

ANNEXURE A

City of Johannesburg Red Fleet Specification:

Major Pumper

4 x 2

Fire and Rescue Vehicle

Specification for 4x2 Major Pumper.

1. GENERAL

1.1 SCOPE

- 1.1.1 This specification describes City of Johannesburg Red Fleet requirements for 4x2 Major Pumper Fire and Rescue vehicle.

1.2 DESIGN STANDARDS

- 1.2.1 The vehicle must be designed and manufactured to meet the road traffic requirements of South-Africa
- 1.2.2 The material selection and usage should be of the highest standard available in South Africa.
- 1.2.3 All body frames should be manufactured from aluminium extrusions.
- 1.2.4 All plating is of the highest-grade aluminium and the thickness selection is in accordance with international norms for firefighting (NFPA) vehicles.
- 1.2.5 The unit must be manufactured with the following material:
 - A. Light weight for increased power to weight ratio
 - B. Low maintenance
 - C. Corrosion resistant
 - D. High strength
- 1.2.6 The manufacturer must be registered with, Manufacturer, Importer and Builder (MIB) of fire engines and with the South African Bureau of Standards (SABS Capability Report)
- 1.2.7 The manufacturer must comply with ISO 9001:2008 quality certified manufacturer
- 1.2.8 The unit manufactured must comply fully with the National Road Traffic Act 93 of 1996 as amended, SABS Compulsory and CKS 928 Specifications.
- 1.2.9 The complete apparatus shall be homologated prior to delivery to the end user.

1.3 COMPLIANCE TO NFPA AND TESTING FACILITY

- 1.3.1 The vehicle will be tested by the manufacturer that it is in accordance with NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition): including pumps and certification to be provided.

1.4 TESTING

- 1.4.1 The following tests should be performed on all products that are manufactured by service provider/s.
 - A. Electrical system performance testing
 - B. Weld quality
 - C. Alternator performance test
 - D. Primer test
 - E. Pump flow test

- F. Piping Hydrostatic pump test
 - G. Water tank to pump flow test
 - H. Water tank and foam tank tests
 - I. Power train testing
 - J. Superstructure integrity test
 - K. Paint sample test
 - L. Complete operational test
 - M. Foam system test
 - N. Emergency lighting system test
- 1.4.2 All products must undergo a quality assurance program and be fully inspected for compliance to specifications.

1.5 WARRANTY

- 1.5.1 The service provider will be responsible for the warranty of the complete vehicle irrespective of the components. All warranty and related calls will be logged with the service provider/s.
- 1.5.2 The overall warranty period on the apparatus superstructure must be at the minimum standard of five years (5) from the date of delivery.
- 1.5.3 The minimum five (5) years warranty for the following unit must apply with the exclusion of the chassis cab and water tank warranty must be minimum of 10 years.
- A. Structural Integrity Warranty
 - B. Power Train
 - C. Transmission
 - D. Painting
 - E. Plumbing
 - F. Fire Pump
- 1.5.4 All components and spares utilised in the manufacturing process must be approved by the Original Equipment Manufacturer (OEM).
- 1.5.5 All defects encountered due to poor workmanship and manufacturing deficiencies will be replaced at the cost of service provider/s during the warrantee period.

1.6 FREE SERVICE/ INSPECTION

- 1.6.1 A Pre -Delivery (PDS) and 1st Inspection service will be undertaken prior to delivery.

1.7 TRAINING AND SKILL TRANSFER

- 1.7.1 Training will be provided free of charge, on-site for sixty (60) personnel members, by professionals and will be based on the following:
- A. Driving Techniques
 - B. Fire Fighter Safety
 - C. Operating Instructions - Warrior
 - D. Water & Foam Supply Systems
 - E. Pumping Operations & Techniques
 - F. Basic Vehicle Care & Preventative Maintenance

G. Basic Equipment Care & Preventative Maintenance

H. Basic Vehicle & Equipment Specifications

1.8 LICENSING & REGISTRATION

1.8.1 The vehicle shall be register and licence as per the City of Johannesburg Emergency Management Services (COJEMS) requirements, and the cost will be included on the price of the unit.

2 FUNCTIONAL SPECIFICATION FOR A HEAVY-DUTY FIRE AND RESCUE APPARATUS

2.1 CHASSIS CAB

2.1.1 The heavy- duty Fire and Rescue apparatus must be manufactured on a double cab chassis.

2.1.2 Spare parts must be readily available in South Africa.

2.1.3 Drive Configuration: 4x2

2.2 ENGINE GOVERNOR

2.2.1 The engine must be governed to a maximum speed of 110 km/h on a flat surface.

2.3 ENGINE HOUR METER

2.3.1 An engine hour meter must be supplied and fitted in the cab.

2.4 CREW SEATING

2.4.1 The standard seating in the cab is for six persons only.

2.5 BATTERY MASTER SWITCH

2.5.1 A battery master switch must be provided that shall isolate power to the batteries

2.6 GENERAL

2.6.1 Vehicle Description

Table A

No	Description	Comment
1	Product class	Truck
2	Chassis adaptation	Basic
3	Wheel configuration	4x2, 2-axle vehicle with drive on one rear axles
4	Duty class	High
5	Chassis height	High

2.6.2 Dimensions

Table B

No	Description	Comment
1	Axle distance	Not less than 3900 mm
2	Dimension JA	Not less than 3500 mm

3	Chassis width	Not less than 2600 mm
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2.6.3 Weights

Table C

No	Description	Comment
1	Legal weight front axle	Not less than 7500 kg
2	Legal weight 1st rear axle	Not less than 10500 kg
3	Legal GVW	Not less than 25700 kg
4	GCM Legal	Not less than 66000 kg
5	Techn. gross vehicle.weight (GVW)	Not less than 29500 kg
6	GCM Technical (kg)	Not less than 28500 kg
7	Gross train weight, technical	65001-66000kg
8	GTW actual	0-20 ons

2.6.4 Engine

Table D

No	Description	Comment
1	Fuel	Diesel
2	Engine stroke volume	13 litres
3	Engine type, vehicle	Between 270Kw - 310 kW Euro-3 Diesel engine, six-cylinder Max. output at 1900 rpm: between 350-420 hp Max. torque at 1000-1350 rpm: 2000 Nm
7	Emission level	Euro 3

2.6.5 Cooling System

Table E

No	Description	Comment
1	Fan control	electronic
2	Fan, gear ratio	1:1

2.6.6 Fuel System

Table F

No	Description	Comment
1	Fuel tank mounting	single tank
2		Not less than 300-litre tank in aluminium/steel
3	Fuel cap	lockable

2.6.7 Exhaust System

Table G

No	Description	Comment
1	Exhaust outlet, direction	Either top, side or rear

2.6.8 Gearbox

2.6.8.1 Automatic gearbox (6-speed fully automatic with integrated retarder)

2.6.9 Power Take Off (PTO)

Table H

No	Description	Comment
1	EG-power take off	compulsory

2.6.10 Axles

Front

Table I

No	Description	Comment
1	Axle weight front, technical	Minimum 8500 kg

Rear

Table J

No	Description	Comment
1	Bogie weight, technical	Minimum 11000kg
2	Differential lock	compulsory

2.6.11 Wheels

Rims

Table K

No	Description	Comment
1	Wheel, type	disc
2	Rim material	steel/Aluminium
3	Rim quantity front axle(s)	2
4	Rim size front axle(s)	Minimum 9.00 disc
5	Rim quantity rear axle	4
6	Rim size rear axle	Minimum 9.00 disc
7	Rim quantity spare and size	1 x Minimum 9.00 disc (same as above sizes)

2.6.11 Tyres

Table L

No	Description	Comment
1	Tyres	compulsory
2	Tyre quantity front	2
3	Tyre size front	Minimum 315/80 R22.5
4	Tyre type front axle	Minimum 315/80 R22.5
5	Tyre quantity rear	4
6	Tyre size rear	Minimum 315/80
7	Tyre type rear axle	Minimum 315/80 R22.5
8	Tyre type tandem/tag/steer	Minimum 315/80 R22.5
9	Tyre quantity spare and size	1 x Minimum 315/80 (same as above sizes)
10	Tyre type spare wheel	Minimum 315/80 R22.5

2.6.12 Brakes

Table M

No	Description	Comment
1	ABS intelligent compressor	air management
2	Wheel brake	Drum and shoes
3	Brake control combination	pneumatic
4	Brake control	pneumatic
5	ABS, Anti-lock brakes	compulsory
6	Slack adjuster	Automatic (2-axle)
7	Retarder	compulsory
8	Exhaust brake control	Manual/automatic

2.6.13 Anti-roll bar

Table N

No	Description	Comment
1	Anti-roll bar, front	normal stiffness

2.6.14 Steering

Table O

No	Description	Comment
1	Steering wheel position	right hand
2	Steering system	1-circuit
3	Adjustable steering wheel	compulsory
4	Steering wheel type	basic
5	Steering wheel air bag	compulsory

2.6.15 Power Supply

Table P

No	Description	Comment
1	Battery	180 Ah, 2x12 V batteries in series for 24 V
2	Battery security	On Lockable
3	Alternator charge	Must be a minimum of 150A alternator that produces minimum 86A at the idling speed.

