SPECIFICATIONS FOR 6 X 6

1. GENERAL

1.1. SCOPE

1.1.1. This specification describes Airports Company South Africa SOC Limited, requirements for a 6x6 Aircraft Rescue and Fire Fighting Vehicle (ARFFV).

1.2. DESIGN STANDARDS

1.2.1. The design and construction of the vehicle must be suitable for carrying its full load on all types of roads and all-terrain surfaces, and in the vicinity of the airport in all weather conditions.

1.2.2. The design and construction of the vehicle shall comply to the standards in this specification and shall comply with all applicable International Civil Aviation Organisation (ICAO) and National Fire Protection Association (NFPA) standards, including, but not limited to:

- ICAO Annexure 14 Aerodromes Volume 1 Aerodrome Design and Operations;
- ICAO Document 9137: Airport Services Manual Part 1 – Rescue and Fire Fighting, Fourth Edition, 2015;
- NFPA 414; and
- NFPA 701.

1.3. QUALITY OF SUPPLIES

1.3.1. The successful Bidder shall ensure that the supplies are in accordance with and identical to the specifications, drawings and other requirements submitted in the Tender.

1.3.2. All supplies including components and parts thereof, shall be new and unused.

1.3.3. Where specific grades and specific brands of commodities are specified in the specification or submitted in the Tender, such grades and brands shall be supplied.

1.4. WORKMANSHIP

1.4.1. The workmanship used in the manufacture and construction of the equipment and the system covered by this specification, shall be of a consistently high standard and shall comply with ISO 9001 or relevant South African National Standards.

1.4.2. The manufacturer shall ensure that the high standards are maintained throughout the period of manufacture.

1.5. INTERCHANGEABILITY

1.5.1. Interchangeability of components is of major importance to the maintainability of the vehicle and equipment.

1.5.2. Preference shall be given to designs that feature equipment that include components that are interchangeable for ease of service.

1.6. SAFETY

1.6.1. The design of the Aircraft Rescue and Fire Fighting Vehicle and equipment contained thereon, shall take into consideration the need to ensure the safety of all personnel involved in the handling of fire- fighting and rescue equipment.

1.6.2. During the design and manufacture of the Aircraft Rescue and Fire Fighting Vehicle, all aspects of safety including access, equipment operation and service requirements, shall be considered.

1.7. WARRANTEE/GUARANTEE

1.7.1. The Bidder shall warrant that the material and workmanship and the design of the Aircraft Rescue and Fire Fighting Vehicle and associated equipment and guarantees that the Aircraft Rescue and Fire Fighting Vehicle and associated equipment and any component or parts thereof, or the work, for a period of Twenty Four (24) months.

1.7.2. The Bidder shall provide the full details of the Warrantee / Guarantee conditions.

1.7.3. The warrantee shall commence after the delivery and acceptance of the vehicle, which includes the licensing and registration.

1.8 SPARE PARTS

1.8.1 The Bidder shall guarantee the availability of spare parts for the Aircraft Rescue and Fire Fighting Vehicle for a period of fifteen (15) years after the delivery date and acceptance of the vehicle.

1.9. PAINTING

1.9.1. The vehicle shall be painted with a minimum of two (2) coats of high gloss coating, as follows:

(a) Cab, firefighting superstructure and turret cover RAL 3000 RED; and
(b) Chassis, rims, rear view mirrors and brackets, outside step RAL 9005 BLACK.

1.9.2. The cab and body exterior shall be painted with epoxy primer.

1.9.3. The cab and firefighting superstructure body roof shall be covered with anti-skid composite material.

1.9.4. The interior of the cab/crew compartment shall be finished in a gloss enamel meeting the requirements of SABS 630.60, Grade 1.

1.9.5. All items, such as hand grips, door handles, etc shall be metal and matt black finish.

1.9.6. All aluminium anodized roller shutter doors shall be a NATURAL COLOUR.

1.9.7. Details of the sign writing on the sides of the body of the vehicle will be provided by Airports Company South Africa and must be done before delivery to the nominated airport.

1.9.8. Underbody compound must be provided on all chassis and body parts, as required.

1.10. NAMEPLATES

1.10.1. A major equipment identification and sub equipment identification plate shall be fitted inside the driver's cab.

1.10.2. The wording shall be displayed in 6-millimetre-high black characters, in the ENGLISH language only and shall be etched or engraved onto the plate.

1.10.3. A tyre pressure plate shall be fitted inside the driver's cab. Information shall consist of all tyre pressures for all types of terrain.

1.10.4. Etched metal instruction plates, showing the sequence of all operations required to operate the foam producing and water deliveries, shall be fitted in a prominent position in front of the driver.

1.10.5. All instructions shall be in the ENGLISH language.

1.11. ELECTROMAGNETIC RADIATION

1.11.1 All electrical components fitted to the vehicle shall be suppressed and bonded to eliminate interference to the radio reception.

1.12. OWNERSHIP AND RISK

1.12.1 Ownership and risk of all loss, damage and / or destruction in and to the Aircraft Rescue and Fire Fighting Vehicle and associated equipment, shall remain vested with the successful Bidder until it has been registered and licensed in the name of Airports Company South Africa Soc Limited, delivered to Airports Company South Africa's nominated airport, and accepted by the Airports Company South Africa, where after ownership and risk shall pass to the Airports Company South Africa.

1.13. DEVIATIONS AND SUBSTITUTIONS

1.13.1 The successful Bidder shall adhere strictly to the provisions of this specification and shall not deviate therefrom.

1.14. TECHNICAL DOCUMENTATION

1.14.1. All technical documentation shall be supplied in the ENGLISH language.

1.14.2. The Bidder shall be required to supply the three (3) hard copies and one (1) soft copy of all the technical information, manuals and documentation necessary to enable the Airports Company South Africa to operate and maintain the Aircraft Rescue and Fire Fighting Vehicle and firefighting equipment in accordance with the manufacturer's requirements, for the life span.

1.14.3. The technical documentation shall include, but not limited to:

(a) Vehicle logbook;
(b) Operational Manual for Fire Fighting Superstructure;
(c) Operational Manual for Chassis;
(d) Operations Manual for Equipment supplied with Vehicle;
(e) Maintenance Manual for Fire Fighting Superstructure:
(f) Maintenance Manual for Chassis;
(g) Layout Drawings;
(h) Axle Weight Distribution Drawing; and
(i) Layout of the expanded view of the pump in colour.

1.14.4. The Bidder shall supply all revisions and updates, technical bulletins and any other relevant information necessary to operate and maintain the Aircraft Rescue and Fire Fighting Vehicle and equipment in accordance with the manufacturer's requirements.

1.15. **EXPORT AND IMPORT PROVISIONS**

Where the equipment or vehicle or any component or part thereof, is imported from outside South Africa:

1.15.1. It shall be imported in the name of the successful bidder;
1.15.2. The successful Bidder shall ensure that the provisions of any law or regulation prohibiting the importation into South Africa of certain insects, fungi, disease or pests by way of certain types of packing materials and containers are complied with and that guarantee or certificate which may be required in terms of such law or regulation be obtained and provided at the Bidder's expense;
1.15.3. Where the successful Bidder fails to comply with the provisions of the law or regulation and as a result thereof the consignment are seized, destroyed or delayed at the port of entry or elsewhere in South Africa, the successful Bidder shall be liable for any delays, demurrage charges or any other loss arising out of such seizure, destructions or delays;
1.15.4. Airports Company South Africa is not liable for any losses suffered or expenditure incurred by the successful Bidder or any other person (including losses suffered or expenditure incurred in respect of the manufacture, supply, transport or delivery of the Aircraft Rescue and Fire Fighting Vehicle and associated equipment) due to government of the country of origin of the supplies on strength of existing legislation failing or refused to grant an export licence or cancelling an export licence that has been issued; and

1.15.5. The successful Bidder shall apply to the South African National Department of Transport and obtain a “Principle Approval Letter” in accordance with the South African National Road Traffic Act, Act 93 of 1996, as amended, prior to manufacturing and importing the Aircraft Rescue and fire Fighting Vehicle to South Africa.

1.16. INSURANCE

1.16.1. Where the Aircraft Rescue and Fire Fighting Vehicle is imported into South Africa, it shall be imported on a basis of Delivered Duty Paid(DDP)to be delivered at the final destinations at the airports, as nominated by the Airports Company South Africa.

1.16.2. The successful Bidder must have a valid and effective insurance contract with a reputable insurance company, covering the Aircraft Rescue and Fire Fighting Vehicle and associated equipment for the whole transit contemplated and for the purchase price plus 10 % (ten percent) of the purchase price.

1.16.3. Insurance shall cover all possible maritime risks / institute cargo clauses “all risk WPA”. All risks and physical loss and / or damage from any external cause irrespective of percentage specifically including war, storage, breakage, theft, pilferage, fire, R.S.C.C. and non-delivery from warehouse to warehouse.

1.16.4. The Insurance requirements for servicing and maintenance on the ACSA fire trucks are;

Service providers must produce proof of insurance in the form of an insurance certificate, before the contract is signed, for the following:

(a) Motor Traders insurance for a limit not less than R10 million each and every claim, to cover damage to the fire trucks and theft whilst the engines are under the service provider’s care, custody and control.

(b) List the fire engines in the service provider’s Assets policy for a limit not less than R10 million each and every claim, to cover for damage caused by fire, lightening, and explosion whilst the fire trucks are under the service provider’s care, custody & control.

Proof of insurance in the form of insurance certificates must be submitted to ACSA before the contract is signed.

1.17. ON SITE TRAINING PLAN

1.17.1. Bidders shall submit an On-Site Training Plan that shall be conducted at the specific airport.

1.17.2. Training must be conducted at each specific airport where the Aircraft Rescue and Fighting Vehicle will be delivered.

1.17.3. A Training Plan for a central location will not be considered and accepted, as the fire fighters need to be available at the respective airports.

1.17.4. The on-Site Training Plan shall be for a duration of ten (10) days and shall comprise of theoretical training for a minimum of five (5) days followed by practical training for a minimum of five (5) days and shall include formative and summative assessments, but not limited to:

(a) Driver Training;
(b) Operational Training on the chassis and firefighting system;
(c) Basic training on the use of the Rescue equipment and related maintenance;
(d) Basic Maintenance Training on the chassis and firefighting system;
(e) Trouble Shooting on the chassis and firefighting system; and
(f) Hot Exercise using Vehicle and Equipment.

1.17.5. The training shall be conducted by a qualified factory engineer who has a minimum of five (5) years' experience.

1.17.6. Bidders shall submit proof of the factory engineer's qualifications and experience.

1.18. PREPARATION FOR DELIVERY

After the delivery of the registered and licensed Aircraft Rescue and Fire Fighting Vehicle to the nominated airport, the successful Bidder shall:

1.18.1. Carry out an inspection of all loose equipment and ensure that they are securely stowed.

1.18.2. Carry out a pre-delivery service prior to the vehicle being used for airport operations. The pre-delivery service shall include, but not limited to:

(a) All grease points shall be checked;
(b) All pump operations shall be checked;
(c) Checks shall be made to ensure all electrical circuits are operational;

(d) Tyres shall be inflated to the required pressures;
(e) Wheel nuts shall be torqued to the manufacturer's specifications;
(f) Engine checks; and
(g) Leak detection inspections/tests on water and foam tanks.

