

# **SPECIFICATION SHEET**

## **FIRE VEHICLE**

## TECHNICAL SPECIFICATION AND BASIC REQUIREMENTS

FOR

### AIRPORT CRASH RESCUE VEHICLE

#### 1. SCOPE

This specification sets out the minimum requirements to be met by all contractors in supplying 4x4 or 6x6 drive, 6000 liters Airport Crash Rescue Vehicles for the operation of Cat 5 airport in the Republic of Maldives.

The primary purpose of this vehicle is to aircraft rescue and fire fighting. However, facilities for use in the secondary role of providing fire protection for airport buildings and other assets are required.

The intended in-service life span of the vehicle is 12 years during which there is no degradation of reliability of operational capability. The vehicle is operated by full-time fire service staff. In the period following delivery and up to on-line commissioning there will be an intensive training phase during which all at the fire unit will be trained to full proficiency in driving and operating the vehicle and equipments including full familiarity with the capability of the vehicle to traverse the varying terrain on the airport.

The in-service conditions following commissioning are also very severe. Normal vehicle operation is that the vehicle is operated at or near full capability very frequently for training, terrain familiarisation, testing and call-out duties.

Potential tenders are urged to ensure that they and their suppliers/sub-contractors fully appreciate the extent and severity of in service use of the vehicle.

Warranty and in-service problems will arise during the life of this vehicle. Consequently it is essential that the contractor have the technical and physical resources and competence to provide speedy and expert response whenever and wherever problems occur.

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The requirement is for very fast, rugged and reliable all wheel drive diesel engine vehicle designed to reach a crash site quickly over all types of road and terrain and equipped for effective fire fighting.

The vehicle must have excellent cross-country performance; it must be well balanced and offer excellent stability at all speeds in the loaded, partly-loaded and empty conditions.

The driver at a crash site must be able to manoeuvre the vehicle slowly and under full control using normal driving controls, stopping, reversing, moving forward, etc, at will without interrupting or causing noticeable reduction in the required discharge.

The cabin and equipment stowage must be designed for safe and fast response action whether during night or day operations.

A very high reliability and availability for operations approaching 85-100% on a 24 hour's day basis is essential. Good serviceability, adequate manuals and assured spares availability are essential.

The attention of Tenders is drawn to the various mandatory requirements indicated in this specification by the words "shall" or "must". These requirements have been determined to be essential.

The requirements are consistent

With the recommendations of International Civil Aviation Organization (ICAO) and National Fire Protection Association (NFPA).

## 2. AUTOMOTIVE PERFORMANCE

- A. Acceleration 0-80 km/hr. within 40 seconds (at the normal operating temperature)
- B. Top speed not less than 100 km/hr.
- C. All wheel drive capability
- D. Angle of approach not less than 30 degrees
- E. Angle of departure not less than 30 degrees
- F. Full automatic transmission
- G. Single rear wheel configuration
- H. Static side slope stability tilt angle 28 degrees
- I. Turning radius of the vehicle 15m

## 3. CHASSIS

- 3.1 The chassis shall be 4 x 4 or 6 x 6 of all wheel drive unit designed to offer high speed, rapid acceleration with excellent cross country performance together with extreme reliability, safety, operational simplicity and good braking capability. The ABS braking should be stopping the vehicle from 32kmh to 0kmh within 15m and 64kmh to 0kmh within 35m.
- 3.2 The chassis design shall be that centre or off-centre steering position providing optimum vision for both sides and rear mounted engine with reduced noise level within the crew cab. A Centralized, automatic lubrication system, wired to all the vital greasing points shall be installed in the vehicle.
- 3.3 Four large tow eyes shall be attached directly to the frame structure, two at front and two at rear, capable of towing the unloaded vehicle on hard level surface without damage. A full width heavy-duty brush guard protecting vehicle front shall be provided.
- 3.4 An access ladder shall be provided on the rear of the vehicle for access to the top of the Vehicle.


4. ENGINE AND ENGINE COMPARTMENT

4.1 The vehicle engine shall be a diesel, having horsepower, torque and speed characteristics to satisfactorily meet all vehicle performances specified in this specification. The vehicle shall be able, when fully loaded to accelerate 0 to 80 km/hr on dry level pavement within the maximum of 40 seconds.

4.2 The engine shall be rear mounted of the chassis with good access for maintenance and repair.

4.3 All water and oil level filler ports and dipsticks shall be extended to provided easy access from the top surface of the vehicle.