2.6.16 Battery master switch electronic double-acting switch on the battery box and dashboard, which switches off the connection to one of the battery's terminals, and this way the whole vehicle is de-energised, apart from the tachograph.

2.6.17 All vehicle electronic components and lights must be powered from the 24 volts battery

2.7 Body Work System

2.7.1 BWS (body work system)

2.7.1.2 Must have an extra control unit prepared bodybuilder function.

2.8 Battery connection bodybuilder

2.8.1 Must have a fuse box for positive feed that allows the connection of current consumers than those permitted by the central electric unit in the cab.

2.8.2 The box must be located on the inside of the left-hand frame member behind the battery box and with the dimensioned for maximum 200 A.

2.9 Cable harness additional switches

2.9.1 The dashboard must be prepared with wiring for 4 extra switches, 2 on each side of the steering wheel.

2.10 Instruments

Table Q

No	Description	Comment
1	Instrument panel finish	treated
2	Instrument panel colour	Black/Grey
3	Underskirt instruments panel colour	Black/Grey
4	Instrument cluster	Basic, km/h
5	Air pressure display	Bars/psi

6	12V socket in dashboard	One socket for 12 and 24 volts must be located in the instrument panel on the passenger side. Extra 24-volt socket in the switch panel, which will be located by the lower bunk in sleeper cabs.
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2.11 Communications

2.11.1 Vehicle based Two- way radio

2.11.2 Voltage converter 12V, electrical wiring and routed antenna to compartment in the roof shelf above the driver are included.

2.12 Cab

Table R

No	Description	Comment
1	Roof height	Low
2	Roof rack	without
3	Cab Type	(Crew cab) Long, low crew cab with up to 6 seats

2.12.1 Cab exterior

Table S

No	Description	Comment
1	Cab suspension	2-point air sprung
2	Cab anti-roll bar	Comfort
3	Cab tilting	automatic/manual
4	Second step in the front	Must be integrated in the left-hand side of the lower front grille panel, folds out for use. Facilitates cleaning the windscreen for example.
5	Bumper protruded execution	Must be 50 mm High-mounted bumper, all in steel. Fitted 50 mm ahead of vehicle front to protect against damage.
6	Towing device in bumper	must be centre-mounted towing device rated not less than 24 tons.
7	Signal horn	compressed air
8	Boarding step front, foldable	the folding boarding step must be secured in the front edge and fitted in the bumper.
9	Front mudguard, execution	Must be in two pieces
10	Splash guard, front	Must be provided

2.12.2 Windows and mirrors

Table T

No	Description	Comment
1	Windscreen	tinted (top part)
2	Door windows	single glazed with smash and grab film.
3	Window winder door	mechanical or automatic
4	Rear view mirror type driver	spherical
5	Rear view mirror type passenger	spherical

2.12.3 Cab interior

Table U

No	Description	Comment
1	Wall panel/headlining material	Must be black/ grey patterned vinyl upholstery which is dirt repellent and easy to clean.
2	Door panel	plastic
3	Sunvisors door driver side	Foldable
4	Interior lighting	<ol style="list-style-type: none"> 1. Must consists of dome lamps. 2. Must have Lamps in the roof shelf. 3. Must have Reading lamps. 4. Must have Lighting under the long instrument panel and lamps in the outer storage compartments. 5. The background lighting must comprise of red LEDs integrated in the dome lamps. 6. Must have the lighting under the instrument panel and the boarding step lighting. 7. Must Switch off and on via a separate switch.
5	Gear selector position	Must be located in the suitable position where a driver can easily reach.
6	Protective mats floor	Must be non-slippery rubber

2.12.4 Seats

Table V

No	Description	Comment
1	Driver seat	Must be with air suspension and several setting options. Adjustable for legroom and height. Equipped with adjustable backrest, with integrated head restraint, quick-release function for rapid air release, as well as integrated safety belt.
2	Passenger seat	unsprung seat with several setting options, which can be moved backward and forward, raised, and lowered, and has an adjustable backrest with integrated head restraint. The seat must have an integrated safety belt.
3	Crew seat lay out	All four- crew seat must face the front, with safety belt each. The seat must have a provision of the SCBA storage
4	Upholstery	All seats upholstery must be in black leather, dirt repellent and easy to clean.
5	Warning signal for unconnected seat belts	lamp and audio signals (and shall warns an unbelted driver with an acoustic signal and a warning lamp when speed exceeds a minimum of 25 km/h.)
6	Seat belt pre-tensioner	Compulsory for all seats
7	Seat belt colour	all seats must be equipped with a safety belt with a fabric coloured red/black.

2.12.5 Storages

Table W

No	Description	Comment
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1	Dashboard passenger side compartment	with lid
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2.12.6 Climate system

Table X

No	Description	Comment
1	Climate system control	Must be manual
2	Air conditioning	Must be able to reach all seats

2.12.7 Illumination

Table Y

No	Description	Comment
1	Headlamp type	H4
2	Headlamp asymmetry	Left hand
3	Headlamp levelling	Compulsory
4	Headlamp protection	Compulsory
5	End outline marker lamp	Clear
6	Beacon lights	Compulsory
7	Tail lamp position	on bracket
8	Fog lamp, rear	compulsory

2.12.8 Accessories

Table Z

No	Description	Comment
1	Hose for tyre inflation	Minimum 20 meters
2	Vehicle first aid kit, as per Government regulation 7 OHS act	Compulsory
3	Triangle	Compulsory
4	Fire extinguisher	1 x 2 kg
5	Reverse alarm audible inside and outside	Compulsory
6	Tool Case	<ol style="list-style-type: none"> 1. Jack 2. Wheel Spanner 3. Spanner size 13 and 10 4. Reversible Screwdriver Star and Flat

2.12.9 Crew and passenger seats

- 2.12.9.1 Provision must be made for SCBA storage brackets on the back rest of all seats excluding the driver seat.
- 2.12.9.2 The incorporation of the SCBA brackets in the back rests must allow for the immediate donning on arrival at an incident.
- 2.12.9.3 The SCBA seat must have dual padded extensions to ensure the comfort for all the passengers whilst travelling in the crew cab.
- 2.12.9.4 The SCBA retaining bracket must be fitted with a quick release strap to allow the BA set to be easily released for quick donning.
- 2.12.9.5 The bracket must be capable of containing the BA set when a 10-G force is applied in the longitudinal axis of the vehicle.

2.12.9 Seat Belt Monitoring System

- 2.12.9.1 A seat belt monitoring system (SBMS) must be provided.
- 2.12.9.2 The SBMS must be capable of
- 2.12.9.3 Monitoring the status of occupancy if seat belts are buckled/not buckled with both red LED and beeper indicator when seat occupied and unbuckled.

2.12.10 Dash mount Radio.

- 2.12.10.1 The apparatus must have a provision for the dash mount two-way radio.

2.12.11 Dash mounted GPS.

The vehicle shall have a GPS mounted on the dashboard.

- 2.12.11.1 Dimension 9.2" x 6.4" x 3" (23.3 x 16.2 x 7.6 cm)
- 2.12.11.2 The device shall have touchscreen capabilities
- 2.12.11.3 The display size shall be not less than 7.8" x 4.4"; 9.0" diagonal (19.9 x 11.2 cm; 22.9 cm diagonal)
- 2.12.11.4 Display resolution shall not less than 1280 x 720 pixels
- 2.12.11.5 Display type shall be WXGA
- 2.12.11.6 Minimum 1.6 kg
- 2.12.11.7 Water rating shall not be less than ipx7
- 2.12.11.8 Maps & memory shall accept data cards 2 micro SD cards (back of unit), have a minimum of five (5) waypoints, a minimum of 50 track points, and have a minimum of 100 track routes.
- 2.12.11.9 Sensors must have a built-in receiver with a minimum of Ten (10) hz high-sensitivity, NMEA 2000 compatibility, NMEA 0183 compatibility and supports WAAS
- 2.12.11.10 The unit shall have built-in maps-in auto guidance, bluechart (coastal), lakevu (inland)

- 2.12.11.11 The unit connections shall have one NMEA 2000 ports, NMEA 0183
2.12.11.12 input ports, NMEA 0183 input (TX) ports, video input ports, BNC j1939 ports
, marine network ports, 12-pin transducer ports, USB port, BNC external GPS
antenna port. Bluetooth, ant+ (connectivity), Wi-Fi network (local connection)
2.12.11.13 The unit shall have an electrical power input between 10 to 32 VDC at
2.12.11.14 a typical current draw at 12 VDC 1.37, maximum power usage at 10 VDC
40.2W

2.12.12 Vehicle Camera System

- 2.12.12.1 It must have rear view camera.
2.12.12.2 The camera image/s must be displayed on the driver's full colour Mux display.
The camera must be able to operate in the dark/night and over exposed
lighting.