1.18.3. Clean and polish the vehicle after the pre-delivery services.
1.18.4. Issue Airports Company South Africa with the following certificates:

(a) Letter from the South African Bureau of Standards;
(b) Vehicle roadworthy certificate;
(c) Vehicle registration and license certificate;
(d) Certificate of fitness; and
(e) Letter from the South African Department of Transport confirming that the "Principle Approval" application has been approved.

1.19. **VEHICLE REGISTRATION AND LICENSING**

1.19.1. The successful Bidder shall be responsible for the registration and licensing the Aircraft Rescue and Fire Fighting Vehicle.
1.19.2. The Aircraft Rescue and Fire Fighting Vehicle shall be registered and licensed in the name of Airports Company South Africa Soc Limited and in the city of the nominated airport.
1.19.3. The Aircraft Rescue and Fire Fighting Vehicle must be registered and licensed prior to being delivered to the nominated airport.
1.19.4. Unlicensed and unregistered Aircraft Rescue and Fire Fighting Vehicles must not be delivered to the nominated airport and will not be accepted by the Airports Company South Africa.

2. HUMAN ENGINEERING

2.1 The design of the Aircraft Rescue and Fire Fighting Vehicle shall be designed to conform to human factor engineering principles for 5 – 95 percentile man wherever possible.
2.2 Particular attention shall be given to the design location of controls and instruments at the operator's station.
2.3 Special consideration shall be given to increase efficiency by simplifying maintenance tasks that cannot be eliminated.

2.4 Seats

2.4.1 The driver's seat shall be fully adjustable to suit both tall and short persons.

2.4.2 All seats shall be designed to fit the back and buttocks of the 5 – 95 percentiles.

2.5 Controls

2.5.1 The steering control to the driver's seat relationship, shall be designed to permit safe, easy and comfortable driving.

2.5.2 The control function shall require as few body movements as possible.

2.5.3 All successive control movements shall be interrelated, one movement passing easily into the next.

2.5.4 All controls, intended for rapid sequential operation, shall be designed to include uniform directional motion.

2.5.5 Methods used to prevent accidental activation of controls, shall not increase the time required to operate the control to a level that would be detrimental to the safe operation of the Aircraft Rescue and Fire Fighting Vehicle.

2.5.6 Activation of a control shall not obscure any visual display or control.

2.5.7 Controls, including the brake and throttle controls, shall be located in a manner that ensures ease of operation.

2.5.8 The foot throttle shall be located so as to ensure that the driver, with a minimum of effort and movement, can remove his foot from the control and apply the foot brake.

2.5.9 The instrument panel shall be located in a position that ensures that it can be clearly observed and monitored from the normal driving position.

2.5.10 Visual or audible indicators, designed to signify possible malfunctions relating to engine temperature, oil pressure, air pressure, etc shall be provided where practical and shall be clearly discernible to the driver.

2.6 Displays

2.6.1 All visual displays intended for the conveying of information to the driver, shall be kept to a minimum and only provided where information is necessary for the safe operation of the vehicle.

2.6.2 If scale interpolation is required, it shall not introduce a probability of operator error that is greater than the operator's tasks permits.

2.6.3 Displays shall be simple in design and shall present visual information in the most immediate and meaningful form, no explication decoding shall be required.

2.6.4 Symbol type displays shall be used where practical.

2.6.5 Information relating to different types of activities, operation or maintenance, shall not be combined unless such activities require the same information.

2.6.6 Tools shall be located in a position easily accessible to the driver.

2.6.7 Non-skid decking shall be provided for safety.

2.6.8 All equipment shall be designed to permit easy access, to reduce wear, and to facilitate ease of maintenance to all items or functions, which are, or must be manipulated for operation, servicing or maintenance in compliance with the Human Engineering standards.

3. QUALITY ASSURANCE

3.1 GENERAL

3.1.1 All major components and sub-assemblies shall be tested and inspected prior to assembly.

3.1.2 `The Aircraft Rescue and Fire Fighting Vehicle shall undergo a complete inspection to ensure that all the requirements of this specification have been attained.

3.1.3 ISO 9001 standards shall be used for Quality Assurance Procedures.

3.1.4 Bidders must be ISO 9001 certified and shall submit proof of their ISO 9001 certification.

3.1.5 The successful Bidder shall be responsible for all tests and inspections of the assembled vehicle and in addition, shall be responsible for the test and inspection of all major components of the unit prior to assembly.

3.1.6 All components used in the construction of the Aircraft Rescue and Fire Fighting Vehicle shall undergo acceptance tests to ensure compliance with the manufacturer’s specifications.

3.1.7 All test results shall be made available at the factory acceptance testing on request by Airports Company South Africa.

3.2 QUALITY CONFORMANCE INSPECTIONS

3.2.1 The success Bidder will be required to provide and maintain an effective inspection or Quality Assurance System.

3.2.2 The Bidder shall submit a description of the Quality Conformance Inspections.

3.3 CLIENT VERIFICATION

3.3.1 All Quality Assurance operations performed by the successful Bidder, may be subject to the Airports Company South Africa verification at unscheduled intervals.

3.3.2 Verification may consist of:

(a) Surveillance of the operations to determine that practices, methods and procedures of the written inspection plan are being properly applied;

(b) Airports Company South Africa inspections to measure quality of the product offered for acceptance; and

(c) Deviations from the prescribed or agreed upon procedures, or instances of practices which might have an adverse effect upon the quality of the product, will be immediately brought to the attention of the successful Bidder.

3.3.3 Failure by the successful Bidder to promptly correct defects reported shall be cause for the immediate suspension of acceptance until corrective action has been taken or until conformance of the product to the specified criteria has been demonstrated.

3.4 FACTORY ACCEPTANCE TEST

3.4.1 Prior to the delivery/shipment of the Aircraft Rescue and Fire Fighting Vehicle, each unit and associated equipment, shall be subjected to a Factory Acceptance Test.

3.4.2 The factory acceptance test shall be conducted by one (1) Airports Company South Africa representative, per vehicle, unless otherwise advised in writing by Airports Company South Africa.

3.4.3 The Bidder shall make provision for the costs for full board hotel accommodation and travelling between the hotel and factory, for the one (1) Airports Company South Africa representative, per vehicle, should this require International travel.

3.4.4 The factory acceptance tests shall be done in accordance with the manufacturer’s quality control programme and shall meet the minimum ICAO and NFPA standards.

3.4.5 The successful Bidder shall provide inspection assistance as may be requested or required by Airports Company South Africa.

3.4.6 At the time of the inspection, the successful Bidder shall make available his inspection plan, inspection records and any certification pertinent to the units and its components.

3.4.7 The factory acceptance test shall be conducted over a minimum period of three (3) days.

3.4.8 The factory acceptance tests shall include, but not limited to the following tests:

3.4.8.1 Vehicle

(a) Dimension check;
(b) Weight measuring, fully loaded and empty;
(c) Road test, including acceleration, top speed test and cooling system;
(d) Brake test;
(e) Turning diameter;
(f) Electrical system; and
(g) Complete functional test.

3.4.8.2 Fire Fighting System

(a) Pump test;
(b) Water and foam tank capacities;
(c) Fire Fighting System test, including turret performance;
(d) Proportioning system calibration check;
(e) Foam quality test;
(f) Equipment test;
(g) Complete functionality test;
(h) Dry Chemical Powder Testing;
(i) In manual mode, these need to be tested manually; and
(j) Pump and drive test.

3.4.9 Failure of the initial unit or any other unit to meet these specifications during the factory acceptance tests, may result in Airports Company South Africa refusing to accept all similar units, until such time that all corrective action can be proved to have been taken.

3.4.10 On successful completion of the factory acceptance test of each of the Aircraft Rescue and Fire Fighting Vehicles with associated equipment, the successful

Bidder shall issue a Test Inspection Certificate, which shall be signed by both Parties.

3.5 VEHICLE WEIGHT

3.5.1 Where a number of Aircraft Rescue and Fire Fighting Vehicles are ordered, one of the initial production units, on completion, shall be weighed in order to determine the curb weight and the distribution of the kerb weight on the front and rear axles.

3.5.2 The imposed loading on the front and rear axles shall be computed and measured using the kerb weight and payload described herein to provide the specific Gross Vehicle Mass.

3.5.3 Calculated and measured loads on the front and rear axles shall be utilised to ascertain that the suspension axles and tyres furnished, are of adequate capacity.

3.6 CONFORMANCE VERIFICATION

3.6.1 All air lines, hydraulic lines and fittings shall be inspected at the place of manufacture.

3.6.2 Installations shall be checked to ensure that the fittings are properly assembled and that no chafing with adjacent parts of the body of the vehicle is evident.

3.7 TEST FAILURE

3.7.1 Where an Aircraft Rescue and Fire Fighting Vehicle fails to pass the any acceptance test, Airports Company South Africa will stop the acceptance of subsequent units until evidence has been provided by the successful Bidder, that corrective actions have been undertaken and that the defects have been rectified.

3.7.2 Where the successful Bidder does not take corrective action and rectify the defects in a reasonable time, the Airports Company South Africa reserves the right to terminate the contract.

4. VEHICLE CHARACTERISTICS

4.1 VEHICLE PERFORMANCE

4.1.1 The Aircraft Rescue and Fire Fighting Vehicle, under full load conditions and complete with the maximum crew, shall meet the following requirements at an altitude of 800 meters above sea level:

(a) Accelerate from a standing start, to a speed of 80 kilometres per hour within a maximum of 35 seconds at the normal operating temperature;
(b) Achieve a top speed of a minimum of 113 kilometres per hour;
(c) Maintain a constant speed of 100 kilometres per hour on dry roads, for a distance of 100 kilometres without overheating;
(d) Operate at a cruising speed of 80 kilometres per hour for a distance of 250 kilometres without overheating;
(e) Operate continuously at full pump capacity for a minimum of five (5) hours without overheating;
(f) Ascend and descend an incline with a 50% gradient, maintain water delivery of 85% rated capacity on ascend and descend of 30% and 20% side slope.
(g) Operate continuously at a speed of 25 kilometres per hour when travelling over all types of terrain of cross-country terrain;
(h) Minimum angle of approach and departure of 30 ° (degrees);
(i) Minimum angle of tilt (static) 28 ° (degrees);
(j) Capability of pump and roll at different speeds without having to stop the vehicle;
(k) The performance of the service brake shall comply with ICAO and NFPA requirements; and
(l) The vehicle wall to wall turning diameter shall not be less than three times the length of the ARFF vehicle.