4.4 The engine compartment shall be a single module covering the engine, fuel tank etc. made of metal framework with GRP covering. Prior to assembly of panelling, the frame shall be galvanized and treated with anti corrosive material. The module shall have lift off / sliding ability giving instant full access to the engine and ancillary components.

4.5 The module shall have hinged panels on the roof providing access to the engine compartment from the top for daily inspections.

4.6 The silencer shall be above engine mounted and arranged as such that the exhaust fumes should be discharged to the rear of the vehicle. The exhaust system shall be made of high-grade stainless steel.

*Chippa*





## 5. BRAKING SYSTEM

5.1 Vehicle braking system shall be an air operated system with split dual circuit

An engine driven air compressor shall be the primary source providing air to the reservoirs via an air dryer. An auxiliary air compressor powered by 230V AC mains supply, shall be fitted to maintain air brake system at necessary pressure when the vehicle is parked at the station.

Automatic drain valves shall be fitted to all air reservoirs and an Anti-lock braking system (ABS ) shall be provided.

An independent, protected reservoir shall be provided to supply air for the pneumatically operated vehicle functions and a fast build up facility shall be provided to release the parking brake within 12 seconds of engine start with empty reservoirs.

All pipe works on the axles shall be made of metal tubing and elsewhere, fire retardant high quality nylon tubing shall be used and protected where necessary by heavy-duty spiral wrap straps.

## 6. FIRE FIGHTING SYSTEM

- A. Water tank capacity, 6,000 L
- B. Foam liquid tank capacity 600 L
- C. Monitor discharge rate, 3,200 L/min at high
- D. Dry powder system capacity, 185 kg
- E. Bumper mounted non-aspirating turret, controllable from the cab.
- F. Under truck nozzles, 1 for each wheel and 2 Nos. for the engine.
- G. Monitor jet throw, straight stream 100% 60 m.



H. Foam sideline delivery. 2. Nos. (One on each side of the vehicle, Pressure automatically regulated.

Connection: 2.5" BSS 336 female.)

I. Water sideline delivery. 1. Nos. (Located at the left-hand side of the vehicle. Pressure unregulated.

Connection: 2.5" BSS 336 female.)

J. First aid hose reel, 1. Nos. (30m length with jet/spray gun c/w trigger shut off valve. Located at the right-hand side of the vehicle. Hose reel shall have powered rewind facility with manual override.)

K. Power Take Off, driven by vehicle engine.

L. Fire pump should be a Centrifugal, gunmetal casing and impeller with stainless steel shaft suitable for brackish water, capable of discharging 4,000 l/min at 11 bars.

M. Automatic priming system c/w out side suction 4" round thread located in the left hand side locker of the vehicle.

## 7. CAB CONSOLE AND INSTRUMENTATION

7.1 Instrument console shall be moulded in GRP, centrally located in front of the driving seat containing all necessary information, gauges and warning lights. Gauges and other instruments shall be illuminated for night use. All instruments and controls shall have either sign or labelled in English for easy identification of the function.

Console design consideration shall be given that will ensure that the vital automatic functions are

central to the driver and the fire fighting panel is displayed to the right hand side of the driver.

The following switches for the fire fighting system shall be made available for the driver within his

easy reach. All the switches and instruments shall be located in the driver's instrument console right hand side, and shall be clearly visible and operable without leaving his seat.

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|----|---|------------------|
| A. | Master switch for fire control panel  | ON/OFF           |
| B. | Power Take Off  | ENGAGE/DISENGAGE |
| C. | Water tank valve  | OPEN/CLOSE       |
| D. | Foam tank valve   | OPEN/CLOSE       |
| E. | Monitor lock  | LOCK/UNLOCK      |
| F. | Monitor valve   | OPEN/CLOSE       |
| G. | First aid hose reel   | OPEN/CLOSE       |
|    |   |                  |
| H. | Left hand foam sideline   | OPEN/CLOSE       |
| I. | Right hand foam sideline  | OPEN/CLOSE       |
| J. | Front bumper turret   | OPEN/CLOSE       |
| K. | Under truck nozzles   | OPEN/CLOSE       |
| L. | Foot/hand throttle  | ON/OFF           |
| M. | Water / foam system flushing valve  | ON/OFF           |
| N. | Water tank contents indicator   |                  |
| O. | Foam tank contents indicator  |                  |
| P. | Single action switch or 'Ready Button' which will simultaneously operate PTO, water & foam tank valves, monitor valve and monitor lock to minimise reaction time. |                  |
| Q. | Pump pressure gauge calibrated in bar and lbf/in <sup>2</sup>   |                  |
| R. | Vacuum gauge  |                  |

NOTE: The ready button shall be brightly marked for prompt recognition and should be individually located separate from other switches.