2.12.13 Bulbar

- 2.12.13.1 Must be a chromed bulbar mounted to the chassis frame.
2.12.13.2 The bulbar must be fitted with four (4) galvanized towing eyes.

2.12.14 Controls and Indicators in the Cab

- 2.12.13.1 A double acting battery master switch must be provided with a visual warning
when switched on.
2.12.13.2 Two (2) 75mm x 25mm red light must be positioned in the cab.
2.12.13.3 The light must provide a warning to the driver in the event any cab door, crew
cab door, equipment locker door and mast light are left ajar.
2.12.13.5 A visual warning must be provided in the cab to indicate when the pump is
engaged.
2.12.13.6 In addition to chassis standard controls and indicators the following items
must be installed in the driver's cab must have:
A. Visual warning for the main current being switched on
B. Solenoid master switch (the solenoid must be continuous rating type)
C. Visual warning for any of the equipment lockers being open
D. Visual warning for the rear axle being locked
E. Switch with visual indication for all emergency lighting
F. Switch with visual indication for siren unit
G. Microphone for the public address system
H. Visual warning that pump is engaged
I. Visual and audio warning for low water level in radiator.
J. Visual warning that floodlight is extended.

2.13 Mud flaps

- 1.13.1 Must be made out of Black linear low-density polyethylene (proprietary blend) mud flaps must be installed on the rear body wheel wells and on the front directly behind the wheels.
- 2.13.2 CoJ EMS logo must be affixed to the flap itself

2.14 Deck Gun/Monitor

- 2.14.1 The pump panel must include all electric 12 VDC controls.
- 2.14.2 The Deck gun must include the automatic stow feature.
- 2.14.3 A remote control must be installed on the pump operator's panel and a wireless radio remote.
- 2.14.4 The Deck gun must match the colour of the vehicles.
- 2.14.5 The Deck gun must be mounted between the pump panel and the cab in the most convenient position allowing for maximum operation with no restrictions.

2.15 Nozzle

- 2.15.1 An electronic controlled select automatic master stream nozzle must be provided.
- 2.15.2 The deluge riser must have a male National Standard Threads for mounting the monitor.

2.16 Pump System

Pump Compartment

- 2.16.1 The pump compartment must be a separate module from the apparatus body and hose bed compartments.
- 2.16.2 This must allow each module to move independently of the other.
- 2.16.3 The pump compartment module must extend the full width of the body.
- 2.16.4 The pump operator's panel and side panel must be constructed of brushed stainless steel for lasting appearance and ease of maintenance.
- 2.16.5 Pump panel light shields must be provided for each side panel and the top mount pump operators panel.
- 2.16.6 Valve control levers must be of a vertically operated quarter turn locking type.
- 2.16.7 Each lever must have round, chrome, fluted edge knob providing an easy grip surface.
- 2.16.8 Each knob must be clearly engraved to identify the locking direction.
- 2.16.9 Valve control levers must locate directly adjacent next to one another, mounted inline so they are in the same position when shut off.
- 2.16.10 Each control lever must be connected directly to its respective valve.
- 2.16.11 The pressure gauges must be located directly above the discharged control levers.

2.17 Pump System

2.17.1 The pump must be a mid-ship mounted single stage centrifugal pump. The pump must be mounted on the chassis frame rails and must be PTO driven.

2.17.1 Two (2) 152mm diameter suction ports with 152mm NST male threads and removable screens must be provided, one each side.

2.17.2 The ports must be mounted one (1) on each side of the mid-ship pump and must extend through the side pump panels. Inlets must come equipped with long handle chrome caps.

2.18 Pressure Relief Valve

2.18.1 The pump must be equipped with an automatic pressure control device. A single bronze variable pressure setting relief valve must be provided and be of ample capacity to prevent an undue pressure rise as outlined in N.F.P.A 1901.

2.18.2 The relief valve must be normally closed and must open against pump pressure. A relief valve control wheel with a control light to signal when open must be mounted on the pump operator's panel.

2.19 Discharge Manifold

2.19.1 The pump system must utilize a stainless-steel discharge manifold system that allows a direct flow of water to discharge valves.

2.19.2 The manifold and fabricated piping systems must be constructed of a minimum of Schedule 10 stainless steel, to reduce corrosion.

2.20 Primer System

2.20.1 The electronic driven priming pump must be a positive displacement vane type. One (1) priming control, located at the pump operator's position, must open the priming valve and start the priming motor.

2.20.2 The primer must be oil-less type.

2.20.3 The priming valve must be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

2.21 Pressure Gauge System

2.21.1 One (1) minimum 114mm master suction and one (1) minimum 114mm master discharge gauge must be pump panel mounted.

2.21.2 These compound gauges shall be liquid filled.

2.21.3 A throttle must be mounted on the pump operator's panel and must be used to control the engine RPM.

2.21.4 A master drain valve must be installed and operated from the pump operator's panel.

2.22 Pressure Governor

- 2.22.1 This apparatus must be equipped with a Class 1 "Total Pressure Governor" engine/pump governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine.
- 2.22.3 The "Total Pressure Governor" is to operate as a pressure sensor (regulating) governor (PSG).
- 2.22.4 A special pre-set feature must permit a predetermined pressure or RPM to be set.
- 2.22.5 The pre-set pressure or RPM must be displayed on the message display of the "Total Pressure Governor".
- 2.22.6 The pre-set must be easily adjustable by the operator.
- 2.22.7 The pressure sensor governor system must be operable only after the vehicle parking brake has been set, the transmission is on the pumping mode, and the fire pump has been engaged.
- 2.22.8 The pressure sensor governor system must have two (2) modes of operation: pressure mode or rpm mode.
- 2.22.9 When in the pressure mode, the PSG system must automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).
- 2.22.10 In the rpm mode, the PSG system will automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).
- 2.22.11 A pump cavitation protection feature will be provided which must return the engine to idle should the pump cavitate.
- 2.22.12 The pressure controller must incorporate monitoring for engine coolant temperature, oil pressure, and battery voltage.

2.23 Auxiliary Engine Cooler

- 2.23.1 An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator's panel must be provided.
- 2.23.2 The engine cooler must be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action.
- 2.23.2 Cooler inlet and outlet must be continuous, preventing intermixing of engine coolant and pump water.

2.24 Pump Cooler

- 2.24.1 The pump must have a minimum 10mm line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged.
- 2.24.2 The pump cooler line must be controlled from the pump operator's panel by a minimum of 10mm snubber valve.

2.25 Pump Certification

- 2.25.1 The minimum of 4,700 l/min pump, when dry, must be capable of taking suction and discharging water in accordance with current NFPA 1901: Standard for Automotive Fire apparatus (2016 edition).
- 2.25.2 The pump must be tested at the manufacturer's facility by an independent, third-party testing service.
- 2.25.3 The conditions of the pump test must be as outlined in current NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition).
- 2.25.4 The tests must include, a minimum but not limited to the following as outlined in current NFPA 1901: Standard for Automotive Fire apparatus (2016 edition):
 - A. The pump test,
 - B. The pumping engine overload test
 - C. The pressure control system test
 - D. The priming device tests
 - E. The vacuum test
 - F. The water tank to pump flow test
 - G. A plumbing hydrostatic test
 - H. Foam tank and pump flow test

2.26 Water Tank Level Gauge

- 2.26.1 One (1) electronic water tank level gauge must be located at the pump operator's panel to provide a high visibility display the level of water in the tank

2.27 Top Mount Pump Panel

- 2.27.1 The pump controls must be top mounted and be constructed of stainless steel.

2.28 Pump Access Doors

- 2.28.1 The driver and officer side pump module must include horizontally hinged pump access doors.

2.29 Crosswalk Module

- 2.29.1 An aluminium extruded crosswalk module must be provided and located forward of the pump module.
- 2.29.2 The crosswalk must include two (2) access folding steps with handrails secured to the forward extrusion of the pump module.

2.30 Crosswalk Compartments

- 2.32.1 Two (2), one (1) each side, compartments must be provided in the area below the walkway.

