog, anti-scratch, anti-chemical and anti-static.
4	Frame Design & Construction	a. It shall have a lightweight a dual-injected moulded frame. b. It shall have the facility to change the lens as and when required by keeping the same frame.
5	Safety & Ergonomics	a. Dual-injected cushion brow guard and universal fit nose-bridge pivots. b. It shall have a wrap-around design for superior orbital eye socket coverage. c. There shall be ventilation channel that helps prevent fog and heat by channelling warm/moist air out and cool air in for added comfort. d. It shall have adjustable temple lengths to help wearers get the best possible comfort and slip-proof fit. e. It shall have a pantoscopic lens adjustment to move lens up and down on the face for optimum fit and sightline.
6	Packing	It shall be supplied with a lanyard and a storage bag.
7	Certification	The eyewear shall be approved to ANSI Z87.1/EN or equivalent.

TECHNICAL SPECIFICATIONS FOR REUSABLE EAR PLUG

Sl. No	ITEM	DESCRIPTION
1	Design & Construction	It shall be of pre-moulded, 3-flanged design. It shall be washable to promote work hygiene.
2	Ergonomic	It shall be comfortable fitted to wide variety of ear canal sizes and there shall not be any touching of plug portion during insertion.
3	Packing	Each pair shall be supplied with a breakaway cord. The packing shall be a convenient carrying case to keep plugs clean when not in use
4	Attenuation	It shall have a Mean Attenuation of NRR 25 db or SNR 32 db measured as per ANSI S3.19/ EN or equivalent.

TECHNICAL SPECIFICATIONS FOR CHOCKS

Sl. No	ITEM	DESCRIPTION
1	Size	15" (Approx.)
2	Material	Polyethylene/ Polypropylene/ Polyurethane
3	Design & Construction	One-piece moulding, Non-slip, water & oil-resistant, Lightweight, floats on water, Having high friction factor
4	Allowable Strength	100 kg/cm ² in all directions.
5	Certification	Confirming to International Standard.

Appendix-VIII

TECHNICAL SPECIFICATIONS FOR HYDRAULIC SPREADER AND CUTTER WITH PUMP & ACCESSORIES

Sl. No.	Technical Specifications
1	General
	The unit shall be safer for heavy duty performance during rescue and salvage operation. It should be certified as per EN 13204 /NFPA 1936/ equivalent (latest version).
2	Pump Driven by Petrol Engine
2.1	Should be able to operate cutter and spreader at the same time at their maximum performance level.
2.2	Weight not more than 25 KG, fully / ready for operation as per EN 13204 /NFPA 1936/ equivalent (incl. couplings, engine oil, hydraulic oil and fuel).
2.3	Fuel Tank: Suitable for minimum 01 (One) hour operation in one fill.
2.4	Oil Tank: Having usable oil content capacity as per OEM's Design.
2.5	Output: Should be capable of giving adequate output at each stage and desired working pressure.
2.6	Noise Level: Less than or equal to 85 dB (A) at distance of 1 mtr. (EN: 13204) / NFPA 1936/ equivalent.
2.7	Safety: Provision of safety valves at each stage is essential in addition to excess pressure release valve. The system shall comply with all safety requirements specified in EN: 982. And EN: 60204-1/equivalent.
2.8	The pump shall be 4-stroke air-cooled petrol engine with minimum 2.2 KW, working with mineral non-toxic oil and should have following additional features:
	i. Single switch operation
	ii. Protection cap for spark plug
	iii. Easy excess for filing of fuel and oil
	iv. The hydraulic fuel reservoir shall be provided with a means to visually determine the Fluid level. Such means shall include but not limited to dip stick type indicator, sight gauges or remote fluid level gauges.
	v. Handles and controls shall be located on the power unit to allow the power unit to be safely carried and operated by personnel.
	vi. Electronic / Suitable Speed control Mechanism.
3	Hose
3.1	The pump shall be supplied with a heavy duty hydraulic co-axial (High Pressure hose within return hose) suitable for operating all the tools having a working pressure of not more than 750 bar and tested to a pressure of not less than 2 times the working pressure coupled with single hose coupler.
3.2	The bursting pressure shall be 4 times the working pressure.
3.3	The hose and hose assembly shall have minimum resistance against abrasion, fluids and ozone as stated in EN: 853, 855, 856 and 857/equivalent.
3.4	The quantity of hose with instantaneous couplers preferably mounted on a hose reel shall be as follows: a. 10 mtrs: 2 nos. b. 20 mtrs: 2 nos.
3.5	Hose shall be made of suitable components and design to perform the task without any personal safety hazard. The hose shall confirm to EN: 13204/NFPA 1936/equivalent.
3.6	Color code as per international code.
3.7	Shall have quick coupler to prevent inadvertent disconnection.
4	Cutter for Rescue (as per EN: 13204 / NFPA 1936 / equivalent)
4.1	Shall be made of anticorrosive material with the provision of carrying handles for operating the cutter in all directions for safe and easy operation.
4.2	The equipment shall be capable for using under water.
4.3	Weight shall not exceed more than 20 kg
4.4	Cutting force not less than 100 tons and shall be able to cut A-36 Hot Rolled steel round bar of 40 mm.
4.5	Jaw width not less than 180 mm
4.6	Blade design: Any design certified by EN/NFPA/ equivalent for the desired level of performance.