7.4 All switches in the fire control console with OPEN/CLOSE ON/OFF indicators shall be true type showing that the relevant function is complete.

7.5 The following switches / controls shall be made available for the driver on left-hand instrument console panel, and shall be clearly visible and operable without leaving his seat.

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- A. Ignition ON/OFF
- B. Engine start
- C. Engine stop
- D. Rear fog lights
- E. Hazard warning
- F. Deluge pump
- G. Front axle differential lock
- H. Rear axle differential lock
- I. Transfer box high/low warning light
- J. Transfer box differential lock
- K. Cab light
- L. Locker lights
- M. Emergency beacon
- N. Airfield obstruction light
- O. Demister

7.6 The following instrument / warning lights shall be made available for the driver on central instrument console panel and shall be clearly visible to the driver without leaving his seat.

- A. Speedometer / odometer
- B. Engine tachometer
- C. Fuel contents gauge
- D. Left hand indicator
- E. Right hand indicator
- F. Coolant temperature / high



- G. Oil pressure low
- H. Air pressure low
- I. Parking brake on
- J. A.B.S
- K. High beam
- L. Gear shift neutral
- M. External mains connected
- N. Alternator no charge
- O. Coolant level low
- P. Flood light mast extended

7.7 In addition to the above instruments, following gauges shall be provided for the driver.

- A. Primary air pressure gauge – 1
- B. Primary air pressure gauge – 2
- C. Secondary air pressure gauge
- D. Auxiliary air pressure gauge
- E. Voltmeter
- F. Engine oil pressure gauge
- G. Engine coolant temperature gauge
- H. Transmission oil temperature gauge
- I. Clock

7.8 Following controls shall be incorporated in the steering column.

*Ch. Huma*

*Amirul*



- A. Road horn control
- B. Direction indicator left / right c/w self cancellation

7.9 Following lighting control switches shall also be provided in front of the driver within his easy reach.

- A. Side light with head lights
- B. Tail lights
- C. Stop lights
- D. High intensity rear fog lights
- E. Reverse lights

7.10 Following controls shall be located right hand side of the driver within the driver's easy reach.

- A. Joystick control for roof monitor rotation, elevation, depression and jet/spray. In addition the following controls shall incorporated in to the joy stick, Monitor dual out put. 100% / 50%.
- B. Joystick control for the front bumper turret rotation, elevation, depression and jet/spray

Note: Both joysticks for the roof monitor and front bumper turret shall be located at the right hand side and adjacent to the driver. They shall be arranged as such that the joysticks shall be accessible by both the driver and right hand side crew member.

- C. Gear select lever
- D. Parking brake control
- E. PTO manual engage
- F. Engine emergency stop

8. CREW CAB DESIGN

- 8.1 The crew cab shall be constructed with robust steel frame, with GRP panels bonded in place using adhesives compatible to tropical humid climate. The cab module should be mounted forward of the front axle and provide accommodation for a crew of 4.
- 8.2 Individual seats shall be provided for all 4 crewmembers. Driver's seat shall be central and fully adjustable in the fore and aft position. Two fixed crew seats shall be provided on each side of the driver's seat. A forth seat shall be positioned behind the three forward seats. All seats shall have finish in hard wearing vinyl over foam rubber cushions.
- 8.3 All seats shall be fitted with automatic retracting self-locking lap type or lap/diagonal seat belts.
- 8.4 Backrest of the two crew seats on both sides of the driver shall be designed to incorporate Breathing Apparatus.
- 8.5 Wide opening doors on each side of the cab to facilitate crew movement shall be provided with hinges for forward opening. Grab handles shall be positioned in the cab to ensure safety of the crewmembers when mounting and dismounting the vehicle. Both doors shall have straps and anti burst locks. Non slip aluminium shall be provided on the access steps into the cab.
- 8.6 A large quick action, sliding hatch shall be provided in the cab for access to the monitor platform, non-slip material shall be provided on all steps.
- 8.7 Air-conditioning shall be provided in the cab for crew comfort, powered from an engine driven compressor.
- 8.8 Windscreen shall be wide-angle single piece, cab door and side windows shall be made of laminated tinted safety glass. Windscreen shall be fitted with two multi speed wipers c/w standard wash system having a minimum capacity of 4 minutes continues wash and folding type sun visor shall be provided forward of each front seat position.
- 8.9 Two large rear view mirrors shall be provided on each side of the cab.