2.31 Foam Tank Level Gauge (Class A and B)

- 2.31.1 There must be an electronic foam tank level gauges for both foam tanks located at the pump operator's panel.

2.32 Double Cross-Lay Hose Bed

- 2.32.1 Two (2) cross-lay hose beds must be provided at the front area of the body.
- 2.32.2 Each of the two cross-lay sections must have a capacity for 90m of 38mm double-jacket fire hose pre-connected to the pump discharge.
- 2.32.3 **Note:** Three (3) 38mm x 30m double jacket hoses with a firefighting branch nozzle must be supplied with each cross lay bed.

2.33 Left Side Discharges

- 2.33.1 Two (2) 65mm discharge outlets with manually operated valves must be provided at the left side pump panel.
- 2.33.2 These discharge valves must be fitted with 65mm NST Male couplings with a chained blank cap
- 2.33.3 One (1) 100mm hi-volume discharge outlet with manually operated valves must be provided at the left side pump panel. This discharge valve must be fitted with 100mm Storz coupling with 115mm lug distance with chained blank cap.
- 2.33.4 The valve controls must be located at the pump operator's panel and must visually indicate the position of the valve at all times.

2.34 Right Side Discharges

- 2.34.1 Two (2) 65mm discharge outlets with manually operated valves must be provided at the left side pump panel.
- 2.34.2 The discharge valves must be fitted with 65mm NST male couplings with chained blank cap.

- 2.34.3 One (1) 100mm hi-volume discharge outlet with manually operated valves must be provided at the left side pump panel.
- 2.34.4 This discharge valve must be fitted with 100mm Storz coupling with 115mm lug distance with chained blank cap.
- 2.34.5 The valve controls must be located at the pump operator panel and must visually indicate the position of the valve at all times.

2.35 Around the Pump (ATP) Foam System, A/B Dual Tank

- 2.35.1 An electronic foam proportioning system must be provided to proportion Class A & B foam concentrates into the suction side of the pump.
- 2.35.2 The System must directly measures water and foam concentrate flow and automatically adjusts to deliver a consistent foam concentrate injection rate based on that flow.
- 2.35.3 Operation must be unaffected by various nozzle flows, hose lengths, intake or discharge pressures.

2.36 A/B Control Panel

- 2.36.1 A single A/B changeover control panel must be provided to include individual controls for selecting either A or B foam concentrate storage tank controls and for controlling water pump supplied flushing water. The panel must be located near the main foam system control panel.

2.37 Tank Selector and Flushing Valves

- 2.37.1 When dual foam concentrate tanks are installed on the apparatus a dual tank switch over system consisting of both A and B options must be installed to provide rapid change-over of foam concentrate reservoirs.
- 2.37.2 The dual tank selector valves must also have provision for connection of flushing water to prevent mixing of dissimilar incompatible foam concentrates.

2.38 Air Operated Dual Tank Selector

- 2.38.1 An air operated dual tank selector must provide dual foam tank selection via a three-position toggle switch located on the pump operator panel.
- 2.38.2 Indicator lights on the switch placard will indicate which tank is selected.
- 2.38.3 The air operated dual tank system must be provided as an integral part of the foam concentrate pump.
- 2.38.4 The air dual tank system must be installed and tested at the foam system manufacturer. Operating air must be provided continuously from the apparatus compressed air system.

- 2.38.5 A foam concentrate bypass valve must be provided integral to the air operated dual tank valve to permit operation of the foam concentrate pump for test and calibration purposes without injecting foam concentrate into the water discharge.
- 2.38.6 The air operated dual tank selector must be electrical interlocked with the low tank switches and control unit.
- 2.38.7 When the selector is switched from one tank to the other the default foam concentrate injection rate must automatically change without operator intervention.
- 2.38.8 Also, when the selector is switched from one tank to the other the low-level sensor in the selected tank must be active and the other one must be isolated from the system.
- 2.38.9 The centre position of the panel mounted dual tank switch must provide a clean water flush of the foam concentrate pump to prevent concentrate mixing and possible jelling. When FLUSH is selected the foam pump must only run for 10 seconds.
- 2.38.10 All NFPA required check valves and flushing water strainers must be provided integral to the air dual tank selector.

2.39 Manual Dual Tank Selector

- 2.39.1 An operator panel mounted manual dual tank valve to provide manual selection of dual foam concentrate tanks from the operator panel must be provided.
- 2.39.2 The manual dual tank selector must be electronically interlocked with the low tank switches and control unit.
- 2.39.3 When the selector is switched from one tank to the other the default foam concentrate injection rate MUST automatically change without operator intervention. Also, when the selector is switched from one tank to the other the low-level sensor in the selected tank will be active and the other one will be isolated from the system.
- 2.39.4 The manual dual tank selector handle will have a "FLUSH" position between the tank settings.
- 2.39.5 The "FLUSH" position will provide a clean water flush of the foam concentrate pump preventing foam concentrates from mixing and possibly jelling.
- 2.39.6 Switches provided on the manual dual tank valve must determine which low tank level sensor is providing feedback and which foam concentrate injection rate to use.
- 2.39.7 When FLUSH is selected the foam pump must only run for 10 seconds.
- 2.39.8 All NFPA required flushing water check valves must be provided with the manual dual tank selector.

2.40 Foam Concentrate Strainers

- 2.40.1 A field serviceable foam concentrate strainers must be provided in the foam concentrate suction line.
- 2.40.2 When the strainer is not subjected to flushing water pressure a plastic bodied in-line strainer must be used.
- 2.40.3 The strainer body must be constructed of plastic with a stainless-steel mesh screen and must be compatible must be both Class A and Class B foam concentrates.
- 2.40.4 A shutoff valve must be provided to enable isolation of the strainer for service. The strainer must be mounted in the pump compartment.
- 2.40.5 The strainer must be a low-pressure device and must not be subjected to flush water pressure.

2.41 Booster Tank

- 2.41.1 The booster tank must be rectangular in configuration and shall have a minimum of **3,500 litres capacity**.
- 2.41.2 The entire tank must be constructed from welded 12mm polypropylene sheets.
- 2.41.3 The tanks must be designed in accordance with NFPA standards and OEM certification is required on all designs.
- 2.41.4 Baffles must be in the form of baffle balls which must protect against any water surge during travel mode within the water tank.
- 2.41.5 The baffle design must be such as to ensure that it occupies less than 1% of the tank content.
- 2.41.6 The baffle must ensure a free flow of 98% of the tank contents during pumping operations.
- 2.41.7 The tank must feature a square combination vent and manual fill tower of dimensions minimum 450mm x 450mm with cover.
- 2.41.8 The tower must be located in the left front corner of the tank.
- 2.41.9 The tank overflow must be 100mm diameter and shall dump behind the rear wheels to permit maximum traction.
- 2.41.10 There must be two (2) standard tank openings; one for the tank to pump suction line with an anti-swirl plate and one for a tank fill/drain line.
- 2.41.11 The tank must be mounted on hard rubber cushions to isolate the tank from road shock and vibration.
- 2.41.12 The tank must be completely removable without disturbing or dismounting the vehicle body structure.

2.42 Foam Tank – Class A

- 2.42.1 A minimum of 150-litres Class A foam tank, manufactured from Stainless Steel and shall be fitted on the vehicle.

2.42.2 The vehicle must be delivered with 150 ltr class-A firefighting foam concentrate, as well as an extra 25 litres to test the foam system.

2.43 Foam Tank – Class B

2.43.1 A minimum of 150-litre Class B foam tank, manufactured from Stainless Steel and shall be fitted on vehicle.

2.43.2 The vehicle must be delivered with 150ltr class-B firefighting foam concentrate, as well as an extra 25 litres can to test the foam system.

2.44 Bodywork & Equipment Lockers

2.42.1 The manufacture and mounting process must carry the approval of the Original Equipment Manufacturer (OEM).

2.45 Underbody Support System

2.43.1 The underbody support system must form the backbone of the entire fire superstructure and provides extremely high compartment load ratings.

2.43.3 The support system must consist of a minimum 9.5mm thick steel vertical angle support bolted to the chassis frame rails.

2.43.4 Horizontal angles must be gusseted and welded to the bottom of the vertical angles, extending to the outside edge of the body.

2.43.5 All steel superstructure frame must be mounted on top with neoprene elastomer isolators.

2.43.6 Additional reinforcing must be added for extra support.

2.46 Aluminium Construction

2.44.1 The vehicle body must be constructed entirely of formed aluminium plates.

2.44.2 All horizontal walkway surfaces must be constructed from aluminium fire vehicle quality diamond plate.

2.44.3 The wheel well frame must be constructed from formed aluminium and must be fitted with an aluminium wheel arch. Aluminium tread plate must finish off the skirt.