4.7	Anodized for corrosion resistance.
4.8	Working Pressure: Not more than 750 bar.
4.9	Testing pressure shall be 1.5 times of working pressure.
4.10	The equipment shall comply with the requirement of operating temperature as per the provisions of NFPA 1936.
5	Spreader for Rescue (as per EN: 13204/ NFPA 1936/ equivalent)
5.1	Should be made of anticorrosive material with the provision of carrying handles for operating the spreader in all directions for safe and easy operation.
5.2	Spreading force not less than 32 tons and not less than 4 tons measured at 25 mm from the tips as per EN 13204/NFPA 1936/ equivalent.
5.3	Weight should not exceed more than 20 kgs
5.4	Spreading distance not less than 650 mm
5.5	Pulling force not less than 6.5 tons.
5.6	Must be ultra-light weight and suitable for use under water
5.7	Teeth double edged, should be capable of spreading & squeezing. Tips must have possibility to be changed without the use of tools
5.8	Check valves for all operating parameters
5.9	Working Pressure shall not be more than 750 bar.
5.10	Testing pressure shall be 1.5 times of working pressure.
5.11	Quick lock system for tips & chain pulling set and adaptors
6	Chains
6.1	Metallic provided with suitable eye and hook for the spreader.
6.2	Length: 02 Nos. of chain having minimum total length of 4.5 metres. However, none of the two chains should be less than 1.5 metres.
6.3	Strength: Shall be capable of working at more than the force exerted by spreader.
7	Telescopic RAM (as per EN: 13204/ NFPA 1936/equivalent)
7.1	The ram cylinder shall be double acting hydraulically operated device of lightweight construction suitable for manual application with ease.
7.2	The telescopic ram shall be capable of lifting and spreading operation. Built in speed valve for faster operation.
7.3	The telescopic ram shall have following specification:
7.3.1	Max. Spreading force 1st plug - Not less than 20 Ton
7.3.2	Max. Spreading force 2nd plug - Not less than 08 Ton
7.3.3	Length retracted - Not more than 575 mm
7.3.4	Length extended - Minimum 1250 mm
7.3.5	Stroke 1st plug – As per OEM’s Design
7.3.6	Stroke 2nd plug - As per OEM’s Design
7.3.7	Total stroke – Minimum 700 mm
7.3.8	Weight - Not more than 22 kgs
7.4	Working Pressure: Not more than 750 bar.
7.5	Testing pressure shall be 1.5 times of working pressure.
8	Other Requirements
8.1	Technical and Operational Manual: One set each of Technical and Operational Manuals in soft and Hard format shall be provided with each equipment.