9. MONITOR / MONITOR PLATFORM

- 9.1 The monitor shall be dual out put high performance self aspirating type producing high quality foam either in stream or spray pattern with the vehicle stationary or in motion. The monitor shall be forward parked / locked for travelling.
- 9.2 The monitor shall be power operated with driver and platform control of rotation, elevation and foam pattern. Should the power system fail, the monitor should be manually operable from the platform.
- 9.3 A GRP cowling shall be fitted around the monitor barrel to minimize foam spill on the monitor platform and the cab roof.
- 9.4 The platform shall be designed for the most effective control of the monitor. The floor shall be provided with a substantial non-slip surface, capable of supporting the weight of two men.
- 9.5 Monitor platform shall be designed such that access is gained from the crew cab via non-slip access steps through a sliding hatch formed in the cab roof and the rear bulkhead. The hatch shall be fitted with operating handle and positive latching in both open and close positions shall be provided. The hatch dimension shall ensure rapid entry and exit of crewmembers wearing full fire fighting equipment.
- 9.6 Performance requirement.
- |   |                   |              |
|---|-------------------|--------------|
| A | Output 100 % flow | 3'200 lpm    |
| B | Output 50 % flow  | 1'600 lpm    |
| C | Jet range         | 60 m or more |





- |   |            |                                 |
|---|------------|---------------------------------|
| D | Rotation   | 120 degrees or more either side |
| E | Elevation  | +45 degrees or more             |
| F | Depression | -5 degrees                      |

9.7 Monitor operator's position at monitor platform shall be equipped with the following controls. All switches shall be of waterproof type suitable for outdoor use.

- |   |               |          |
|---|---------------|----------|
| A | Water tank    | ON / OFF |
| B | Foam tank     | ON / OFF |
| C | Monitor valve | ON / OFF |
- D Joystick control for monitor rotation, elevation, depression and jet/ spray/ c/w monitor dual output. 100% / 50%
- E Water tank contents indicator
- F Foam tank contents indicator
- G Engine speed control
- H Pump pressure gauge calibrated to bar and lbf / in<sup>2</sup>
- I Light mast control

#### 10. BUMPER TURRET

- 10.1 Bumper turret shall be high performance, single output power operated non aspirating type producing foam either in stream or spray pattern mounted on the front bumper.
- 10.2 The control of the turret shall be incorporated in an electric operated joy stick within the cab adjacent to the right hand side of the driver, operable by the driver or right hand front crewmember for elevation and rotation. Automatic oscillating facility with override control shall be provided.
- 10.3 Performance requirement



- |    |                    |                        |
|----|--------------------|------------------------|
| A. | Output ( minimum ) | 1'000 lpm              |
| B. | Jet range          | 45 m or more           |
| C. | Rotation           | 85 degrees either side |
| D. | Elevation          | +45 degrees            |
| E. | Depression         | -20 degrees            |

#### **11. WATER AND FOAM TANKS**

- 11.1 The water and foam tanks shall be manufactured as a full width, low profile integral unit contoured to vehicle body style. The tanks shall be designed and fixed as such that the complete module can be removed from the chassis without disturbing the rest of the vehicle bodywork modules.
- 11.2 The tanks should be manufactured from high quality glass reinforced plastic GRP to minimize corrosion and shall be internally baffled to prevent undue liquid surge. The tanks should be flexibly mounted on rubber mounts inhibiting any tensional stress being put into the tanks from the chassis when traversing rough terrain.
- 11.3 The tank should be mounted as low as possible on the chassis to maintain low centre of gravity for enhanced vehicle stability.
- 11.4 Both tanks shall be facilitated with an electrical contents indicator.
- 11.5 Lifting eye positions shall be incorporated in the tank top and all weather non-slip surface shall be provided on the tank roof.



## WATER TANK

Capacity, 6'000 litres.