2.44.4 The entire superstructure roof must be covered with aluminium diamond plate.

2.44.5 The entire exterior body must be completely sanded and deburred to assure a smooth finish prior to painting.

2.44.6 Components must be seam welded together both internally and externally to ensure maximum strength.

2.47 Rear Step

- 2.47.1 An auxiliary access ladder must be provided at the rear of the body for access to the body deck. The ladder rungs must be fitted with non-slip surfaces.
- 2.47.2 The ladder must fall within the angle of departure.

2.48 Hosebed

- 2.48.1 Hosebed sides must consist of smooth aluminium plate welded to a perimeter frame constructed heavy walled aluminium extrusion for rigidity.
- 2.48.2 The hosebed compartment deck must be constructed entirely from maintenance free, extruded aluminium.
- 2.48.3 Extrusions must have an anodized, radiuses ribbed top surface for maintenance free service life.
- 2.48.4 Extruded aluminium slats must be riveted into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose.
- 2.48.5 The hosebed compartment must be free of sharp edges and projections to prevent hose damage.
- 2.48.6 The hosebed must be completely removable for easy access to the booster tank.
- 2.48.7 The compartment deck design must incorporate a provision for the installation of adjustable hosebed dividers.
- 2.48.8 A lip must be provided at the rear on the hose deck to prevent the accidental discharge of the flaked hoses during travel.
- 2.48.9 The hosebed must be designed to accommodate 3x100mm supply hose and 10x65mm driveline hose.

2.49 Hosebed Divider

- 2.49.1 There must be two (2) hosebed dividers provided for the full length of the hosebed.
- 2.49.2 The hosebed dividers must be constructed of smooth aluminium plate with an extruded aluminium base welded to the bottom.
- 2.49.3 The rear end of the divider must have a radius corner to protect personnel.
- 2.49.4 The dividers must be natural finish aluminium for long-lasting appearance and must be sanded and deburred to prevent damage to the hose.
- 2.49.5 The dividers must be adjustable from side to side in the hosebed to accommodate varying hose loads.

2.50 Rubrail

- 2.50.1 The body must have a body side protection rubrail along the length of the body on each side and at the rear.

- 2.50.2 The rubrail must be constructed of aluminium extrusion. The rubrail must extend beyond the body width to protect compartment doors and the body side.
- 2.50.3 The rubrail must be a minimum 4mm thick anodized aluminium extrusion and must allow marker and warning lights to be recessed inside for protection.
- 2.50.4 Reflective tape must be applied in accordance with the National Road Traffic Act requirements to the Rubrail to enhance vehicle visibility.

2.51 Handrails and Access Steps

- 2.51.1 Access handrails must be provided at all step positions.
- 2.51.2 All body handrails must be constructed of maintenance free, corrosion resistant and extruded aluminium.
- 2.51.3 Access steps offering a non-slip surfaces must be provided for ease of access to top compartments.

2.52 Access Ladder

- 2.52.1 An auxiliary stainless steel access ladder must be provided at the rear of the body for access to the hose bed.
- 2.52.2 The ladder must have a lower hinged section that must be stored when not in use.
- 2.52.3 Each ladder rung must be fitted with aluminium “crocodile” plate to ensure a non-slip surface when using the ladder.
- 2.52.4 The left top section of the ladder must be raised at the deck to allow a secure handgrip.
- 2.52.5 A stainless steel grab handle must be fitted to the hose deck side at the rear to assist in accessing the vehicle deck from the ladder.

2.53 Compartmentation

- 2.53.1 Seven (7) outside compartments must be provided as follows:
 - A. One (1) full height compartment between the pump module and the rear wheels on each side of the vehicle
 - B. One (1) full height compartment over the rear wheel arches on each side
 - C. One (1) rescue style full height compartment behind the rear wheels.
This compartment must have access doors from both sides of the vehicle and the rear.
 - D. One (1) full height compartment at the rear of the vehicle
- 2.53.2 All body compartments must be constructed from welded aluminium alloy plate.
- 2.53.3 Each compartment must be modular in design and must not be a part of the body support structure.
- 2.53.4 Compartment floors must be constructed of aluminium fire apparatus quality diamond plate welded in place and shall be supported by aluminium extrusions.

- 2.53.5 A drain hole must be provided in each compartment floor.
- 2.53.6 A grommet must be fitted around all electrical wiring to prevent the ingress of dust.
- 2.53.7 An anodized aluminium drip rail must be mounted over each compartment opening to assist with water runoff.

2.54 Adjustable Shelving Tracks

- 2.54.1 All compartments must be equipped with vertically mounted tracks for the installation of adjustable shelves.
- 2.54.2 The tracks must be of extruded aluminium and attached to the side walls with rivets.

2.55 Aluminium Shelves

- 2.55.1 Six (6) shelves must be constructed with a minimum of 4.7mm smooth aluminium plate.
- 2.55.2 The shelves must have bi-directional rigidity (side to side and front to back) and one-piece construction. Each shelf shall hold a maximum load of 45 kilograms.
- 2.55.3 The shelves shall be adjustable utilising the adjustable shelving tracks.

2.56 Slide-out Tray

- 2.56.1 Two (2) slide-out trays to accommodate heavy equipment must be provided.

2.57 Removable Equipment Panels

- 2.55.1 Removable aluminium panels must be fitted inside each locker compartment for the mounting of equipment. The panels must be secured to the locker interior.
- 2.55.2 The equipment brackets must be secured to these panels and not the compartment walls.

2.58 Compartment Access Platform

- 2.58.1 The lower section of the side compartments on each side must be designed to act as a fold down step platform for elevated access to the equipment.

2.59 Roll-Up Doors

- 2.59.1 All compartments must be fitted with roll-up doors. The door slats must be double wall box frame and manufactured from anodized aluminium.
- 2.59.2 The slats must have interlocking end shoes on each slat.
- 2.59.3 The slats must have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.
- 2.59.4 The track must be anodized aluminium with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or

caulking. The track must have a replaceable side seal to prevent water and dust from entering the compartment.

- 2.59.5 The doors must be counterbalanced for ease in operation.
- 2.59.6 A full width latch bar must be operable with one hand, even with heavy gloves. Securing method must be a positive latch device.
- 2.59.7 The doors must be fitted with a micro switch that must energise a red warning lamp in the cab when the door is not in a fully closed position.
- 2.59.8 All compartment doors must be fitted with a dual function automatic switch to activate the compartment lights upon opening of the door and give an indication in the cab when doors are opened.

2.60 Hydraulic Ladder Gantry

- 2.60.1 A hydraulic / electric ladder gantry must be mounted on the left side of the body.
- 2.60.2 The ladder gantry must allow for removal of the ladders from the ground position without having to get onto the vehicle.
- 2.60.3 An interlock must be provided to prevent operation of the ladder gantry unless the parking brake is activated.
- 2.60.4 The gantry must be fitted with the following ladders:
 - A. Two section extension ladder.
 - B. Roof Hook ladder.

2.61 Hydraulic Hose Gantry

- 2.61.1 A hydraulic / electric suction hose gantry must be mounted on the right side of the body.
- 2.61.2 The suction hose gantry must allow for removal of the suction hoses from the ground position without having to get onto the vehicle.
- 2.61.3 An interlock must be provided to prevent operation of the suction hose gantry unless the parking brake is activated.
- 2.61.4 The suction hose gantry shall be fitted with 2 x 3m lengths of 150mm hard suction hoses complete with wire bound couplings

2.60 Electrical System

- 2.60.1 All electrical equipment installed by the vehicle manufacturer must conform to current automotive electrical system standard
- 2.60.2 All exposed wiring must be run in a loom. All wiring looms must be properly supported and attached to body members along the entire run.
- 2.60.3 At any point where wire or looms must pass through metal, rubber grommets must be installed to protect the wire from abrasion.

- 2.60.4 Electrical connections in exposed areas must be made using heat shrink or weather proof connections.
- 2.60.5 All circuits must be protected with automatic reset circuit breakers.
- 2.60.6 All electrical equipment switches must be mounted on a switch panel mounted in the cab convenient to the operator.
- 2.60.7 Light switches must be of the rocker type with integral indicator light to show when the circuit is energised.
- 2.60.8 All switches must be appropriately identified as to function.