TECHNICAL SPECIFICATIONS FOR POWER DRIVEN CIRCULAR SAW WITH ACCESSORIES

Sl. No	ITEM	DESCRIPTION
1	Engine	2/4 Stroke single cylinder petrol Engine 4.5 HP with Electronics Ignition system & Recoil Starter along with air-cooled having diaphragm carburettor. Self-Compensating carburettor that maintains continuous and regular full power in any conditions.
2	Engine Speed	Min-2500 RPM, Max- 10,550 RPM
3	Fuel	Petrol start & petrol run.
4	Fuel Tank Capacity	Not less than 0.5 litres and not more than 1.5 litres
5	Power Transmission system	Automatic centrifugal clutch, V-Ribbed belt type Driven system Heavy Duty sealed Multi V Ribbed belt for constant grip which reduces the slippage and indicator is fitted on the external side which is helpful in maintaining the convenient belt tensioning.
6	Power Output	Not less than 3 KW
7	Safety Device	a) Wheel Guard Equipped with Spring-Loaded Stainless-steel Wheel Guard while the operator is cutting a material it will adjust itself automatically and hence reducing the pressure on the operator. b) Throttle Lock-out having throttle lock-out.
8	Handle	Handle should be full wrap for ease of use with gloves and large rubber coated secured grip & also work as anti-vibration.
9	Stopping	There should be momentary contact switch which is always in 'On Position' ready to start with just starter Handle within seconds.
10	Anti-Vibration	There should be anti-vibration System, which reduces the fatigue for the Operator with T-point support and isolating the handle as much as possible from the engine and cutting blade.
11	Cutting Depth	Not less than 3 inch
12	Noise Power Level	Max 105 dBA.
13	Vibration Level	Vibration Level a) Front Handle – As per Manufacturer standard design b) Rear Handle – As per Manufacturer standard design
14	Cut-off Wheel Blade	Circular Saw with Diamond Blade in which Diamonds are fused on the Blade Size 14 Inch.
15	Cutting Parameters	Metals, Security Bars, Iron Rods, Iron Chain, Reinforced Concrete, Stones, Rock, Block Steel, Auto Body, Glass, Cock pit, Bullet Proof Glass, Hurricane Glass, Rubber, Plastic & More etc.
16	Typographic test	Circular saw working in temperature range from -10° to 50° Celsius.
17	Dimension (LxWxH)	As per Manufacturer's standard design.
18	Weight	Not more than 13 kgs.
19	Applications	It should cut any material found at Fires, Building Collapses, natural Disasters, Terrorist Attacks, Car Accidents & other Rescues etc.
20	Reversible Cutting Arm	It should be provided with Reversible cutting Arm so that, it allows the user to cut any material in the "outboard" position, to allows the user to make a "flush" cut e.g. this feature is useful for cutting security bars off a window of rail coach in outboard position and to allow the user to cut the bars at the level of the window frame.
21	Priming bulb	Priming bulb should be provided to make smooth and easier starting by pressing the priming bulb few times, to clean the bad gasoline out from the cylinder and clean gasoline into the cylinder which makes it easier for the engine to start

22	Stable Base	It should be provided with stable base designed to keep system straight on the ground which maintains distance/ gap between the blade and ground and it doesn't harm the blade.
23	Endurance	The machine should be capable of operating continuously not less than one hour without overheating.
24	Spares	One set of 1. Fast moving spares must be supplied with machine. 2. Tool kit also be supplied with machine
25	Training	Operation and maintenance staff shall be trained on machine for operation and repair.
26	Spares & Technical Manual	The sets of Technical Manuals and essential spares shall also be supplied.