- 11.6 Access to the water tank interior shall be provided by a large diameter mild steel hatch complete with hinged fill – inspection cap with saddle bar and clamp.
- 11.7 The tank shall be vented through a baffled overflow to prevent possible damage to the tank during filling or discharging. The overflow shall be designed to limit / restrict the loss of water during vehicular motion, any loss shall be discharged clear of the wheels and chassis.
- 11.8 The tank shall have a drain, complete with manually operated valve, and shall be terminated at the side of the vehicle.
- 11.9 The tank shall be facilitated with minimum 2 outside filling connections, one on each side fitted with quarter turn ball valves terminating in 2.5" British Instantaneous male light alloy couplings c/w dust cap and chain.

## FOAM LIQUID TANK

Capacity 600 litres

- 11.10 Access to the foam tank interior shall be provided by a large diameter manhole, complete with hinged fill – Inspection lid and removable stainless steel filter.
- 11.11 The tank shall be designed to vent to the atmosphere to accommodate pressure changes during filling, discharging or temperature variation. The over flow shall be designed to discharge clear of wheels and chassis.

11.12 Drainage of the tank shall be made by a pipe complete with a manually operated shut – off valve and shall be terminated at the side of the vehicle.

11.13 An electrically driven foam tank filling pump powered by vehicle battery shall be provided for foam tank replenishment and shall be capable of replenishing foam tank from containers outside the vehicle and shall be protected by a re-settable circuit breaker.

12. PUMP AND FIRE ENGINEERING.

12.1 The pump and proportioning system shall be of modular construction and shall be installed as such that will minimize transmission of noise to the crew cab interior when the pump is in operation, and assist in the rapid removal of the pump module for the replacement of major components and repair if necessary.

12.2 The fire pump shall be centrifugal constructed from sea water resistant gunmetal with the impeller running on a stainless steel shaft and shall be located within the pump / proportioning module.

12.3 The pump shall have a rated capacity of 4000 l/minute at 11 bars with intermediate lower outputs and pressure to support the monitor, sidelines and auxiliary requirements. The pump shall be equipped with an automatic water ring primer with a suction connection for working from an open

water source. The suction connection shall be 4" round thread conforming to BS336 and shall incorporate a quarter-tern shut off valve, stainless steel mesh strainer and dust cap.

12.4 The left-hand side locker containing pump suction connection shall be facilitated with the following instruments and controls.

A. Pump pressure gauge calibrated to bar and lbf/in2

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- B. Vacuum gauge
- C. Engine speed hand throttle control

- 12.5 Foam proportioning system shall be designed that the concentrate is drawn in to the system by means of an automatic 'Round-the-Pump' proportioning system containing minimum number of moving components. Inductors shall be both variable and fixed types offering adjustable foam concentrate flows of 3% and 6% for the monitor and 6% for the sideline, bumper turret and undertruck nozzles.
- 12.6 The pump shall be driven via a power take off which shall be mounted on a torque converter, coupled to the vehicle engine, allowing the pump to operate whilst the vehicle is stationary or on the move in either forward gear (1<sup>st</sup>) or reverse gear.
- 12.7 All pipe works / valves in contact with foam concentrate shall be made of high-grade stainless steel / gunmetal and be suitably sized to keep frictional pressure losses to a minimum.
- 12.8 All pipes shall be designed to enable valves, flexible joints etc. to be removed with minimum of disturbance to other components and pipe work.
- 12.9 Foam production system shall be designed that the system can be flushed out by inducing clean water downstream from the foam tank valve and discharging through the delivery outlets. The flushing valve shall be remotely controllable from the cab.
- 12.10 A pressure relief valve shall be provided to relieve system shock and prevent high pressure surge, which may burst hoses when branch-pipes are closed without reducing pump speed.

13. FOAM SIDELINE DELIVERY

- 13.1 Two foam sideline delivery connections shall be provided one on either side of the vehicle c/w British Instantaneous female connection. A constant flow valve shall be provided for each delivery,





which shall ensure that when the roof monitor and sideline are operated simultaneously the hand line output remain constant at 450lpm and 7bar.

- 13.2 Pneumatic on/off remote control shall be provided for the foam deliveries, in the cab fire control panel along with manual override within the delivery locker.

#### 14. WATER SIDELINE DELIVERY

- 14.1 An unregulated water delivery outlet, complete with a manually operated shut-off valve, 2.5" British Instantaneous female connection with dust cap and chain shall be provided adjacent to the foam delivery outlet at the left hand side of the vehicle.

#### 15. FIRST AID HOSE REEL

- 15.1 Once first aid hose reel with 30m hose, jet/spray gun complete with trigger shut off valve shall be provided at the right-hand side of the vehicle. hose reel shall be equipped with blocking brake and power rewind for reeling up the hose.