2.61 Cab and Body Lighting

- 2.61.1 Clearance lights and reflectors must include two (2) red lights, four (4) red rectangular reflectors, two (2) amber rectangular reflectors, and three (3) red marker lights centred at the rear step, recessed in the rub-rail.
- 2.61.2 A rectangular shaped marker light with an amber coloured lens must be installed on either side of the vehicle body, recessed in the rub-rail at the front of the body.
- 2.61.3 The marker light must be wired to the turn indicator.
- 2.61.4 A rectangular shaped marker light with a red coloured lens shall be installed at the trailing edge on either side of the vehicle body, recessed in the rub-rail.
- 2.61.5 One (1) minimum 177mm red, one (1) amber and one (1) minimum 177mm clear light shall be installed on each side of the vehicle rear.
- 2.61.6 Light functions must include running lights, brake lights, turn signal lights and back-up lights.
- 2.61.7 One (1) minimum 100mm circular single bulb light shall be mounted in each body compartment and must be wired to a master on/off rocker switch on the cab dash.
- 2.61.8 The light must be in a resilient shock absorbent mount for improved bulb life.
- 2.61.9 The wiring connection must be made with a weather resistant plug in style connector.
- 2.61.10 A single water and corrosion resistant switch with a polycarbonate actuator and sealed contacts must control each compartment light.
- 2.61.11 A compartment light with a switch must be installed to illuminate the pump area for service.
- 2.61.12 A license plate light must be installed on the rear of the vehicle.

2.62 Compartment Lighting

- 2.62.1 There must be a minimum of one (1) LED lighting string mounted in each body compartment.
- 2.62.2 Each light must be in a resilient shock-absorbent mount.
- 2.62.3 There must be a compartment light with a switch installed to illuminate the pump area for service.

- 2.62.4 A sensor switch must be fitted in each compartment door to activate the light when door is opened, the sensor must also activate the warning light in the cab to warn the driver of the open locker/s

2.63 Step Lights

- 2.63.1 The vehicle must have sufficient lights to properly illuminate the work areas, steps, walkways and ground areas around the vehicle.
- 2.63.2 Areas under the driver and crew area exits must be activated automatically when the exit doors are opened.
- 2.63.3 Ground area lights must be switched from the cab dash with the work light switch.

2.64 Pump Panel Lights

- 2.64.1 Two (2) working lights must be provided above the pump panel to illuminate the working area during pumping operations.

2.65 Scene Lights

- 2.65.1 Two (2) scene lights with clear lenses must be provided at the rear of the vehicle.
- 2.65.2 Each light unit must consist of two (2) 20 watt LED lamp fixtures within a light housing.
- 2.65.3 The lamps, within each housing, must be adjustable horizontally and vertically to provide the desired coverage.
- 2.65.4 All electrical connectors must be enclosed in the housing providing protection against the elements.
- 2.65.5 The lights must be 24VDC, 40 watts, and provide 1050 candelas.

2.66 Auto Eject for Shoreline

- 2.66.1 One (1) shoreline receptacle must be provided to operate the dedicated 230-volt circuits on the truck without the use of the generator.
- 2.66.2 The shoreline receptacle (s) must be provided with an IEC 60309 Standard European connector (16A-6h) 200-250 volt, 16 amp, round pin auto eject plug with a weatherproof cover. The cover must have magnetically loaded points for closure, preventing water from entering when the shoreline is not connected.
- 2.66.3 A solenoid wired to the vehicle's starter must be energized when the engine is started. This instantaneously drives the plug from the receptacle.
- 2.66.4 The shoreline must be connected to 220v.
- 2.66.5 A mating connector body must also be supplied with the loose equipment.
- 2.66.6 The shoreline receptacle must be located on the driver side on the pump panel.

2.67 Electronic Load Management

- 2.67.1 Load Manager must be provided on the vehicle.

- 2.67.2 The device must be an electronic load management (ELM) system that monitors the vehicles 12-volt electrical system, and automatically reduces the electrical load in the event of a low voltage condition and by doing so, ensures the integrity of the electronic system.
- 2.67.3 The ELM must monitor the vehicle's voltage while at the scene (parking brake applied). It must sequentially shut down individual electrical loads when the system voltage drops below a preset value.
- 2.67.4 Two (2) separate electrical loads must be controlled by the load manager.
- 2.67.5 The ELM must sequentially re-energize electrical loads as the system voltage recovers.

2.68 Back-up Alarm

- 2.68.1 An electronic back-up alarm must be supplied.
- 2.68.2 The minimum 97 dB (A) alarm must be wired into the chassis back-up lights to signal when the vehicle is in reverse.

2.69 Robotic Light Mast System

- 2.69.1 One (1) Robotic Mast Light System complete with 4 x LED lights, must be supplied and fitted on the crew cab roof.
- 2.69.2 The control unit for the Mast Light must be mounted in the left side compartment. The light must go to its original position when the hand brake is released.
- 2.69.3 There must be a flasher in the cab when the light is extended.
- 2.69.4 The Mast Light must be operated remotely with a remote. The remote must be attached to a 5m spiral cable/ wireless.

2.70 Warning Lights

Rotating Beacons

- 2.70.1 Two (2) red rotating LED beacons must be fitted at the rear and must be controlled from inside the cab.
- 2.70.2 Two (2) red rotating LED beacons must be fitted one each side of the bull bar and must be controlled from inside the cab.

2.71 Light Bar

- 2.71.1 A High Intensity LED light bar must be fitted on the cab roof. The light bar must have the following features:
 - A. Ultra low profile unit, aerodynamically efficient and unobtrusive until lit.
 - B. All-round, 360 Degree light output.
 - C. Front and rear LED clusters individually user programmable.

- D. Low current draw. Approximately 20% of a rotator light.
- E. Long service life due to LED technology and no moving parts.
- F. LEDs rated to 100,000 operational hours.
- G. Solid state electronics.

2.72 Speaker/ Public Announcement (PA)

2.72.1 A minimum of 100 watt speaker must be supplied and fitted.

2.73 Electronic Siren

- A. A minimum of 100W siren system must be provided and mounted inside the cab within easy access of the officer. The system must have the following features:
 - B. Compact, feature-packed, high powered
 - C. Automatic selection of emergency lights when any tone is selected.
 - D. Wail and Yelp siren tones as defined in the National Road Traffic Act with Stenner tone for intersections.
 - E. Air horn tone activated by hooter button when no siren tone is selected.
 - F. Siren sound pressure level with HD110R driver system exceeds minimum of 123dB. and P.A. level exceeds minimum of 115dB.
 - G. Push to talk (PTT) switch on microphone allows for siren tone over-ride when selected.

2.74 Lower Level Warning Light Package

2.73.1 Four (4) halogen warning lights and eight (8) LED warning lights, all with red lenses, must be provided. – FANA to Provide.

Lighting must be mounted as follows:

- A. Zone A- (2) Two LED lights on the front of the vehicle facing forward.
- B. Zone B - (2) LED lights at the forward most point (as is practical), one (1) at the rearward most point (as is practical), and a recess mount mid-ship halogen light located within the rub rail.
- C. Zone C - Two (2) LED lights on the rear of the vehicle facing rearward.
- D. Zone D - Two (2) LED lights, one (1) at the forward most point (as is practical) and one (1) centrally located to provide mid-ship warning lighting.
- E. One (1) recess mounted halogen light located within the rub rail at the rearward most point (as practical).
- F. The side facing lights must be located at forward most position, centered in rear wheel well, and in rub rail side facing at rear of body.
- G. A lighted rocker switches on the cab instrument panel, labelled lower level warning, must control the lights.

- H. Lower level devices must be mounted in compliance with NFPA standards.

2.75 Chassis Paint Finish

- 2.75.1 All chassis exterior components such as mirrors and bumpers must be removed prior to the finish procedure.
- 2.75.2 Paint process must feature acrylic urethane products and must be performed in the following steps:
- a) Filler Primer must be applied to guarantee smooth sub straight to provide good enamel hold-out of the top coat
 - b) A lead free, two-part acrylic urethane enamel top coat must be applied, providing excellent coverage and durability. A minimum of two coats must be applied.
 - c) High Solid clear coat must be applied as the final step in order to ensure full gloss and colour retention and durability. A minimum of one coat must be applied.
 - d) The vehicle rim must be painted in silver. The vehicle wheels arches must be trimmed in silver paint to complete the wheel finish.

2.76 Body Paint Finish

- 2.76.1 The aluminium body exterior must have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body.
- 2.76.2 Any vertically or horizontally hinged smooth-plate compartment door must be painted separately to assure proper paint coverage on body, door jambs and door edges.
- 2.76.3 Paint process must feature high solid Low Viscosity (LV) products and be performed in the following steps:
- A. Corrosion Prevention - all raw materials must be pre-treated to provide superior corrosion resistance and excellent adhesion of the top coat.
 - B. Sealer/Primer LV - acrylic urethane sealer/primer must be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base colour.
 - C. High Solid LV (Top coat) - a lead free, chromate-free high solid acrylic urethane top coat must be applied, providing excellent coverage and durability. A minimum of two coats must be applied.
- 2.76.4 Any location where aluminium is penetrated, after painting, for the purpose of mounting steps, handrails, doors, lights, or other specified components must be treated at the point of penetration with a corrosion inhibiting pre-treatment.