4.1.2 Bidders must submit full technical information of the vehicle offered. The information must include all the relevant details relating to the engine, transmission, gearbox, suspension, axles and road wheels, forming a standard part of the vehicle.

4.1.3 Bidders must submit performance diagrams and calculations.

4.2 VEHICLE PHYSICAL CHARACTERISTICS

4.2.1 GROSS VEHICLE MASS

(a) Bidders are required to submit the estimated gross vehicle mass of the completed vehicle and the estimated axle load distribution.

(b) The axle load distribution shall comply with the South African National Road Traffic Ordinance and Regulations.

(c) Where the gross vehicle mass and / or axle load distribution exceed the permissible limits of the South African National Road Traffic Ordinance and Regulations, the successful Bidder shall apply to the South African National Department of Transport for “Principle Approval” or obtain and exemption, prior to the manufacture and import of the vehicle.

4.2.2 **VEHCILE DIMENSIONS**

(a) Bidders are required to submit a general arrangement drawing (plan view, front view, side view and rear view) of the complete vehicle indicating all the relevant dimensions including the wheelbase, overall length, height, width, approach and departing angles, etc.

(b) The dimensions of the vehicle shall comply with the South Africa National Road Traffic Ordinance and Regulations.

(c) Where the dimensions of the vehicle exceed the permissible limits of the South African National Road Traffic Ordinance and Regulations, the successful Bidder shall apply to the South African National Department of Transport for “Principle Approval” or obtain and exemption, prior to the manufacture and import of the vehicle.

(d) Notwithstanding the maximum external dimensions of a vehicle of the nature, as outlined in the South African National Road Traffic Ordinance and Regulations, in order to accommodate the vehicle in the existing fire stations, the vehicles shall not exceed the following dimensions:

(1) Width: 3,000 millimetres (excluding both side mirrors)

(2) Height: 3,700 millimetres (including roof turret)

(3) Length: 12,000 millimetres (including front bumper monitor)

4.2.3 **TRANSPORT AND STORAGE**

The design of the vehicle shall take into consideration the need to ensure that all the equipment, whether loose or fixed, will remain in a secured position during travel over rough terrain.

4.2.4 **REALIABILITY**

The materials used in the construction of the vehicle shall be selected for their proven reliability in service. This requirement shall include all the equipment and ancillary equipment forming an integral part of the finished vehicle.

4.2.5 **MAINTAINABILITY**

4.2.5.1 The design of the vehicle and the selection of the components, shall take into consideration the following requirements:

(a) Design characteristics shall include minimum practical preventative and in store maintenance;
(b) The design shall provide easy access for maintenance using a minimum of tools, equipment and supplies;
(c) Equipment and components shall incorporate self-adjusting mechanisms where practical;
(d) Permanent lubrication to the maximum practical extent;
(e) A minimum variety and quantity of replacement and repair parts;
(f) Readily accessible test points for automated checking of components where practical;
(g) Scheduled maintenance servicing shall be on an annual basis;
(h) All major components of the vehicle, including the engine, transmission, axles, suspensions, etc shall be designed and selected on the basis that they are maintenance free, except for the scheduled maintenance services; and

(i) Schedule maintenance servicing shall be done in accordance with the original equipment manufacturers recommended service intervals.

4.2.5.2 Bidders shall provide a schedule of frequency of scheduled maintenance and the designed mean downtime for unscheduled maintenance.

4.2.6 **ENVIRONMENTAL CONDITIONS**

(a) The vehicle will be required to operate in conditions that will vary from desert conditions to areas of high humidity in sub-tropical regions and shall be capable of being operated continuously in ambient temperatures that will range from minus 15 °Celsius to plus 50 °Celsius.

(b) All components shall be adequately protected from corrosion as the vehicles will be operating in high humidity in sub-tropical conditions at the coastal areas.

(c) Bidders are required to submit the temperature ranges in which the vehicle is designed to operate.

(d) All components selected for the manufacture of the equipment shall be suitable for operation within the stated temperature range.

5. VEHICLE CHASSIS DESIGN

5.1 GENERAL REQUIREMENTS

5.1.1 Bidders are required to submit full technical details of the chassis, engine, gearbox, axles and road wheels, including any modifications that will apply to the basic chassis on which the firefighting system will be built.

5.1.2 The chassis shall be purposely built. No modified commercial chassis shall be used. Preference shall be given to chassis in the same family as the 6 x 6-wheel drive and 8 x 8-wheel drive chassis for compatibility reasons.

5.1.3 The chassis frame shall be constructed from channel sections of adequate strength and dimensions to with stand heavy duty usage and the demands of an Aircraft Rescue and Fire Fighting Vehicle.

5.1.4 The Bidders shall submit proof that the chassis is purposely built for use as an Aircraft Rescue and Fire Fighting Vehicle.

5.1.5 The chassis shall be corrosion resistance.

5.1.6 The engine compartment shall be manufactured from a fire and corrosion resistant material.

5.1.7 A heavy duty bush pusher shall be fitted and attached to the front ends of the chassis longitudinal members.

5.1.8 Two horizontal mounted “D” towing and lifting eyes, capable of accepting a rod of 32-millimetre diameter, shall be mounted to the front and rear of chassis.

(a) The eyes shall be mounted in line with and shall be attached to the ends of the longitudinal chassis members.

(b) Each eye shall be capable of withstanding 25% of the gross vehicle mass, either under normal or suspended tow.

(c) A safety factor of a minimum of seven (7) shall be incorporated into the design of the eye, based upon the ultimate tensile strength of the material used.

5.2 ENGINE

5.2.1 The vehicle shall be powered by a water-cooled high-performance diesel engine of the in-line/V configuration and the vehicle shall be capable of meeting all performance requirements in section 2.1, at 800 meters above sea level.

5.2.2 The engine shall be a low emissions engine and comply with the highest available emissions standards (Euro 5 Compliant).

5.2.3 The engine shall be capable to operate using diesel with a sulphur content of 10 parts per million, 50 parts per million and 500 parts per million.

5.2.4 The Bidders shall confirm that the engine will be capable to operate using all diesel types available in South Africa.

5.3 ENGINE COOLING SYSTEM

5.3.1 The engine shall be water cooled suitable to operate at an ambient temperature between minus 17,8 °Celsius to plus 43,3 °Celsius .

5.3.2 The engine cooling systems shall be designed such that there is fresh air flow to the radiator, particularly engines that are rear mounted.

5.3.3 The radiator reservoir tank shall be designed for easy filling access.

5.3.4 Drain cocks shall be fitted at the lowest point of the vehicle's cooling system and at such points as may be necessary for the draining of the system.

5.3.5 A red warning light shall be provided within the cab for the engine. The light shall be designed to give visual warning of low coolant levels within the cooling system.

5.3.6 The vehicle shall be capable of travelling over long distances without overheating occurring.

5.4 AIR INTAKE FILTER

5.4.1 The engine shall be provided with highly efficient air cleaners provided with restrictor indicators.

5.4.2 Consideration shall be given to the excessive dust conditions found in various areas of South Africa and to air borne embers during grass fires.

5.5 FUEL FILTERS

5.5.1 Fuel filters capable of removing water and sediment having particle sizes larger than four (4) microns, shall be fitted between the fuel tank and the injector pump.

5.5.2 In addition, a detachable filter shall be inserted into the fuel filter neck.

5.6 FUEL TANK

5.6.1 A certified fuel tank, having a minimum capacity of 300 litres, shall be fitted.

5.6.2 The fuel tank shall be mounted in a position that protects it from damage caused by the flexing of the chassis and heat produced by the engine.

5.6.3 The fuel tank shall be provided with an easily accessible drain plug.

5.6.4 The filler opening shall be easily accessible and shall not be higher than 1,5 meters from the ground and be provided with a lockable cap.

5.6.5 The filler shall be designed to enable the tank to be filled by means of 25 litre drums without having to use a funnel.

5.6.6 The fuel tank shall be constructed of corrosion resistant material.

5.7 EXHAUST SYSTEM

5.7.1 The vehicle shall be provided with an efficient exhaust and silencer system.

5.7.2 The tail pipes shall be sized to avoid undue increases in back pressure and shall be positioned to ensure that the entrance of the exhaust fumes into the cab is avoided under all conditions

5.7.3 The position of the exhaust system shall not disrupt the foam blanket, or the pump operators.

5.7.4 The exhaust shall be fitted with a Selective Catalytic Reduction (SCR) technology.

5.7.5 The exhaust system shall comprise of a stainless-steel pipe and muffler.

5.7.6 The vertical exhaust pipe shall extend to prevent blackening of the cab and shall be fitted with a rain flap.

5.8 MAIN TRANSMISSION

5.8.1 A fully automatic transmission shall be provided with a minimum of five (5) forward speeds, operated by an electrically driven or hydraulic / pneumatic gear shift with lock up torque convertor, shall be provided.

5.8.2 A Power Take Off (PTO) system to drive the fire pump.

5.8.3 In the event of automatic gear control failure, an alternative option to manually select a gear shall be provided.

5.8.4 A hydraulic retarder or engine brake shall be fitted.

5.9 TRANSFER CASE

5.9.1 The transfer case shall be equipped with a driver operated lockable differential between the front and rear axles.

5.9.2 Each axle must have a separate differential-lock system

5.10 DIFFERENCIAL LOCKS

5.10.1 The minimum requirement relating to differential locks are as follows:

(a) Differential inter axle lock in transfer case; and
(b) Differential inter wheel locks on rear axles.

5.11 SUSPENSION

5.11.1 The suspension shall be capable of handling all types of terrain at high speeds and transition from smooth surfaces to rough terrain.

5.11.2 The suspension shall consist of a variable high-performance single coil spring suspension with shock absorbers and a stabilizing bar to ensure superior all terrain capability.

5.12 STEERING

5.12.1 The vehicle shall be a right-hand off-centre drive.

5.12.2 The steering system shall be power assisted and shall be self-correcting.

5.12.3 The steering wheel shall have a horn button, and the steering column fitted with turn signal switches and light beam switches.

5.12.4 An auxiliary power system shall be provided, in the event of a failure of the engine driven pump.

5.13 WHEELS AND TYRES

5.13.1 The vehicle shall be designed to provide for all wheel drive with tyres capable of carrying the vehicle over all -terrain surfaces.

5.13.2 Single wheels shall be provided.

5.13.3 The wheels and tyres shall be designed, constructed, sized and mounted to assure maximum traction and floatation, and the performance of the vehicle.

5.13.4 The wheels shall be of the disc type fitted with dual purpose tread pattern radial tyres.

5.13.5 All wheels and tyres shall be interchangeable between all rear and front axles.

5.13.6 A complete spare wheel and tyre (and tube), interchangeable with all rear and front axles, shall be provided. It must be noted that the spare wheel and tyre need not be fitted to the vehicle but may be supplied as a loose item.