- 15.2 Pneumatic on/of remote control shall be provided for the first aid hose reel, in the cab fire control panel and hose reel locker compartment.



**16. UNDERTRUCK NOZZLES**

16.1 Under truck nozzles (for wheel assembly and below engine) to protect the underside of the vehicle from ground fire shall be provided.

16.2 The control of the under truck nozzles shall be pneumatic from the cab fire control panel and shall be operable independently or simultaneously with the monitor discharge and with vehicle stationary or in motion.

**17. DRY POWDER SYSTEM**

17.1 The secondary media fitted to the vehicle shall consist of powder container fully charged, nitrogen high-pressure cylinder fully charged, control panel and 1x discharge hose reel.

17.2 The powder container shall be manufactured of steel construction, coated internally and externally to the highest quality for maximum protection and safety. the container shall be equipped with a larger diameter filling port to ensure good fluidization of the powder.

17.3 Access to the container for inspection and refilling purposes shall be made possible through hinged panel from the vehicle roof, without removing major components from the vehicle.

17.4 The pressurization system shall provide through mixing of the powder with excellent gas. Provision shall be made for the flushing of the system after use without loss of the remaining powder within the container.

17.5 The control panel containing all the operation levers, gauges shall be located at the left-hand side of the vehicle.



17.6 One hose reel complete with manual rewind mechanism, 30m long hose with trigger operated pistol type powder application shall be provided at the left-hand side of the vehicle.

17.7 Performance/capacity requirement

- |    |                  |                |
|----|------------------|----------------|
| A. | Capacity         | 185kg          |
| B. | Contents         | Monnex powder  |
| C. | Discharging rate | 2.5 to 4kg/sec |

## 18. ELECTRICAL SYSTEM

18.1 The vehicle electrical system shall be negatively earth, fully suppressed for use with radio communication equipment. All circuits shall be protected by suitably rated re-settable circuit breakers giving a visible indication of the fault. The circuit breakers shall be grouped together for convenience

18.2 Wiring shall be numbered at the ends of cables for identification and a battery isolation switch shall be provided adjacent to the batteries.

18.3 The system shall be insulated, waterproofed and protected against exposure from ground fires. All turnings shall be completed with quick disconnecting plugs and socket connections between each module to enable the modules to be easily removed without causing damage to the wiring.

18.4 A battery charger 240V AC with automatic battery balancing facility shall be fitted at the rear of the vehicle. A self-ejecting drive-away socket shall be provided at the rear of the vehicle to supply power for the charger and auxiliary compressor.



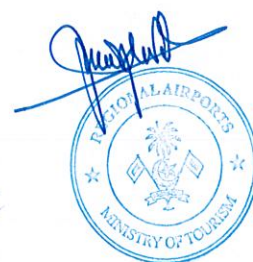
18.5 Electrical lighting / accessories shall be fitted with the vehicle, as listed below

- |    |   |                      |
|----|---|----------------------|
| A. | Sealed / semi sealed beam head lights           | 4Nos,                |
| B. | Side lights                                     | 2Nos,                |
| C. | Tail lights                                     | 2Nos,                |
| D. | Stop lights                                     | 2Nos,                |
| E. | Reversing lights c/w audible alarm              | 2Nos,                |
| F. | High intensity rear fog lights                  | 2Nos,                |
| G. | Direction indicator c/w hazard warning facility | 2Nos,                |
| H. | Cab lights                                      | Appropriate Nos,     |
| I. | Pump compartment lights                         | 2Nos,                |
| J. | Engine compartment lights                       | 2Nos,                |
| K. | Locker lights                                   | 1No. for each locker |
| L. | Road horn                                       | 1No.                 |
- M. A pneumatically operated telescopic lighting mast, controllable from the monitor platform shall be fitted with the vehicle. Two 1000w floodlights shall be mounted on the mast and generator mounted on the vehicle engine shall produce power to the floodlights.

18.6 Warning equipment / accessories shall be fitted with the vehicle, as listed below.

- |    |                            |       |
|----|----------------------------|-------|
| A. | Emergency beacon (RED)     | 2Nos, |
| B. | Airfield obstruction light | 1No.  |
| C. | Audible reverse alarm      | 1No.  |

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D. An Electronic siren with Public Address system containing 3 tones 'Wail, Hi-Lo and Yelp' shall be provided within the cab.