- 2.76.5 The pre-treatment must be applied to the aluminium sheet metal or aluminium extrusions in all locations where the aluminium has been penetrated.
- 2.76.6 All hardware used in mounting steps, handrails, doors, lights, or other specified components must be individually treated with the corrosion inhibiting pre-treatment.
- 2.76.7 The body must be finished painted in **Phoenix Red**

2.77 Chassis and Body Stripe

- 2.77.1 A straight white reflective stripe, 100mm minimum in width, must be applied horizontally around the cab and body.
- 2.77.2 Yellow reflective trim in accordance with the National Road Safety Regulation shall be secured to the vehicle.

2.78 Lettering/ Branding

- 2.78.1 Lettering must be provided in accordance with the instructions from the CoJ.
- 2.78.2 The recommended tyre pressure labels must be placed above each wheel.

2.79 Manuals

- 2.79.1 All equipment, components and maintenance manual must be provided (in English) with the completed unit including Service Book, with the exception of the following:
 - A. Two (2) operators manuals
 - B. Two (2) maintenance manuals

2.80 Auxiliary Equipment

- 2.80 The following equipment will be furnished with the completed unit and will be professionally mounted. The below noted equipment list, amongst others, includes the full list of equipment as prescribed by NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition).

Item no.	Item description	Equipment specification
01	1 x Hydraulic cutter	<ul style="list-style-type: none"> • Minimum working pressure – 720 bar • Minimum blade opening – 170 mm • Minimum cut force – 1420 KN • Weight – not exceeding 23 kg • Single quick acting coupling-core
02	1 x Hydraulic spreader	<ul style="list-style-type: none"> • Minimum working pressure – 720 bar • Minimum blade opening – 170 mm • Minimum spreading force – 280 KN • Weight – not exceeding - 23 kg • Minimum Pulling force – 130 KN • Single quick acting coupling-core • Minimum spreading distance – 610 mm
03	1 x Hydraulic small ram	<ul style="list-style-type: none"> • Minimum working pressure – 720 bar • Weight – not exceeding - 18 kg • Minimum Pulling force – 130 KN • Single quick acting coupling-core • First stage push force – not less than 229 KN • Second stage push force – not less than 83 KN
04	1 x Hydraulic large ram	<ul style="list-style-type: none"> • Minimum working pressure – 720 bar

		<ul style="list-style-type: none"> • Weight – not exceeding - 20 kg • Minimum Pulling force – 130 KN • Single quick acting coupling-core • First stage push force – not less than 229 KN • Second stage push force – not less than 83 KN
05	2 x hydraulic hoses	<ul style="list-style-type: none"> • Single quick acting couplings- core • Minimum length- 10m • Colour – two hoses with two different colours except black
06	1 x hydraulic motor	<ul style="list-style-type: none"> • Minimum working pressure- 720 bar • Maximum Weight - 35 kg • Minimum Motor horse power - 6.5 hp (4 stroke petrol) • Minimum displacement - 196cc • Hydraulic pump – two stage radial piston over piston • Tool operation – two tools simultaneous operation • Single quick action coupling-core
07	1 x Hydraulic hand pump	<ul style="list-style-type: none"> • Minimum working pressure - 720 bar • Effective oil contents: 1800 cc • 2-stage pump unit with output 1st and 2nd stage: min. 28 cc -and 2,3 cc • Maximum weight - 12 kg • Single quick action coupling-core
08	2 x Chock blocks sets	<ul style="list-style-type: none"> • Must be made from plastic (HDPE-high density polyethylene)

		<ul style="list-style-type: none"> • Non-absorbent, oil and chemical resistant and resistant to bloodborne pathogens • Virtually indestructible • High-visibility lanyards for easy carrying and gripping • The set must be black in colour
09	2 x Airbag steering covers	<ul style="list-style-type: none"> • easy to install, within seconds • suitable for all types of vehicles • must be provided with a synthetic storage box with wall-mounting bracket
10	1 x Set edge protective cover	<ul style="list-style-type: none"> • 6 Pillar covers at least 280mm x 240mm broad • Side window sheets at least 500mm x 700mm • 1 Windshield cover at least 1400mm x 800mm • 1 Side removal sheet 1850mm x 1200mm <p>Additional</p> <ul style="list-style-type: none"> • Sheets must be fitted with magnets on the edges to keep sheet in position • Pillar Covers must be fitted with tie down straps or Velcro strapping <p>Manufacturing Material</p> <ul style="list-style-type: none"> • Rip-stop • Woven Polyester • At least 280g per square meter • Unbrushed • Must be scotch guard treated
11	1 x Glass master	<ul style="list-style-type: none"> • Must cut on pull stroke

		<ul style="list-style-type: none"> • Must also be used on fiberglass, wood, plaster and underwater. • Storage of the spring-loaded center punch • Precision made of high strength aluminum alloy.
12	4 x High pressure airbags (small, medium, large, and extra-large)	<p>Small</p> <ul style="list-style-type: none"> • Must have a lifting force: minimum of 900kg • The inflation height must be: minimum of 80 mm • Dimensions (LxW) must be: maximum 150mm x150 mm • The Thickness including profile must be at maximum of 22 mm • The Weight must be at maximum of 0,6 kg • Must be made of rubber compound, reinforced with 3 aramide (Kevlar) inlays • Must be Equipped with light reflecting labels <p>Medium</p> <ul style="list-style-type: none"> • Must have a lifting force: minimum of 24 000kg • The inflation height must be: minimum of 215mm • Dimensions (LxW) must be: maximum 310mm x310 mm • The Thickness including profile must be at maximum of 25mm • The Weight must be at maximum of 9.5 kg • Must be made of rubber compound, reinforced with 3 aramide (Kevlar) inlays • Must be Equipped with light reflecting labels <p>Large</p> <ul style="list-style-type: none"> • Must have a lifting force: minimum of 32 000kg • The inflation height must be: minimum of 380mm

		<ul style="list-style-type: none"> • Dimensions (LxW) must be: maximum 658mm x 658mm • The Thickness including profile must be at maximum of 25mm • The Weight must be at maximum of 13.0kg • Must be made of rubber compound, reinforced with 3 aramide (Kevlar) inlays • Must be Equipped with light reflecting labels <p>Extra Large</p> <ul style="list-style-type: none"> • Must have a lifting force: minimum of 68 000kg • The inflation height must be: minimum of 520mm • Dimensions (LxW) must be: maximum 908mm x 908mm • The Thickness including profile must be at maximum of 25mm • The Weight must be at maximum of 24.0kg • Must be made of rubber compound, reinforced with 3 aramide (Kevlar) inlays • Must be Equipped with light reflecting labels
13	2 x 10m airbag hoses	<ul style="list-style-type: none"> • The minimum length must be 10m • Must be supplied with two hoses in different colours. • Must be equipped with push lock couplers • The hose must be made of Polyurethane
14	1 x Airbag regulator (first stage)	<ul style="list-style-type: none"> • Must have a Pressure reducer with PUSH LOCK couplings. • It must reduce pressure from 300 Bar to operating pressure with max 12 Bar outlet pressure • It must Indicate Cylinder Pressure and set operating pressure • It must be suitable for 300 bar • It must be supplied with 2m hose.