TECHNICAL SPECIFICATIONS FOR PNEUMATIC LIFTING AIRBAG WITH ACCESSORIES

Para No.	Technical Specifications
1	GENERAL
	High pressure pneumatic rescue bags capable of lifting heavy loads in harsh environment and with standing rough uses of fire brigade/ rescue operation.
2	DESIGN
	The Pneumatic Lifting Airbags should be able to stack to make modular system to achieve greater height and lifting capacity without skidding. The connection of bags should be through open or closed connectors allow all the bags together or separately. Bags should also have an integrated hand point.
3	CONSTRUCTION & MATERIAL
	Pneumatic Lifting Bag should be constructed of Kevlar reinforced nitrile rubber with 3 layers aramide reinforcement covering the entire top and bottom surface of lifting bag with highly tear proof polyamide fabric. Each Pneumatic Lifting Bags should be equipped with a brass valve connection 1/8" NPT internal thread and vulcanized into the reinforced corner of bag to which a male connector of quick connect coupling should be threaded in. This male connector should be replaceable if it is damaged. The colour of Airlifting shall be fluorescent type for better visibility during night operations.
4	LIFTING CAPACITY
4.1	Working Pressure: minimum 8 bar.
4.2	Capacity: minimum 40 ton
4.3	Insertion height: Max. 25mm
4.4	Inflation height: Min. 400mm
4.5	Dimensions: Minimum 700 mm X 700 mm
4.6	Weight: Not more than 16 kg.
4.7	Minimum bursting pressure: 32 bar.
5	HOSES
5.1	All the hoses should be equipped with a quick connect/ disconnecting male and female couplings, compatible with entire air lifting bag system. The colour of hoses should be black/yellow/ Red.
5.2	The hoses should have minimum working pressure of 8 bar and should be capable of using in temp range of -20° C to + 55° C.
5.3	The hoses should be either of polyester or thermo plastic material.
5.4	The hoses should be resistant to Ultra Violet Light, change of colour, stress or cracking.
5.5	One shut off hoses with built in safety valve should be provided to release the pressure between 8.5 bar and 10 bar.
6	PERFORMANCE REQUIREMENT
6.1	Inflation should be pneumatic.
6.2	Insertion thickness not more than 25 MM.
6.3	Working pressure not more than 10 bars.
6.4	Safety ratio > 4:1
6.5	Dead Man space – NIL
6.6	Working Temperature – 20°C to +55°C.
6.7	Point loading should be possible. There should not be any stress point.
6.8	Lifting should be continuous, Noiseless & jolt free. The surface of bags should be inter locking non-skid surface moulded into each side of the bags. A separate non-skid ply that has been vulcanized separately is not acceptable.
6.9	Inflation should be through single regulator 200/300 bars with Quick Connection.
6.10	The Pneumatic Lifting Bags should be portable and light-weight, and should be in set form, consisting of bags, hose assemblies, Pressure gauges, pressure reducers, safety valve, Air bottle connector, and controller.
6.11	The air bags should be chemical and some ozone resistant with carrying straps or handle attached to 40 ton bags as per OEM Design.
6.12	The Pneumatic lifting bags and its accessories should comply all the requirement stipulated under latest EN 13731 / equivalent.
7	PRESSURE REGULATOR

7.1	The pressure Regulator should be capable of reducing the pressure from 300 bar to 8 bar.
7.2	The pressure regulator should be provided with threaded quick connect couplings suitable to fit to normal BA air cylinder by hand without the use of any spanner.
7.3	The pressure regulator should be provided with two pressure gauges of suitable capacity to show the air pressure in the cylinder and set pressure.
7.4	The pressure regulator should be provided with pressure setting knob and safety valve with 2 mtrs. Hose with couplings to connect to Dual Dead man controller.
8	ONE SET OF PNEUMATIC LIFTING AIRBAG WILL COMPRISE OF THE FOLLOWING:
8.1	Lifting Bag 40 tons capacity: 1 no.
8.2	Pressure reducer 300 bar to 8 bar: 1 no.
8.3	Dual Controller with pressure gauges: 1 no.
8.4	Air Hose 5 mtrs. With couplings: 1 no.
8.5	Air Hose 10 mtrs. With couplings: 1 no.
8.6	Single control Unit: 1 no.
8.7	Shut off hose with safety valve: 1 no.
8.8	Connection piece to connect two air cylinders: 1 no.
9	MARKINGS
9.1	Bags should have proper colour to be visible in dark smoky condition. It should have reflective markings on the corners for easy identification when operating in the dark areas.
9.2	The lifting bags should be provided with a warning and information labels. The information and the warning labels must be in English language and in pictograms for clear understanding. Also it should be marked with date of manufacturer and serial number in such a way that they cannot be erased without damaging the surface.
10	TESTING
10.1	Artificial ageing
10.2	Impulse loading with drop weight.
10.3	Dynamic fatigue loading with 16-ton weight.
10.4	Leakage test with sharp drop weight (50 No.) at 600 and 900 from a height of 7 mtrs. Pressure Tests.
11	MAINTENANCE
11.1	The system should be maintenance free.
11.2	There should be provision of draining out moisture after every use.
11.3	Cleaning /Washing should be possible with ordinary detergent.
12	OPERATION AND MAINTENANCE MANUAL
	The bidder should supply operation and maintenance manual with each set in English language.