5.13.7 Wheels and tyres must be readily available in South Africa at the various cities where airports and located.

5.14 BRAKES

5.14.1 The braking system shall be fitted with Anti-Lock Braking System (ABS) and shall comply with ICAO requirements.

5.14.2 The braking system shall be designed to be free of all environmental elements.

5.14.3 The front and rear brakes shall be fitted with drum or disc brakes

5.14.4 **Service Brake**

(a) The service brakes shall operate on all wheels and shall be air operated.

(b) The performance of the service brake shall comply with ICAO and NFPA stopping distance requirements.

(c) The service brake shall be capable of holding the vehicle stationary on a 45 % slope when fully laden.

5.14.5 An emergency, pressure operated system shall also be fitted to ensure that the minimum required air pressure is provided for within the system when the vehicle is not operational to ensure the immediate drive off capability of the vehicle.

5.14.6 In addition to the emergency pressure operated system, a spring actuated emergency brake that can be released manually, shall be installed.

5.14.7 **Hand Operated Parking Brake**

(a) An independent hand operated parking brake, capable of holding the vehicle stationary on a 18% slope when fully laden, shall be provided.

(b) The braking system shall be designed to ensure that the hand operated parking brake can be applied under all operating conditions and temperatures.

5.14.8 **Visible and audible warning devices shall be fitted in the driver's cab.**

(a) The devices shall warn the driver that the air pressure has fallen to a low level.

(b) The warning shall be designed to self-actuate before the pressure falls to a level that makes it impossible to operate the brakes.

(c) An emergency brake release should be fitted in the cab at the driver's side.

5.14.9 Two (2) C type couplings, complying to the requirements of BS AU 138A, complete with dust covers, shall be provided and installed at the front and the back of the vehicle, behind the bumpers.

(a) The couplings shall be connected to the braking system to provide power for braking from a towing vehicle should the Aircraft Rescue and Fire Fighting Vehicle become a casualty.

(b) The service coupling shall be painted yellow.

(c) The emergency coupling shall be painted red.

5.14.10 The compressor supplying air to the brakes, shall be capable of building up to a working pressure in a minimum of time from a cold start.

5.14.11 A take-off shall be provided on the air reservoir for tyre inflation complete with a tyre inflator hose and pressure gauge. The point shall be clearly identified.

5.14.12 An automatic water drain valve shall be fitted on each air reservoir.

5.15 ELECTRICAL SYSTEM

5.15.1 The chassis and lighting system shall be 24 volts.

5.15.2 Batteries

(a) Batteries shall be of the standard heavy-duty maintenance free type and must be readily available in South Africa.

(b) The batteries shall be stored in a closed battery box outside the vehicle, having doors fitted with louvres positioned to prevent the ingress of moisture during wet conditions.

(c) The interior of the box shall be lined with fibreglass and the doors shall be painted with epoxy tar to SABS 0801. Acid resistant weather strips shall be fitted to the doors.

(d) The batteries shall not be installed in the driver's cab.

(e) The batteries shall be stowed in a readily accessible position to facilitate servicing and on a pull-out tray configuration, if it cannot be easily accessed.

(f) A battery disconnect / isolator switch shall be installed in cab.

5.15.3 **Alternator**

(a) A heavy-duty alternator shall be provided.

(b) One ammeter shall be connected and installed into the instrument panel fitted within the cab.

5.15.4 **Reverse Polarity Protective System**

(a) Reverse polarity protective system shall be fitted in the charging circuit to obviate damage to the alternator and/or electrical system should the batteries be accidentally fitted with the polarity reversed.

5.15.5 **Electrical Circuits**

All the important electrical circuits shall have separate circuit breakers which shall be identified and mounted with a box.

5.15.6 **Markings or Switches**

(a) All switches shall be clearly marked on plates, in the ENGLISH language, to indicate their "On/Off" positions and function of the switch, or by internationally approved symbols.

(b) Only one switch for both on and off functions shall be used.

(c) Markings or symbols shall be engraved on a durable material which shall be of adequate thickness and shall be attached by means of screws, rivets or spring fasteners.

(d) All switches shall be positioned within easy, and convenient reach of the driver.

5.15.7 **Ignition System**

(a) The ignition system shall be provided with an engine “START / STOP” keyless switch located in the cab which is easily accessible by the driver.

(b) In addition to the above, an engine “START” button shall be provided on the outside, on the left-hand side and right-hand side of the cab, in close proximity to the door handle.

5.15.8 **Electrical Fittings**

(a) A battery charging unit for the recharging of the vehicle batteries, shall be provided and installed within the cab. The battery charger shall be suitable for connection to an external supply of 220 volts (South African standard three (3) point outlet plug.).

(b) Install one (1) 220 volt electrical three (3) point outlet plug in accordance with South African standards.

(c) An “on charge” warning light shall be installed into the instrument panel. The warning light shall indicate when the charge is in operation.

(d) The supply sockets for the slave start and the battery charger shall be positioned at the rear of the vehicle. The socket shall be clearly identified. The slave start plug shall be capable to accommodate “Hobart” aircraft starting plug.

(e) The connection for the battery charger shall be of the self-ejecting plug type, designed to enable the driver to pull away in an emergency without having to manually disconnect the plug.

(f) Two (2) loose 20-meter cables, complete with plugs compatible with the self-ejecting sockets mentioned shall be supplied with the vehicle.

(g) Five (5) working lights shall be installed on the upper part of superstructure on each of the left-hand side and right-hand side of the vehicle.

(h) Four (4) red air traffic warning lights(two on each side of vehicle) shall be installed on top of the superstructure.

(i) Two (2) red LED rotating beacon lights shall be installed on the top of the cab and two (2) red LED rotating beacon lights shall be installed on the top of the rear compartment of the vehicle.

(j) Two (2) directional indicators shall be installed in the front of the vehicle and two (2) directional indicators shall be installed at the rear of the vehicle.

(k) Two (2) reverse lights shall be provided and shall be operated by the selection of the reverse gear.

(l) A reverse buzzer shall be installed in the vehicle and shall be clearly auditable to the driver and persons outside the vehicle.

(m) A reverse camera with monitor shall be installed in the cab of the vehicle.

(n) Park distance control sensors shall be installed at the rear of the vehicle.

(o) A warning device, emitting the acceptable Whelp type and three tone horn sounds, incorporating a Public Address System having an output of not less than 12 watts, shall be fitted. The control Unit and microphone shall be easily accessible to the driver/operator.

(p) An inspection lamp socket, of an approved type, shall be mounted to the rear bulkhead of the cab. The socket shall be clearly identified in the ENGLISH language. An inspection lamp fitted with a lead of at least 1,5 times the length of the vehicle, shall be provided.

(q) “Hella” or similar fog lights shall be fitted to the front of the vehicle.

(r) One or more “Hella” or similar, red revolving beacon lights shall be fitted to the top of the vehicle. The number shall be advised to the successful Bidder. The lights shall not interfere with the monitor.

(s) Two (2) or more lights shall be provided within the engine compartment. The lights shall be fitted to either side of the engine and shall be controlled by a switch positioned in the engine compartment and identified in the ENGLISH language.

(t) A light, positioned to illuminate controls, gauges, etc fitted into the firefighting control panel shall be provided and installed.

(u) The lighting shall be controlled by a switch mounted into the panel.

(v) Two (2) Airband radio transmitter/receiver shall be provided and mounted / fitted complete with headphones. The successful Bidder will be provided with the further details of the Airband radio.

(w) The headphones and all radio controls shall be easily accessible from the driver’s position.

(x) A speaker shall be provided within the cab to enable the crew to monitor radio traffic.

(y) Two (2) removeable high intensity spotlights (not LED), having a minimum capacity of 200 watts and a diameter of 150 millimetres, shall be provided and mounted to the front of the cab. The spotlights shall be adjustable in all planes.

(z) An elevated light mast, at least 5,5 meters from the ground level, fitted with LED lamps having a rated output of not less than 4 x 50 watts. The invertor shall be able to power other electrical rescue equipment. The light mast should have the capability to rotate 360^0 and have remote control capability. The remote control must be waterproof and stored in enclosed waterproof compartment and a fixed panel with switches to operate the light mast. The elevation mast shall be capable of elevation by pneumatic means. The mast shall automatically be lowered when a gear is engaged. A warning light and audible device shall be installed in the interior of the driver's cab to alert the driver that the light mast is elevated.

(aa) A master switch, capable of controlling the complete electrical system and equipment, including the vehicles engine, shall be provided and installed within the cab in easy reach of the driver. The master switch shall bypass the radio, to ensure that the radio is capable of being operated when the master switch is in the "OFF" position.

6. VEHICLE CAB DESIGN

6.1 CAB DESIGN

6.1.1 The cab shall be designed to provide maximum safety and protection to the crew and provide a crash test Certificate ECE R29-3 or equivalent as per the latest regulation for the 6X6 crew cabin from an authorised certified body.

6.1.2 The cab must be designed to ensure the driver has all-round visibility and effective control of all critical firefighting functions including control of the roof turret, front bumper turret, ground sweep and under truck nozzles.

6.1.3 The cab layout with a cockpit style instrument panel with switching and controls must be logically placed.

6.1.4 The use of status indicators on the instrument panel, using illuminated devices and audible devices to denote the availability of a facility or function or the operation of a control must be fitted.

6.1.5 The use of symbols on the instrument panel, should be used to minimize the need for interpretation of wording or the operation of a control.

6.1.6 The cab must be spacious and designed to ensure safe and easy access or egress for crew members.

6.1.7 Provision shall be made for access to the top of the cab, to the roof turret control platform, from the inside and the outside of the cab. Access from the inside of the cab shall be made in such a manner that accidental damage to the vehicle and equipment is avoided.

6.2 CAB CONSTRUCTION

6.2.1 The cab shall be secured to the chassis by means of flexible rubber mountings.

6.2.2 The cab compartment shall be manufactured from a corrosion resistant material.

6.2.3 Wood and mild steel shall not be used in the construction of the cab.

6.2.4 The cab shall be waterproof and dustproof.

6.2.5 The cab shall be insulated against all weather conditions.

6.2.6 The cab shall be insulated from noise and vibration. Noise insulation shall be sufficient to keep the noise down up to at least 80 decibels.

6.2.7 If the engine is front mounted, adequate insulation shall be provided against the ingress of latent heat from the engine.

6.2.8 An adjustable air conditioning system for heating and cooling, shall be provided. The air ventilators shall be provided and positioned to ensure adequate ventilation around the head and legs levels of the occupants.

6.2.9 The cab roof shall be provided with gutters which shall be of a size adequate to drain away any water or foam spillage that may occur during or after the operation of the roof turret.

6.2.10 Provision shall be made for the prevention of electrolytic action between the cab panels and the framework.

6.2.11 All working areas shall be of the four-way safety tread pattern aluminium plate.

6.2.12 A heavy duty bumper shall be fitted to the front of the cab to protect the safety of the crew in an accident.

6.2.13 Four (4) halogen high intensity headlights, consisting of two (2) low beam lights and two (2) high beam lights, shall be fitted into the bumper.