E. Beacon (amber) apron obstruction light.

## 19. COMMUNICATION

19.1 A VHF mobile radio, complete with antennae, speaker, hand microphone etc. shall be fitted in the cab, operable by the driver or right hand crewmember.

Model: Tait Electronics. T373 or ICOM Radio

Frequency ( to be finalise later )

19.2 An intercommunication system shall be provided between the driver and monitor platform and shall include 2 headsets and a third jack connection shall be provided in the engine compartment to assist in maintenance and repair.

## 20. MANUAL OVERRIDE

20.1 Following controls shall be provided with manual override to enable fire-fighting operation to continue should the air pressure fail.

- A. Power takeoff
- B. Water tank valve
- C. Foam tank valve
- D. Monitor valve
- E. Monitor lock/unlock
- F. Monitor rotation and elevation

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## 21. LOCKERS AND EQUIPMENT

21.1 Six equipment lockers, three on each side of the vehicle shall be provided. All lockers shall be enclosed by aluminium roller shutters complete with top, side and bottom seals and lift bar for one hand operation.

21.2 Lockers shall be constructed of aluminium and inside of the lockers shall be left natural with floors in checkmate aluminium. Locker floor shall be sloped forward to facilitate draining.

21.3 Adequate lighting controllable from the driver console shall be provided for all lockers.

21.4 The following rescue and fire fighting equipment shall be supplied with the vehicle and suitable stowage arrangements within the lockers, cab and roof shall be made by the contractor.

A.	Axe, rescue large, non-wedge type	1 No.
B.	Axe, rescue small, non-wedge type	2 Nos.
C.	Bolt cutter, 61cm	1 No.
D.	Crowbar, 95cm	1 No.
E.	Crowbar, 1.65m	1 No.
F.	Flashlights, rechargeable	4 Nos.
G.	Grab or salvaging hook	1 No.
H.	Tool box containing	
	1. Hammer 1.8 kg	
	1. Heavy duty hacksaw	
	1. Adjustable wrench	
	1. Pliers 17.8cm, side cutting	

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1. Pliers, slip joint 25cm

1. Tin snipper

1. Rope line 30m length

1. Set screwdriver assorted

1. Chisel, cold 2.5cm

2. Chocks. 15cm

2. Harness cutting tool

- |    |  |          |
|----|--|----------|
| I. | Powered rescue saw complete with two blades  | 1 Nos.   |
| J. | Pneumatic forcing tool complete with cutter and jaw  | 1 Nos.   |
| K. | Breathing Apparatus set c/w air cylinders CYL-1200<br>Model: Sabre Centurion or Centurion Plus.  | 2 Nos.   |
| L. | Spare BA cylinders. CYL-1200   | 2 Nos.   |
| M. | Fog nozzle (Model: Elkhart Chief 4000-13)  | 2 Nos.   |
| N. | Foam branch (Model: Feecon PV120 or Angus B225)  | 2 Nos.   |
| O. | Hose, delivery 2.5 inch x 100 ft. with 2.5 inch gunmetal coupling.2 Length<br>Model: Duraline  |          |
| P. | Hose, delivery 1.3/4 inch x 75 ft. with 2.5 inch gunmetal coupling<br>Model: Duraline  | 2 Length |
| Q. | Two-section double extension ladder. Aluminium push-up type<br>Extended length 6.1m  | 1 No.    |
| R. | Gas positive pressure smoke ventilator with Honda engine 4 HP<br>14754 CFM, c/w pneumatic wheels, handles and 3 Nos. 18"x20'<br>flexible ducts / adapters. | 1 No.    |
| S. | 14 Oz. Vinyl nylon salvage covers 8'x12'   | 1 Nos.   |



T.	First-Aid kit ( for 20 persons )	1 No.
U.	Hose, suction 4 inch x 8 ft. with round thread gunmetal coupling	2 Nos.
V.	Suction spanner (universal type)	2 Nos.
W.	Suction strainer	1 No.
X.	Basket strainer	1 No.
Y.	Gas detector pocket-size c/w charger (AIM 3250 or equivalent)	1 No.

21.5 No loose equipment, other than foam branch and hoses should not be stowed in the locker, which has foam/water deliveries.

21.6 Equipment stowage arrangements within the lockers, cab and roof shall be done in consultation with this Airport.

21.7 A watertight bulkhead, between equipment locker and foam/water deliveries or first aid hose reel locker shall be provided on both sides. This bulkhead is required to minimize water/foam splashing on equipment stowed in the equipment lockers.