TECHNICAL SPECIFICATIONS FOR JUMPING CUSHIONS

The jumping rescue cushions should have high reliability and shall be easy to handle and shall be capable of being fully erected by 4 to 6 persons. The possible jumping height shall not be less than 20 mtrs. It shall have illumination for night operations and shall be capable of being used in dusty conditions. The detailed technical specifications are as under:

Sl. No.	ITEM	DESCRIPTION
1	Shape	8 corner shape (octagonal)
2	Outer Dimensions	Not less than 5.50 x 5.50 mtrs
3	Usable jumping area	Not Less than 4.50 x 4.50 mtrs
4	Tube diameter of the inflatable frame:	As per Manufacturer's standard design.
5	Material of frame	Natural rubber reinforced with polyester fabric 940 dtex, black
6	Material of outer cover	Fire retardant special PVC-coated polyester fabric, orange
7	Material of jumping area	Fire retardant special PVC-coated polyester fabric, white with black markings
8	Compressed air cylinders	2 x 6l (min)/300 bar or equivalent steel cylinders
9	Erection time	Not more than 75 sec. (depending on the used cylinders)
10	Re-erection after a jump	Not more than 10 sec.
11	Weight of the complete device (with charged cylinders)	Not more than 150 kg
12	Packing	It Shall be packed in a valise with handles for 6 persons

TECHNICAL SPECIFICATIONS FOR ZERO TORQUE NOZZLES

Para No.	Technical Specifications
1	GENERAL
	The equipment shall be ergonomically designed to reduce fire fighting fatigue and better handling & control of firefighting.
2	MATERIALS
	The material to be used in the construction shall be pyrolite and one-piece solid nozzle hard coated with multiple pattern detents and designed with better ergonomics to reduce the fatigue of fire fighter.
3	DIMENSIONS
3.1	Swivel Inlet: 63 mm approx.
3.2	Weight: Not more than 4.30 kg.
3.3	Length: As per Manufacturer's standard design.
3.4	Type of coupling instantaneous
4	OPERATING
4.1	Quick shut off Valve.
4.2	Flush arrangement without shutting down.
4.3	Fog pattern with spinning teeth.
4.4	Handle grip with pistol type.
5	PERFORMANCE
5.1	Discharge rate 200-450 LPM or more @ 7 bar pressure.
5.2	Water Supply: Controlled
5.3	Jet Reaction: Very Low
5.4	Water Hammer: Very Low
5.5	Working Model: Jet & Spray
5.6	Grip: Free Position
5.7	Spray Pattern: Minimum 120 Degree
6	ATTACHMENT
	The equipment shall be attached with Zero Torque and quick attack foam tube.
7	OPERATION AND MAINTENANCE MANUAL
	The bidder should supply operation and maintenance manual with each set in English language.
8	CERTIFICATION
	The unit shall have CE/EN/NFPA/BIS or equivalent certification.