6.2.14 Two (2) additional fog lights shall be fitted onto the bumper.

6.2.15 Two (2) large electric adjustable rear-view mirrors shall be fitted to the left-hand side and right-hand side of the cab. The mirrors shall be of strong construction

and shall be free from vibration and shall be electrically adjustable from the inside of the cab.

6.2.16 One (1) GPS with at a 200-millimetre screen shall be fitted onto the dashboard in the cab.

6.2.17 One (1) Forward Looking Infrared Camera (FLIRC) shall be fitted into the dashboard in the cab.

6.2.18 Two (2) 2,5-kilogram Dry Chemical Powder fire extinguishers shall be fitted into quick release brackets and mounted within the cab.

6.2.19 Four (4) aluminised fibre glass approach suits complying to NFPA requirements, shall be supplied in the cab.

6.2.20 Suitable quick release brackets shall be mounted within the cab to suit the following equipment which shall be supplied as an integral part of the vehicle:

(a) Two (2) croppers bolt;

(b) Two (2) handed centre cut wire cutter;

(c) Two (2) safety blade rescue knifes;

(d) Two (2) rechargeable handheld intrinsically safe flashlights complete with batteries and one (1) 24-volt mains charger. The mains charger shall be connected to the vehicle's battery; and

(e) One (1) Forward Looking Infrared Camera (FLIRC)low visibility enhanced vision device.

6.3 CREW COMPARTMENT

6.3.1 The crew compartment shall be capable of accommodating a minimum of five (5) persons (comprising of four (4) crew members and one (1) driver).

6.3.2 The cab shall have sufficient space to facilitate the donning of protective clothing.

6.3.3 The floor of the crew compartment shall be fitted with heavy duty, non-slip, vinyl floor mats, having a suitable thickness to minimise wear from heavy boots.

6.3.4 Crew grab handles shall be fitted to assist with entry and exit of the cab as well as grab handles for the crew that are seated.

6.3.5 Lights shall be provided in the crew compartment.

6.4 WINDSCREEN

6.4.1 The windscreen shall provide panorama view and shall be braced to the body work.

6.4.2 The windscreen shall be made of laminated safety glass and be of the ultra-violet ray resistant tint type, giving the maximum possible view.

6.4.3 Suitable windscreen wiper washers and jet washers shall be provided.

6.4.4 Side window deluge washers shall be fitted.

6.4.5 Separate controls for each windscreen wiper system shall be provided and installed in the cab, within easy reach of the driver.

6.4.6 Sun-visors shall be provided at each front seat position in the cab. The visors shall be adjusted to the front and sides.

6.4.7 An adjustable windscreen defroster shall be installed in the cab.

6.5 DOORS

6.5.1 Easy access to the cab and crew compartment, shall be given by means of two (2) large doors, one fitted to each side of the cab or crew compartment.

6.5.2 Doors shall be fitted with door handles and sliding type windows made of laminated safety glass or tempered safety glass.

6.5.3 The doors shall be capable to open up to 90° degrees to allow the crew to enter and exit the cab with full gear.

6.5.4 A reflective strip shall be applied on the perimeter on the interior of the door, to ensure the door is clearly visible when open at night.

6.5.5 The door shock absorbers shall be designed to be strong enough to withstand windy conditions to prevent damage.

6.5.6 Seats shall be provided to provide for a minimum of one (1) driver and four (4) crew members.

6.5.7 The driver's seat shall be:

(a) Adjustable both fore and aft in addition to height and rake;

(b) Air suspended;

(c) Covered with hard wearing leather material of first grade quality; and

(d) Fitted with a three (3) point safety seat belt.

6.6 SEATS

6.6.1 The co-driver's seat shall be:

(a) Adjustable;
(b) Covered with hard wearing leather material of first grade quality;
(c) Fitted with an integrated bracket suitable for Self-Contained Breathing Apparatus (as specified in section 12.5); and
(d) Fitted with a three (3) point safety seat belt.

6.6.2 The crew members seats shall be:

(a) Covered with hard wearing leather material of first grade quality;
(b) Fitted with an integrated bracket suitable for Self-Contained Breathing Apparatus (as specified in section 12.5); and
(c) Fitted with a three (3) point safety seat belt.

6.6.3 All seats and brackets shall be manufactured from foam rubber.

6.7 DRIVING OPERATION CONTROL PANEL

6.7.1 The following minimum gauges shall be fitted into a panel which shall clearly be visible to the driver:

(a) Electronic speedometer with trip odometer;
(b) Electronic tachometer with engine hour meter;
(c) Electronic ammeter;
(d) Voltmeter;
(e) Engine oil pressure;
(f) Engine temperature;
(g) Transmission oil temperature;
(h) Air pressure; and
(i) Fuel level.

6.7.2 The following minimum warning lights shall be fitted into a panel which shall be clearly visible to the driver:

(a) Engine stop;
(b) Check engine;

(c) High engine temperature;
(d) Park brake engaged;
(e) Battery ON;
(f) Low fuel level;
(g) High light beams ON;
(h) Left and right indicators;
(i) Hazard light indicators;
(j) Differential locks engaged;
(k) Low pressure air brake supply;
(l) Low coolant level;
(m) Elevated light mast;
(n) Open doors; and
(o) Lockers.

6.7.3 All gauges shall be calibrated in the metric standard (bar/kPa, km/hr, °C).

6.7.4 All labels shall be in the ENGLISH language.

6.7.5 All gauges shall be water and dustproof.

6.7.6 All controls shall be constructed and designed to prevent opening and closing due to the vibration of the vehicle.

6.7.7 All controls shall be positioned to prevent the possibility of accidental operation of the control by personnel moving within or leaving the vehicle.

6.8 FIRE OPERATION CONTROL PANEL

6.8.1 The following combination of controls and switches, shall be fitted onto a panel inside the cab, and within easy reach of the driver and co-driver, and on both the left-hand side and right-hand side on the outside of the vehicle in a midshaft locker:

(a) Water level gauge with control lamp;
(b) Foam level gauge with control lamp;
(c) High temperature pump control lamp;
(d) Switch for priming pump with control lamp;
(e) Switch for pre-adjustment of foam mixing proportions;
(f) Switch for pump drainage;
(g) Under truck nozzles valve switch with control lamp;
(h) Ground sweep nozzles valve switch with control lamp;
(i) Multiple switch for PTO control.

(j) Water pump engaged control lamp.

6.8.2 All gauges shall be calibrated in the metric standard (bar/kPa, km/hr, °C).

6.8.3 All labels shall be in the ENGLISH language.

6.8.4 All gauges shall be waterproof and dustproof.

6.8.5 All controls shall be constructed and designed to prevent opening and closing due to the vibration of the vehicle.

6.8.6 All controls shall be positioned to prevent the possibility of accidental operation of the control by personnel moving within or leaving the vehicle.

7. FIRE FIGHTING SUPERSTRUCTURE

7.1 DESIGN AND CONSTRUCTION

7.1.1 The firefighting superstructure shall be rectangular in shape.

7.1.2 The design shall be suitable for use in all kinds of terrain.

7.1.3 The firefighting superstructure shall be designed to ensure lightness and stability and shall be constructed to prevent parts working loose under operating conditions.

7.1.4 The top of the superstructure, which shall serve as a walkway, including all upper surfaces and steps, shall be suitably reinforced and covered with a suitable non-slip epoxy coating.

7.1.5 Collapsible handrails of 32 millimetre round stainless-steel tubing or aluminium tubing shall be fitted for personal safety at all steps, platforms, walkways and operation stations.

7.1.6 An access ladder, with hand grips, shall be fitted at the rear of the vehicle to access the roof.

7.1.7 The superstructure shall be constructed of aluminium frame and plates that are suitably constructed, stiffened and formed to give adequate strength and prevent it from cracking.

7.1.8 Steps shall be taken to prevent electrolytic action between any material.

7.1.9 No timber or mild steel shall be used in the construction of the superstructure.

7.2 LOCKERS

7.2.1 All compartments on the firefighting superstructure used to access the pump and storage of equipment shall have aluminium roller shutters, opening upwards and having smooth inner and outer surfaces.

7.2.2 The aluminium roller shutters shall be design such that they move smoothly, low noise and will always open.

7.2.3 The lockers shall be constructed from a corrosion resistant aluminium material.

7.2.4 The lockers shall be both waterproof and dustproof when closed.

7.2.5 The lockers shall be fitted with a lockable bar lock system.

7.2.6 The storage lockers be provided for on the left-hand side and right-hand side of the vehicle.

7.2.7 The storage lockers shall be provided with the necessary brackets, or straps to secure equipment when the vehicle in in motion.

7.2.8 The storage lockers shall be of sufficient capacity to accommodate all the specified equipment.

7.2.9 The storage lockers must be well ventilated.

7.2.10 The lockers must be automatically internally illuminated when the aluminium rollers shutters are opened.

7.2.11 The locker doors shall have an audible warning device to alert the driver when the locker doors are open when the vehicle ignition is switched on. This audible warning device shall be installed in the driver's cab.

8. WATER & FOAM TANKS

8.1 WATER TANK

8.1.1 The water tank shall have a usable capacity of 10,000 litres of water.

8.1.2 The tank shall be constructed from high grade UV and corrosion resistant Glass Reinforced Polypropylene (GRP).

8.1.3 Easily accessible rubber mountings, designed to ensure flexible mounting of the tank to the chassis, shall be installed.

8.1.4 The tank shall be fitted with stainless steel stiffeners and baffle plates to prevent undue surge when the vehicle is acceleration, cornering or braking.

8.1.5 Electronic water tank level sensors shall be installed in the tank.

8.1.6 Visual water level indicators shall be installed on the exterior of the tank, on the left-hand side and right-hand side of the vehicle.

8.1.7 A removeable sump provided with a 38-millimetre drain valve shall be fitted into the lowest part of the tank for cleaning purposes.

8.1.8 A 50-millimetre brass ball valve for cleaning purposes, shall be fitted to the bottom of the tank with a drainage hose, which shall extend down clear of the chassis.

8.1.9 The tank shall be fitted with water filling connections on the left-hand side and right-hand side of the vehicle. The water filling connection on each side of the vehicle shall have two (2) 65-millimetre brass filling connections, male type, Morris instantaneous couplings, each provided with a strainer, a non-return valve and a butterfly valve. The filling connections shall be fitted with blanking off couplings which shall be secured by means of chains to prevent it from been lost.

8.1.10 A 450-millimetre diameter manhole, with a hinged waterproof cover (of the Collins or Emco Wheaton or similar type) that is spring loaded, shall be installed on top of the water tank. The tank opening to which the manhole shall be fitted, shall be of sufficient internal diameter to allow access of personnel.