## 22. FINISH AND DECORATION

22.1 Minimum two coats of corrosion resistant compound undercoat and topcoat shall be applied.

22.2 All aluminium alloy panelling shall be painted with etch primer and grey corrosion resistant undercoat. Where aluminium come into contact with dissimilar metal, PVC inhibitor shall be used which shall prevent electrolytic reaction formation.

22.3 Vehicle exterior and wheels shall be etched, primed and shall have a finish of high gloss, foam resistant, acrylic paint - Signal Red RAL3000.

*[Signature]*

*[Signature]*



22.4 Front and rear bumper with bumper turret shall be painted with etched primer undercoat and a finish of two coats of Black RAL9005.

22.5 All locker doors (roller shutters) chrome plated, plastic coated or decorative aluminium alloy components shall remain natural

22.6 Under surfaces of the vehicle shall be protected by an approved anti-corrosive under seal , except where this will interfere with vehicle maintenance.

22.7 Sign-writing (as in the Attachment-B) shall be applied in reflective Scotchlite white lettering on both sides of the vehicle.

## 23 TECHNICAL MANUALS AND INFORMATION

23.1 Two sets of technical manuals in English shall be supplied with vehicle comprising the following;

A. Manuals for the general description, operation and maintenance of complete vehicle including, engine, transmission, chassis, body fire fighting system and comprehensive wiring diagrams etc.

C. Spare parts manuals for engine, transmission, chassis, fire pump, fire fighting system and all other accessories, containing manufacturer's name, type and parts numbers.

23.2 All manuals shall be current addition including any amendments applicable up to the date of delivery, and shall contain drawings/exploded diagrams sufficient for full parts identification and maintenance of all equipment.



23.3 The contractor shall offer detailed technical information on engine, transmission, PTO, chassis, body, cab, tanks, fire fighting and electrical system, etc; required to enable a fair evaluation of the offered vehicle and all it's equipment.

23.4 A detailed scaled technical drawing of the proposed vehicle, showing different dimension, weights of the major components including guaranteed maximum gross vehicle weight shall be provided and is a mandatory requirement.

23.5 All contractors shall complete and forward the Questionnaire in the Attachment-A of this specification and provide a comprehensive update user reference list showing the exact number of proposed type of vehicles that have been sold and in use.

#### 24. SPARE PARTS AND AFTER SALE SUPPORT

24.1 All quick moving spares such as belts, bulbs and filters etc. necessary for the operation of vehicle for two years shall be supplied with the vehicle. List of quick moving spares quoted shall be the approval by the company.

24.2 The contractor shall be able and agree to supply spare parts / components for the vehicle operation up to 10 years from the date of the vehicle commissioning.

24.3 The contractor shall supply one spare complete wheel and tyre with the vehicle.

#### 25. WARRANTY

25.1 The whole vehicle including all major components shall be guaranteed of faulty workmanship for at least 12 months from the date of commissioning.





25.2 Replacement of any component / part, which may become defective during the 12 month warranty period, provided that the component / part is not an item, which would have normally been consumed within that period, shall be carried out by the contractor without cost to this company.

## 26. OPERATIONAL TRAINING

26.1 The contractor shall provide operational training for 6 fire officers at the airport of delivery during vehicle commissioning.

26.2 Operational training shall include tuition and practical on safe operation of the vehicle, daily / weekly, pump and fire fighting system etc. and shall be no shorter than 5 working days.

## 27. TEST AND TRIAL

27.1 Acceptance test shall be carried out by the contractor at his expense and to the satisfaction of inspection officers.

27.2 Provision shall be made by the contractor for two inspection officers to travel and conduct the necessary test and trials of the vehicle at the manufacturers test ground.

The contractor shall provide two-way air tickets, inland transportation expenses within the host country, food and lodging for the two inspection officers during the test and trial period.

27.3 The contractor shall arrange testing on vehicle weight both laden and un-laden, tilt angle testing, fire fighting system including monitor discharge, speed acceleration and braking trials.

27.4 In the event of any test / trial not being acceptable to the inspecting officers, then such test/trial shall be repeated to their satisfaction.

27.5 Inspection officers shall have free access at all times to all sections of the plant concerned with the manufacturing of the vehicle.

## 28. ACCEPTANCE

28.1 Final acceptance of the vehicle shall be subject to its being in accordance with this specification, to the satisfaction of the inspection officer.

END SPECIFICATION