Appendix-XIII

TECHNICAL SPECIFICATIONS FOR TELESCOPIC ROOF MOUNTED MAST

Para No.	Technical Specifications
1	A Pneumatic telescopic mast should be mounted on the vehicle. It should be manufactured from Anodized aluminium pipes and have a minimum of 115 mm diameter on its base. The temperature range shall be from -25 deg. C up to 60 deg.C, with anti-twist lock, with safety valve and drainage outlet valve.
2	The telescopic mast should be extremely strong and designed with a minimum of 5 sections with internal spiralled Electrical cable. Each section of the mast should have a water drainage outlet. The height of the mast when deployed should be minimum 6000 mm (from the ground). The retracted height should be of maximum 1800 mm.
3	The Light mast will have 4 x 100 Watt LED projectors in weatherproof casing. The LED lamps on the top should have a minimum electrical rotation of 355° and a tilt of 350°. Suitable connections for taking permanent Power Supply from generator set through an internal spiral wire mounted inside the mast should be provided. Each set of LED lamps should have the possibilities to be switched independently through individual switches.
4	All the functions of the mast, including extension and return to the original position, lights on/off, automatic restore should be capable of being done through a wire remote control. An additional remote control without cable (wireless) should be provided

Appendix-XIV

TECHNICAL SPECIFICATIONS FOR CABLE WINCH

Para No.	Technical Specifications
1	An electrically operated cable winch of not less than 5 tons pulling capacity (single layer) would be provided and mounted in the front of the vehicle. The winch unit should be complete with minimum 5.5 HP, 12V/24V DC series wound electric reversible motor for increased pulling power. The motor and solenoids shall be grounded to the battery.
2	It shall have an automatic load holding brake system for more strength. For free spooling the clutch design shall be easy to use type with spring loaded pull and rotate system.
3	The gear system should be 3 stage planetary type for faster line speed and the gear reduction ratio shall not be more than 300:1, the rope drum shall not be of more than 8 inches dia and shall be supplied with minimum 90 ft heavy duty galvanized EIPS wire rope with replaceable self-locking clevis hook and would be mounted on the front bumper of the vehicle with suitable strong supports and a 4 way roller fairlead.
4	The Weight of the winch shall not be more than 55 kgs.

Appendix-XV

TECHNICAL SPECIFICATIONS FOR HANDHELD FORCIBLE ENTRY TOOL KIT

Para No.	Technical Specifications
1	GENERAL
	The equipment is to be use for the purpose of forcible entry, prying, enlarging openings, cutting sheets and twisting off lock and latches. The tool shall enable easy, fast and single person operation.
2	DESIGN
	<p>a) The complete equipment shall comprise of one compact ram bar and a tool bit set of various bits. The ram bar shall be able to connect the interchangeable bits for added versatility.</p> <p>b) The arm bar shall have a locking device that can lock the ram bar at any length for added leverage and safety for storage. The ram bar shall have an easy sliding action that can direct all its forces directly at the point of impact for maximum effect.</p>
3	MATERIAL & CONSTRUCTION
	<p>a) Ram bar shall be made of hard-coated aluminium alloy tube body. The tube body and handle shall be machined grooved for non-slip grip. The ram bar shall have hard coated aluminium alloy tool bit retainer and a locking ring.</p> <p>b) The tool bits shall be made of forged & heat-treated steel alloy.</p>
4	TOOL BIT SET: The tool bit shall be of the following types:
4.1	Bull point tool bit for breaking concrete and masonry walls, Minimum Length 14" (Inch)
4.2	Chisel of approx. 25 mm width for breaking concrete, prying and breaking bolts and brick walls, Minimum Length 14" (Inch)
4.3	Chisel of approx. 75 mm width for breaking concrete, prying and breaking bolts, breaking bricks and block walls, Minimum Length 14" (Inch)
4.4	Metal cutting claw for punching and cutting sheet metal and work like a manual can opener, Length 250 mm – 300 mm.
4.5	Lock breaker claw for prying or force open doors, windows, twisting hasps and breaking locks, Length 250 mm – 300 mm.
5	OPERATION AND MAINTENANCE MANUAL
	The bidder should supply operation and maintenance manual with each set in English language.