8.1.11 The tank shall be provided with a top filling opening incorporated within the manhole (450 millimetre) cover. The cover shall be clearly marked “WATER” and shall be waterproof when in the closed position. A removeable stainless steel strainer of 10 mesh / centimetre shall be fitted into the filer opening.

8.1.12 The tank outlet and fire pump connection shall be sized to ensure that the required flows and discharge rates are met, as contained in this specification. A stainless-steel strainer, 10 mesh / centimetre shall be fitted to the outlet from the tank.

8.1.13 Overflow venting shall be provided, and the outlet hose shall extend down clear of the chassis.

8.1.14 All nuts, bolts and washers shall be stainless steel.

8.1.15 All ball valves shall be brass.

8.2 **FOAM TANK**

8.2.1 The foam compound tank shall have a usable capacity of 1,200 litres.

8.2.2 The tank shall be constructed from high grade UV and corrosion resistant Glass Reinforced Polypropylene (GRP).

8.2.3 Easily accessible rubber mountings, designed to ensure flexible mounting of the tank to the chassis, shall be installed.

8.2.4 The tank shall be fitted with stiffeners and baffle plates to prevent undue surge when the vehicle is acceleration, cornering or braking.

8.2.5 Electronic foam tank level sensors shall be installed in the tank

8.2.6 Visual foam level indicators shall be installed on the exterior of the tank, on the left-hand side and right-hand side of the vehicle.

8.2.7 A removeable sump provided with a 38-millimetre drain valve shall be fitted into the lowest part of the tank for cleaning purposes.

8.2.8 A 50-millimetre brass ball valve for cleaning purposes, shall be fitted to the bottom of the tank with a drainage hose, which shall extend down clear of the chassis.

8.2.9 A 450-millimetre diameter manhole, with a hinged waterproof cover (of the Collins or Emco Wheaton or similar type) that is spring loaded, shall be installed on top of the water tank. The tank opening to which the manhole shall be fitted, shall be of sufficient internal diameter to allow access of personnel.

8.2.10 The tank shall be provided with a top filling opening incorporated within the manhole (450 millimetre) cover. The cover shall be clearly marked “FOAM” and shall be waterproof when in the closed position. A removeable stainless steel strainer of 10 mesh / centimetre shall be fitted into the filer opening. Piecing points to be installed inside the hatch for fast filling of 25 litre plastic foam drums.

8.2.11 The foam liquid draws off outlet shall be fitted with a stainless-steel cone type strainer, 10 mesh / cm to prevent foreign matter from passing into the liquid line. The draw off outlet shall be placed in the centre of the sump in a position that ensures that the top of the strainer is above the level of the bottom of the tank.

8.2.12 Overflow venting shall be provided, and the outlet hose shall extend down clear of the chassis.

8.2.13 All nuts, bolts and washers shall be stainless steel.

8.2.14 All ball valves shall be brass.

9. WATER & FOAM SYSTEM

9.1 FIRE PUMP

9.1.1 A fire pump that meets the requirements of the NFPA/EN shall be installed.

9.1.2 Over heating prevention shall be installed.

9.1.3 The fire pump shall be driven by a Power Take Off and shall be designed to ensure operation of the pump at maximum output. The output of the fire pump shall be capable of discharging the total requirement of all the following systems operating simultaneously at maximum output:

(a) Roof Turret;

(b) Front Bumper Turret;

(c) Ground Sweeps and Under Truck Nozzles; and

(d) Hand Side Lines.

9.1.4 The fire pump shall have a minimum capacity of 6,000 litres per minute at 10 bar pressure.

9.1.5 The fire pump housing, impellers and diffuser shall be constructed of a non-corrosive material.

9.1.6 The fire pump shall be provided with a shaft that is made of a high-grade stainless steel.

9.1.7 An automatic priming device, driven from the pump shaft and capable of priming the pump at 3-meter suction lift, within 20 seconds, shall be provided and installed.

9.1.8 All valves should be labelled and indicate the direction for opening and closing.

9.2 POWER TAKE OFF

9.2.1 A Power Take Off (PTO), required for driving the fire pump, shall be provided to achieve the specified discharge rates as specified in this specification.

9.2.2 Pump and roll forward and reverse speed acceleration, shall comply with the requirements of the NFPA 414.

9.2.3 A PTO engagement switch, within easy reach of the driver, shall be mounted on the dashboard to engage and disengage the power divining system.

9.2.4 The power takes off engagement shall be duplicated by means of a hydraulic / electrical / pneumatic control.

9.3 FOAM PROPORTION SYSTEM

9.3.1 An automatic foam proportioning system shall be installed.

9.3.2 The induction rate shall be variable between 3%, 6% and 8%. In order to maintain this rate, an adjustable inductor(s) foam liquid proportioning system suitably marked, shall be fitted.

9.3.3 The proportioning rates must be pre-calibrated and must be changeable during the operations without disrupting the operation.

9.3.4 Foam liquid shall be automatically induced into the inductor(s) foam liquid proportioning system of the fire pump, or the positive induction system and shall be automatically adjusted to the monitor and the two (2) side lines.

9.3.5 The foam making inductor(s) foam liquid around the pump proportioning system shall be made of a non-corrosive material such as a high-grade stainless steel to ensure the greatest possible simplicity in design and reliability in service with minimum of servicing and maintenance,

9.3.6 A suitable high-grade stainless-steel strainer shall be provided in the inductor(s) foam liquid proportioning system to prevent foreign bodies from passing through the system.

9.3.7 The system must be able to be flushed with clean water.

9.4 CONTROLS

9.4.1 A suitable and reliable self-priming, power driven pump, suitable for operation on 24 volts, shall be provided in a locker for the filling of the foam liquid tank from an external source.

9.4.2 The pump shall be capable of delivering a minimum of 30 litres per minute and a maximum of 50 litres per minute.

9.4.3 The pump shall be manufactured from a high-grade stainless steel or similar non-corrosive material.

9.4.4 The pump shall be mounted at a suitable height for operation from the ground.

9.4.5 A suitable rubber hose ten (10) meter in length, shall be provided and fitted to the suction side of the pump.

9.4.6 A selector cock(s) shall be fitted with a manually operated control in the locker, so that the pump and all the pipelines, between the filling pump and the foam liquid tank, including the overflow pipe, can be flushed after filling.

9.4.7 Valves shall be hydraulically / pneumatically / electrically and manually operated. The valves shall be easily accessible for manual operations.

9.5 PIPE AND VALVES

9.5.1 A shut-off valve shall be fitted into the foam liquid supply line, between the foam tank and the inductor(s) foam liquid proportioning system.

9.5.2 The foam tank shall be vented to the atmosphere.

9.5.3 All water piping and pump connections shall be made of high-grade stainless steel or rigid rubber hoses or flexible rubber joints.

9.5.4 All valves on the vehicle shall be of high-grade stainless steel or brass.

9.5.5 All valves shall be of the ball or flap type, having only open and closed positions.

9.5.6 The design of the valves shall prevent opening and closing due to vibration.

9.5.7 Valves shall be hydraulically / pneumatically / electrically and manually operated.

9.6 PUMP CONTROL PANEL

9.6.1 All main foam / water controls, shall be of a type having only open and closed positions, interconnected wherever possible and as fool proof as can be designed.

9.6.2 A pump control panel shall be position adjacent to the fire pump and shall be provided with the following controls and instruments:

(a) Control panel illuminating light;
(b) Engine throttle control;
(c) Engine revolution counter gauge;
(d) Engine temperature control lamp;
(e) Engine oil pressure control lamp;
(f) Low air pressure control lamp;
(g) Water level gauge with control lamp (no sight glass shall be used);
(h) Foam level gauge with control lamp (no sight glass shall be used);
(i) Water pump start switch with control lamp;
(j) Water pump engaged control lamp;
(k) Switch for water tank suction valve with control lamp;
(l) Switch for foam tank suction valve with control lamp;
(m) Switch for priming pump with engaged control lamp; and
(n) Switch for flushing.

9.6.3 All gauges shall be calibrated in the metric standard (bar/kPa, km/hr, °C).

9.6.4 All labels shall be in the ENGLISH language.

9.6.5 All gauges shall be water and dustproof.

9.6.6 All controls shall be constructed and designed to prevent opening and closing due to the vibration of the vehicle.

9.6.7 All controls shall be positioned to prevent the possibility of accidental operation of the control by personnel moving within or leaving the vehicle.

9.7 SIDELINES WATER/FOAM DISCHARGE

9.7.1 65-millimetre Delivery Hoses

9.7.1.1 Two (2) female Morris instantaneous delivery couplings, 65 millimetres (internal diameter) with a 45 mm diameter hose with brass valves, shall be provided. One (1) on the left-hand side of the vehicle and one (1) on the right-hand side of the vehicle.

9.7.1.2 The coupling shall be fitted into the compartments.

9.7.1.3 The couplings shall be manufactured from phosphor bronze or gun metal.

9.7.1.4 A manually operated control for each side-line shall be fitted to the valves within the compartments.

9.7.1.5 Each delivery outlet shall be provided with one (1) 30-meter length, 65-millimetre rubber lined synthetic hose, fitted with a brass instantaneous coupling at one end and a 65-millimetre brass female Morris instantaneous coupling at the other end.

9.7.1.6 The hose construction shall comply to the British Standard / NFPA standards and the following requirements:

(a) Durable, resistant to petrol, resistant to oil and chemicals, heat and weatherproof;
(b) Temperature range: minus 21° Celsius to plus 100° Celsius;
(c) Testing pressure: 25 bar;
(d) Wrap of hose shall be nylon filament;
(e) Weft of hose shall be nylon filament;
(f) Cover of hose shall be red PVC/Nitrile; and
(g) Lining of hose shall be red PVC/Nitrile.

9.7.1.7 The hose adhesion shall comply to the British Standards / NFPA standards and the following requirements:

(a) Lining shall be of the dual adhesion type and shall be between 30 and 40 kPa/cm minimum;
(b) Covering shall be of the dual adhesion type and shall be between 30 and 40 kPa/cm minimum;
(c) Ozone resistance shall be in excess of 95 hours and show no signs of cracking after this period;
(d) Heat resistance shall comply with the J.C.C.D. specifications for 40 seconds;
(e) Acid/Alkali test – the hose shall show no signs of stress after 45 hours;

(f) The low temperature flex of the hose shall pass the FM test of minus 21° Celsius (repeat) minus 21° Celsius; and

(g) Moisture pick-up shall not exceed 4 grams per square meter.

9.7.2 **32-millimetre Hose Reels on Left Hand Side of Vehicle**

9.7.2.1 One (1) motorised hose reel shall be provided and shall be mounted into a compartment on the left-hand side of the vehicle.

9.7.2.2 The hose reel must be fitted with a 30meter, 32 millimetres (inside diameter), rigid hose.

9.7.2.3 The hose reel and hose must be easily accessible.

9.7.2.4 The hose reel shall be electric driven to rewind the hose, with a manual override and crank.

9.7.2.5 The hose reel shall be of the hinge swing out type and capable of locking at a 45 ° (degrees) and 90 ° (degrees) positions.

9.7.2.6 Roller type hose guides shall be provided in the compartment to protect the vehicle bodywork from been damaged by the hoses.

9.7.2.7 The hose must be fitted with a fog nozzle of type Nepiro Ergo (or of similar type), which is capable of full jet and wide-angle fog, with a minimum discharge rate of 180 litres / minutes at a pressure of 10 bar.

9.7.2.8 The hose shall be fitted so that it can deliver water or a water/ foam solution.

9.7.3 **32-millimetre Hose Reels on Right Hand Side of Vehicle**

9.7.3.1 One (1) motorised hose reel shall be provided and shall be mounted into a compartment on the right-hand side of the vehicle.

9.7.3.2 The hose reel must be fitted with a 30-meter, 32 millimetres (inside diameter), rigid hose.

9.7.3.3 The hose reel and hose must be easily accessible.

9.7.3.4 The hose reel shall be electric driven to rewind the hose, with a manual override and crank.

9.7.35 The hose reel shall be of the hinge swing out type and capable of locking at a 45 ° (degrees) and 90 ° (degrees) positions.

9.7.3.6 Roller type hose guides shall be provided in the compartment to protect the vehicle bodywork from been damaged by the hoses.

9.7.3.7 The hose must be fitted with a fog nozzle of type Nepiro Ergo (or of similar type), which is capable of full jet and wide-angle fog, with a minimum discharge rate of 180 litres / minutes at a pressure of 10 bar.

9.7.3.8 The hose shall be fitted so that it can deliver water or a water/ foam solution.

10. COMPLIMENTARY AGENT

10.1 DRY CHEMICAL POWDER UNIT

10.1.1 One (1) corrosion resistant dry chemical container, with a working pressure of 14 bar, filled with a minimum of 250 kilograms of dry chemical powder.

10.1.2 The dry chemical powder shall be compatible with all firefighting foams.

10.1.3 One (1) 25 litre nitrogen cylinder, with a working pressure of 200 bar, shall be connected to the dry chemical powder container to expel the dry chemical powder.

10.1.4 One (1) spare (full) 25 litre nitrogen cylinder shall be supplied with the vehicle, but not fitted.

10.1.5 Test certificates must be provided for the dry chemical powder container and the nitrogen cylinders.

10.1.6 Pressure gauges must be supplied for the dry chemical power container and the nitrogen cylinder.

10.2 DRY CHEMICAL POWDER DISCHARGE HOSE

10.2.1 The dry chemical powder discharge hose shall be a 32-millimetre (inside diameter) rigid, antistatic, non-collapsing black powder hose, 40 meter in length.

10.2.2 The powder hose shall be fitted onto an electric driven hose reel that is mounted in a compartment on the right-hand side of the vehicle.

10.2.3 The hose reel shall be electric driven to rewind the powder hose, with a manual override and crank.

10.2.4 The powder hose shall be fitted with a hand control nozzle with a throw range of 8 meters (with no wind) and a minimum discharge rate of 2,5 kilograms / second.

11. TURRETS

11.1 ROOF TURRET

A turret shall be fitted onto the roof of the vehicle to provide a high-level water or water/foam solution application and shall comply with the following requirements:

11.1.1 The turret shall be manufactured from high grade stainless steel, as far as possible;

11.1.2 The turret shall be air aspirated;

11.1.3 The design of the turret shall ensure that the turret can be operated and discharge with the vehicle in motion and give audible warning if the monitor is still in attack position

11.1.4 The turret shall be electronically controlled by a joystick control from inside the cab within easy reach of the driver. The joystick movement must be synchronised with the turret movement;

11.1.5 The turret shall also be manually controlled by means of a hand wheel at the turret;

11.1.6 The turret shall be capable to produce water as well as a water/foam solution;

11.1.7 The turret shall be capable of producing a variable water/foam solution pattern ranging from a jet to a dispersed pattern;

11.1.8 The jet water maximum throw range and the jet water/foam solution maximum throw range shall have a minimum throw range distance of 80 meters (with no wind);

11.1.9 The turret shall be capable of operating at a high and low discharge capacity and shall have a minimum high discharge rate of 6,000 litres per minute at 10 bar pressure;

11.1.10 The monitor shall be capable of rotating through a minimum of 270 ° (degrees) with an elevation of 45 ° (degrees) and a depression of 10 ° (degrees); and

11.1.11 A bracket shall be provided to support the monitor when not in use.

11.2 FRONT BUMPER TURRET

A front bumper turret shall be fitted to the vehicle to provide a low-level water or water/foam/DCP Dry Chemical Powder solution application and shall comply with the following requirements:

11.2.1 The turret shall be manufactured from high grade stainless steel, as far as possible;

11.1.2 The turret shall be non-air aspirated;

11.2.3 The design of the turret shall ensure that the turret can be operated and discharge with the vehicle in motion;

11.2.4 The turret shall be electronically controlled by a joystick control from inside the cab within easy reach of the driver. The joystick movement must be synchronised with the turret movement.;

11.2.5 The turret shall have a hand wheel on the turret for manual emergency control;

11.2.6 The turret shall be capable to produce water as well as a water/foam solution;

11.2.7 The turret shall be capable of producing a variable water/foam solution pattern ranging from a jet to a dispersed pattern;

11.2.8 The jet water maximum throw range and the jet water/foam solution maximum throw range shall have a minimum throw range distance of 55 meters (with no wind);

11.2.9 The turret shall have a minimum discharge rate of 1,500 litres per minute at 10 bar pressure; and

11.2.10 The turret shall be capable of rotating through a maxmum of 180 ° (degrees) with an elevation of 45 ° (degrees) and a depression of 10 ° (degrees).

11.3 GROUND SWEEP AND UNDER TRUCK NOZZLES

Ground sweep and under truck nozzles shall be fitted to protect the vehicle and shall comply with the following requirements:

11.3.1 The number of nozzles to be installed shall be adequate to protect the vehicle;

11.3.2 Horizontal ground sweep nozzles shall be fitted to the front of the vehicle at chassis height;

11.3.3 Vertical under truck nozzles shall be fitted beneath the chassis;

11.3.4 The nozzles shall be manufactured from light alloy;

11.3.5 The nozzles shall be positioned in a manner that it is protected when the vehicle is driving through rough terrain;

11.3.6 All nozzles shall discharge a water/foam solution at a minimum of 50 litres per minute at 10 bar pressure;

11.3.7 One switch to actuate all nozzles shall be installed on the dashboard inside the cab; and

11.3.8 Drain valves shall be fitted into the foam system to enable the system to be drained when required.

12. ACCESSORIES AND FITTINGS

The following accessories and fittings shall be supplied:

12.1 VEHICLE

12.1.1 One (1) complete chassis tool set to perform regular minor maintenance activities, which shall include the following:

(a) Two (2) tyre inflation hose complete with inflation and deflation buttons and built in pressure gauge calibrated in kPa. The length of the hose provided shall be capable of extending from the take-off point, to all the tyres fitted to the vehicle;
(b) Two (2) metal wheel spanners;
(c) One (1) hydraulic bottle jack, capable of lifting the fully laden vehicle for the changing of wheels;
(d) One (1) plastic material toolbox (minimum 400-millimetre length);
(e) Two (2) hammers 0.6 kilogram with claw; and
(f) Two (2) socket sets, combinations 8 millimetre to 32 millimetres.

12.1.2 **Mud flaps**. The mud flaps shall be manufactured from 5-millimetre Balata / Conveyor belting and shall be fitted to the rear of the front wheels and to the rear wheels. The mud flaps shall extend down to a position 350 millimetre above the ground level when the vehicle is laden to full load conditions.

12.2 PUMPING EQUIPMENT

12.2.1 One (1) pump and equipment tools to be stowed in a lockable box and comprising of the following:

(a) Two (2) Delivery Hoses with rubber cuffs; red high strength rubberised 65 millimetres (in accordance with the hose specifications in section 7.3.1.6 and 7.3.1.7), 5-meter length, testing pressure 25 bar, for tank filling;

(b) Ten (10) Delivery Hoses with binding pads; red high strength rubberised 65 millimetres (in accordance with the hose specifications in section 7.3.1.6 and 7.3.1.7), 30-meter length, testing pressure 25 bar, complete with Morris couplings;

(c) Six (6) Delivery Hoses with binding pads; red high strength rubberised 45 millimetres (in accordance with the hose specifications in section 7.3.1.6 and 7.3.1.7), 30-meter length, testing pressure 25 bar, complete with Morris couplings

(d) Four (4) discharge nozzles with complete foaming attachment; and

(e) Two (2) purpose fit keys to be provided for manual operational of firefighting valves.

12.3 FIRE FIGHTING EQUIPMENT

12.3.1 Nozzles: each hose shall be equipped with a trigger operated, *Nepiro Ergo* or similar type nozzle capable of projecting a solid jet of water which shall be adjustable to a wide-angle fog discharge. The nozzle shall be mounted to the hose by means of a swivel coupling.

12.3.2 Two (2) high strength light alloy scaling ladders, 8-meter extended length, mounted to the top of the vehicle by means of quick release brackets. The ladder must be certified to carry two (2) persons with a maximum weight up to 200 kilograms.

12.3.3 Two (2) multi-purpose fire hydrant key / spanner for several sizes.

12.3.4 Adjustable brackets with foam making capability with 65mm male coupling.

12.4 FIRE EXTINGUISHERS

The following extinguishers shall be provided and stored within a suitable compartment:

12.4.1 Three (3) 6,8 kilogram, CO2 extinguishers; and

12.4.2 Three (3) 9-kilogram, dry chemical powder extinguishers of the stored pressure type.

12.5 RESCUE AND MISCELLANEOUS EQUIPMENT

12.5.1 The following rescue and miscellaneous equipment shall be provided and secured in suitable compartments, on the vehicle:

(1) Two (2) Felling Axe, length 350 millimetre;

(2) Four (4) Fireman Axe non-jamb 900-millimetre length with insulated handle;

(3) Two (2) Heavy Duty Metal Hack Saw 300-millimetre length, including Ten (10) 300-millimetre spare blades;

(4) Two (2) Crowbar; 1000 millimetre, forged, heat treated;

(5) One (1) Crowbar, 1800 millimetre, forged, heat treated;

(6) Three (3) Heavy Duty Shifting Spanner 300-millimetre length;

(7) One (1) Heavy Duty Shifting Spanner 450-millimetre length;

(8) Two (2) sets of Heavy-Duty Spanners; combinations 10 millimetre to 22 millimetres;

(9) Four (4) Safety Blade Rescue Knifes for cutting seat belts and harness (Two (2) to be fitted into the Cab);

(10) One (1) Pliers 200-millimetre length side cutting, with insulated grips;

(11) One (1) Flat Nosed Pliers 200-millimetre length with insulated grips;

(12) Two (2) Flat Chisels 200-millimetre length, with 25-millimetre blade width;

(13) One (1) Flat Screwdriver 100 millimetre;

(14) One (1) Flat Screw Drive 200 millimetre;

(15) One (1) Flat Screwdriver 300 millimetre;

(16) One (1) Phillips Screwdriver Size 1;

(17) One (1) Phillips Screwdriver Size 2;

(18) One (1) Phillips Screwdriver Size 3;

(19) One (1) Sledgehammer length 700 millimetres with wooden hammer;

(20) Two (2) Rescue Tool Hooligan, 900-millimetre length with Metal Cutting Claw and non-slip grip;

(21) Four (4) metal Wheel Chocks 100 millimetre high;

(22) Four (4) metal Wheel Chocks 150 millimetre high;

(23) Two (2) Ball Pane Hammer 1,8 kilogram with wooden handle;

(24) Five (5) Self Contained Breathing Apparatus (type Drager only) sets complete with full face mask and composite air 6.8 litres / 300 bar cylinder and cylinder cover, including 5 spare cylinders with covers;

(25) Two (2) Emergency Back Packs for Fire Brigades red coloured with yellow reflective stripes, with burn shield rescue medical first aid kit;

(26) Two (2) Fire Blankets size 1,5 meters x 2 meters, with red colour carrying bag;

(27) Three (3) Wire and Cable Cutters 600-millimetre length with insulated grips; capable to cut wire and cables up to 16-millimetre diameter;

(28) Two (2) Bolt Cutters 610-millimetre length with insulated grips; capable to cut bolts up to 10-millimetre diameter;

(29) Two (2) Bolt Cutters 750-millimetre length with insulated grips; capable to cut bolts up to 13-millimetre diameter;

(30) Tow (2) Forcible Entry and Rescue Tool Pry-Axe with Metal Cutting Claw;

(31) One (1) battery operated Reciprocating Saw (150-millimetre blades) for cutting aluminium and steel; including two (2) spare batteries and one (1) electricity mains battery charger 220 volts, and ten (10) metal saw blade 150 millimetre;

(32) One (1) battery operated Heavy Duty Combi Tool (Jaws of Life / Spreading Ram) (Weber type or similar) with a spreading force of up to 780 kN, pulling force of 50 kN, spreading distance of 350 millimetre, cutting force of up to 30 millimetre EN Class CK 37/360-H-18 and NFPA Class A6/B8/C6/D8/E7; including Three (3) battery charges (12 / 24 volts) fitted in compartments on the vehicle, three (3) battery electricity mains chargers 220 volts and six (6) spare Li-Ion batteries;

(33) One (1) petrol driven Chain Saw 500-millimetre bar; including two spare chains, one (1) chain filing kit, and one (1) two section 10 litre plastic can (for mixing petrol and oil);

(34) One (1) petrol drive Multi-Purpose Saw (406-millimetre blades), minimum engine 3 kilowatt / 4 Horsepower for cutting through aluminium, steel, concrete, brass; including ten (10) universal diamond cutting blades 406 millimetre;

(35) One (1) set of Vetter Lifting Bags (with two (2) power Bags) minimum lifting capacity of 22 metric tons lifting height of 1000 millimetres; including gauges, controller, repair kit and transport bag;

(36) One (1) Basket Stretcher complete with mats, harnesses lifting bridles with four (4) carabiners; colour red, 2-meter length, load capacity 300 kilograms;

(37) Four (4) Round Point Shovels, spark resistant;

(38) Four (4) Rescue lines made of high-quality polyester; 30-meter length, 12-millimetre diameter, breaking strength 1000 kilogrammes, with polyester carrying bag;

(39) Four (4) Rescue lines made of high-quality polyester; 45-meter length, 12-millimetre diameter, breaking strength 1000 kilogrammes, with polyester carrying bag;

(40) Four (4) Salvage Canvas Covers; size 4 meters x 5 meters, treated with a fire- and water-resistant finish (NFPA-701 large scale);

(41) Four (4) Hand Held Intrinsically Safe Flashlights; high intensity LED (minimum of 200 Lumen), rechargeable light Li-on battery, made of thermoplastic resin of high resistance to shocks, extreme high temperatures, liquids and corrosive substances, including two (2) spare Li-Ion batteries and two (2) electricity mains battery chargers 220 volts;

(42) One (1) petrol drive High Performance Fan (approximate dimensions 500-millimetre x 500-millimetre x 500 millimetre) with Water Spray minimum engine 4 kilowatt / 4 Horsepower;

(43) Three (3) metal wrecking bars 300 millimetres in length;

(44) Two (2) Oxygen Resuscitation Equipment kits complete with carrying case and one (1) spare oxygen tank;

(45) Two (2) Automated External Defibrillator kits complete with carrying case(replacement batteries must be available in South Africa).;

(46) Two (2) 65-millimetre dividing branches;

(47) Two (2) 65 millimetre connecting branches;

(48) One (1) Portable mobile thermal imaging camera complete with carrying case, one (1) battery mains charger 220 volts and two (2) spare batteries;

(49) Two (2) slip joint -multi -grip 250 millimetres;

(50) One (1) GPS with a 200-millimetre screen fitted onto the dashboard in the cab; and

(51) One (1) Forward Looking Infrared Camera (FLIRC) fitted into the dashboard in the cab.

(52) Four (4) aluminised fibre glass approach suits complying to NFPA requirements, shall be supplied in the cab

13. PAYMENT TERMS

13.1 Bidders are requested to submit payment proposals;

13.2 Airports Company South Africa may consider an upfront payment on placing an order;

13.3 Where upfront payments are considered, such payments will be made against a bank guarantee, which shall be provided by the successful Bidder and must be in South African Rands (ZAR) and shall include South African Value Added Tax (15%); and

13.4 The Bidder accepts that final payment terms will be at the discretion of Airports Company South Africa and will be negotiated with the successful Bidder.

14. PRICES

14.1 The Bidders shall provide all prices and rates in South Africa Rands (ZAR).

14.2 The Bidders shall include escalation in the prices and rates, which shall be an annual increase that is market related.

14.3 Bidders to submit prices and rates per annum for a period of 5 years.

14.4 The Bidder shall complete the prices and rates on the forms provided and shall submit the following completed documents:

14.4.1 **6x6 Aircraft Rescue and Fire Fighting Vehicles (ARFFV)**

(a) Unit Price for 6x6 ARFFV;

(b) Unit Price for Rescue Equipment for 6x6 ARFFV;

(c) Prices for 6x6 ARFFV Scheduled Maintenance; and

(d) Prices for 6x6 ARFFV Corrective, Breakdown and Supply, Fitment and Repairs of Wheels and Tyre Maintenance.

14.5 The Bidder acknowledges that prices and rates that are not submitted in the prescribed format, will not be considered for adjudication.

15. MAINTENANCE SUPPORT PLAN

15.1 The Bidder shall submit a proposal for a five (5) year maintenance support plan that will ensure that the Airport Rescue and Fire Fighting Vehicles and rescue equipment are maintained in a serviceable condition and comply to Civil Aviation Regulations.

15.2 **MAINTENANCE ACTIVITIES**

15.2.1 The Bidder shall ensure that the maintenance support plan include schedule maintenance which is defined as planned replacement, inspection or test conducted with the purpose of preventing specifically defined failures through maintaining the condition of the vehicle and rescue equipment or assessing its condition for the purpose of corrective maintenance.

15.2.2 The Bidder shall ensure that the scheduled maintenance services are carried out in accordance with the requirements of the Original Equipment Manufacturer specifications.

15.2.3 The Bidder shall ensure that the maintenance plan include corrective maintenance which is defined as the activity following preventative maintenance with the purpose of correcting a problem or restoring the condition before the failure occurred.

15.2.4 The Bidder shall ensure that the maintenance plan include breakdown maintenance which is defined as that maintenance which is unforeseen and is necessary to restore the serviceability of the vehicle.

15.2.5 The Bidder shall ensure that the maintenance plan include the supply, fitment and repairs to wheels and tyres.

15.3 VEHICLE DOWNTIME, RELIABILITY AND AVAILABILITY

15.3.1 The Bidder shall undertake to carry out the necessary maintenance activities to:

(a) Minimise vehicle downtime;

(b) Ensure 100% vehicle reliability; and

(c) Ensure vehicle availability as required by Airports Company South Africa.

15.4 SERVICE LEVELS DETAILS

15.4.1 The Bidder shall ensure that all services and work shall be carried out to the standards as required by:

(a) The Original Equipment Manufacturer;

(b) Prevailing applicable governing laws and/or regulations;

(c) Prevailing industry norms and best practice; and

(d) Airports Company South Africa requirements.

15.4.2 The Bidder shall provide all supplies, personnel, equipment, tools, materials supervision, and other items or services necessary for the maintenance and repair of the Airport Rescue and Fire Fighting Vehicles and rescue equipment.

15.4.3 The Bidder shall ensure that all tools and equipment used shall be in good working order, with current and valid calibration certificates where applicable. The personnel must be capable to use the tools and be able to interpret any results obtained.

15.4.4 The Bidder will be required to implement a fault reporting system to enable faults to be reported, recorded and repaired in the shortest possible time. A log shall be maintained of all service calls received, a description of the problem or requested work, date and time received, vehicle or equipment registration / serial number, the caller's name and telephone number and the airport name shall be recorded.

15.4.5 The successful Bidder shall be required to respond to emergency call outs twenty-four (24) hours a day, seven (7) days a week, including weekends and public holidays and be on the airport within the following response times, after receipt of an emergency call:

(a) 2 hours for work on the chassis, engine and tyres at all airports; and
(b) 3 hours for work on the firefighting system at all airports.

Note: Emergency call outs consist of failures that will result in the downgrade of the airport fire and rescue category and effect the airport operations.

15.4.6 The successful Bidder shall be required to respond to urgent call outs twenty-four (24) hours a day, seven (7) days a week, including weekends and public holidays and be on the airport within the following response times, after receipt of an urgent call:

(a) 24 hours for work on the chassis, engine and tyres at all airports; and
(b) 24 hours for work on the fire firefighting system at all airports.

Note: Urgent call outs consist of providing services or correcting failures which will not result in the downgrade of the airport rescue firefighting category but will soon affect the operations of the airport.

15.4.7 The successful Bidder shall be required to respond to routing services call outs within in two (2) working days after receipt of the callout.

Note: Routing service call outs shall normally be carried out during regular working hours Monday to Friday.

16. AFTER SALES SUPPORT PLAN

16.1 The Bidder shall submit an After-Sales Support Plan designed to ensure the continued useful life of the Aircraft Rescue and Fire Fighting Vehicle and associated equipment.

16.2 The Bidder shall demonstrate and provide proof of maintenance support capabilities available at the respective airport sites where the Aircraft Rescue and Fire Fighting Vehicle will be operating.