15	1 x Deadman controller (second stages)	<ul style="list-style-type: none"> • It must have a Dual Operations (Inflates and deflates) • It must have a Safety Pressure release automatic valve • Must have a Dead man safety system • It must have two (2) Pressure Gauges
16	20 x 65mm double jacket fire hoses (NST coupling)	<ul style="list-style-type: none"> • Must have National Standard Thread • Minimum 30 Meter • Must be double jacketed • Must be Canvas Hose • Must have 100% Synthetic high tensile all polyester double jacket • Must have 100% Mildew resistant • Must be single-ply synthetic polyurethane liner resists ozone • Reduced weight, • Increased flexibility • Must be tested and stenciled in accordance with NFPA Standard 1961 • Must have minimum one year warranty for manufacturing defects and delamination
17	20 x 38mm double jacket fire hoses (NST coupling)	<ul style="list-style-type: none"> • Must have National Standard Thread • Minimum 30 Meter • Must be double jacketed • Must be Canvas Hose • Must have 100% Synthetic high tensile all polyester double jacket • Must have 100% Mildew resistant • Must be single-ply synthetic polyurethane liner resists ozone • Reduced weight,

		<ul style="list-style-type: none"> • Increased flexibility • Must be tested and stenciled in accordance with NFPA Standard 1961 • Must have minimum one year warranty for manufacturing defects and delamination
18	6 x fire branches (750l/m)	<ul style="list-style-type: none"> • Must be manufactured of a metal alloy • Must be fitted with pistol grips • Must have a stainless steel shut-off sliding cylinder shut off valve • Must have adjustable tip - Flush, fog to straight stream • Must be integrated debris screen. • Must fit 38mm hoses with NST female couplings • Must have a selectable litre nozzle from approximately 100 l/min to 750l/min • Must be fitted with suitable steel/aluminum material spinning fog teeth • Must have variable setting of nozzle litre by means of shut/ open sliding valve • Must have minimum 5 Years Product Warranty • Must meet NFPA 1964 standards or EU Standards
19	2 x fire branches (360l/m)	<ul style="list-style-type: none"> • Must be manufactured of a metal alloy • Must be fitted with pistol grips • Must have a stainless steel shut-off sliding cylinder shut off valve • Must have adjustable tip - Flush, fog to straight stream • Must be integrated debris screen. • Must fit 38mm hoses with NST female couplings • Must have a selectable litre nozzle from approximately 100 l/min to 360l/min • Must be fitted with suitable steel/aluminum material spinning fog teeth • Must have variable setting of nozzle litre by means of shut/ open sliding valve • Must have minimum 5 Years Product Warranty

		<ul style="list-style-type: none"> • Must meet NFPA 1964 standards or EU Standards
20	2 x playpipes	<ul style="list-style-type: none"> • Axial Play pipe with stacked tip smooth bore nozzle with 7cm, 3,5cm & 2,5cm outlets. • Must be equipped with removable debris screen, durable metal ball and a smooth waterway. • Must have fulltime 6.35cm Swivel, • Must have 65mm female NST coupling. • Maximum weight: 3.3kg.
21	5 x SCBA backpack assembly	<ul style="list-style-type: none"> • The back plate shall be a one-piece, anti-static composite construction with orthopedic design so as to evenly distribute the weight of the SCBA over the user's lumbar region, hips and shoulders. • The waist pad shall swivel and pivot from side to side by approximately 20 degrees to increase comfort and stability when moving. • The shoulder and waist padding must be constructed from a high abrasion resistant, high puncture resistant, light weight, water resistant compression formed EVA. The shoulder and waist padding shall be chemical resistant and fire retardant. • The harness webbing must be constructed of a strong, hard wearing type material. • The shoulder pads must be designed with an ergonomic body contoured comfort style to maintain shape when worn, providing comfort and freedom of movement, wide for optimal support. Shoulder and waist belt harnessing must be independently adjustable.

		<ul style="list-style-type: none"> • Shoulder and waist adjustment friction buckles must be of Flame-Retardant polyamide construction. • Each shoulder and waist harness padding must be easily detached from the back plate by a quick release button only. This will allow for easy cleaning and disinfection of the harness if requires without the use of tools. • To enable rapid donning without obstructing other wearers in, for example, confined spaces or Fire Appliance cabs, the waist adjustment should be by means of twin 'pull forward' adjusting straps • A cam-lock mechanism shall be used to secure the cylinder strap in place to ensure simple and secure operation. • The cylinder strap shall accommodate a complete range of sizes of cylinders without the use of tools. • The pneumatic system must be easy to detach from the back plate and harness. • Hoses must be routed in hose channels inside the back plate to eliminate snag potential, including over the shoulder rescue hoses. • Hoses must be attached to the harness via hose clips. These clips must not be detached when removing hoses for cleaning. <p>Monitoring</p> <ul style="list-style-type: none"> • The breathing apparatus should be provided with a complete with either a pneumatic pressure gauge or an electronic monitoring unit as described below: <p>Pneumatic Pressure Gauge</p> <ul style="list-style-type: none"> • Pneumatic pressure gauge must be fully luminescent.
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		<ul style="list-style-type: none"> • The low-pressure whistle warning device must be integrated into the pressure gauge hose close to the gauge. • The pneumatic gauge must be encased by a protective rubber cover. • The pneumatic gauge must be located over the left shoulder. <p>The Personal Alert Safety System (PASS) device must be integrated on the pneumatic pressure gauge</p> <ul style="list-style-type: none"> • Continuous location Flashes • Manual Alarm or Tone delay • Movement detector • Pre-set alarm after 30 seconds of no movement • Pre-Alarm at minimum 75 db • Full Alarm at minimum 90db at 2m in free air • Frequency range 2.5Khz – 3.5 KHz • LED Flashes with distress alarm • 1 flash every second • EMC tested and Approved • Small and low-profile maximum dimension metric 140 mm x 100mm x 50mm • Weight maximum 400 grams • Low battery indicator Audio/ Visual
22	9 x SCBA cylinders	<ul style="list-style-type: none"> • Cylinder must be a 300-bar pressure vessel • Must provide test certificate with all cylinders • Minimum 6l water capacity • The cylinder must be suitable for firefighting purpose

		<ul style="list-style-type: none"> • The cylinder must be manufactured from a seamless aluminum liner (Carbon Fiber), which is subsequently over wrapped with carbon and glass fibers. • The cylinder must have an excess flow valve to prevent uncontrolled flow on accidental opening. • The cylinder must have a single valve activation and ratchet to prevent inadvertent valve closure. • Must be light weight
23	1 x medical jump bag	<ul style="list-style-type: none"> • The item should be a Load n' Go. • It must be designed to keep equipment organized and quickly accessible using transparent pockets and elastic holsters that are arranged in a book-style configuration • It must be foam-lined construction maintains pack shape and protects contents • It must have clear, durable urethane windows, mesh pockets, and elastic holsters keep contents in place and well-organized • It must have ergonomic, padded shoulder straps and back panel for comfort during transport • It must have a quick zip access to front compartment • Zips must be robust and hold a life time warranty/Guarantee • Large side pockets must allow quick access to vital sign tools • Must be designed to carry drug module bag, Quick Roll intubation kit, LED light Attachment point. • Must have pathogen resistant material (black) • Must have transparent sleeves and windows • Must be a sturdy, high-tech construction

		<ul style="list-style-type: none"> • Must have an IV module • Colour: tactical black/ red • Must have a minimum Capacity of 42606 cm³ • Minimum Size must be: Height = 50 cm. Width= 48 cm, Diameter =17 cm • The front side of bag must be written "City of Johannesburg" and marked with the COJEMS logo using reflective material.
24	1 x Rubber Mallet	<ul style="list-style-type: none"> • Must be an unbreakable nylon rubber mallet • Non slip grip fiberglass handle, epoxy glued and pinned.
25	2 x Salvage sheet (3.7m x 4.3m)	<ul style="list-style-type: none"> • Must be treated with a fire- and water-resistant finish. • Must meet requirements for NFPA-701 (large scale), and CPAI Section 6. • Must have water resistant finish and mildew inhibitors. • Must easily be wiped clean.
26	10 x Traffic cones	<ul style="list-style-type: none"> • Safe, compact, highly visible • Must meet SABS Standards • Must be constructed of orange plastic material. • Must have reflective strip of minimum of 5cm wrapped around the cone • Must meet the new 2009 NFPA 1901: STANDARD FOR AUTOMOTIVE FIRE APPARATUS (2016 EDITION) apparatus standard
27	1 x Automated External Defibrillator (AED)	<ul style="list-style-type: none"> • Automated external defibrillator with ECG screen and manual override (unit) • Complete unit must include each replaceable accessory as specified within the series

		<ul style="list-style-type: none"> • Complete Operation/Maintenance Manual Book/File copies in English Language must be provided. • The unit must comply with an acceptable International Safety Standard such as IEC 60601-1 or 60601-1-2 or ISO 13485, ISO 9001 for Medical Equipment. • The service provider must maintain a system for notifying and providing Users with Updates, Modifications, and Software Releases and Recalls. • Training in the operation of the unit must be provided. • All Equipment, Materials and Workmanship provided under this contract must be guaranteed for a minimum period of 2 years. • The service provider to note that the Guarantee period must only take effect upon successful commissioning and delivery of this unit. • The unit being bid for must be a button operation BIPHASIC semi-automated external defibrillator and it must be suitable for ground mobile; ambulance use and ward use in Hospitals. • The unit being bid on must be lightweight less than 3.4kg, it must be robustly constructed, it must incorporate the latest and reliable BIPHASIC technology and the unit must conform to IEC 601-2-4 “Particular requirements for the safety of cardiac defibrillators”. • The unit being bid on must be able to perform impedance compensation before delivering a shock to a patient. 2 • Design Standards: should meets AAMI DF-80, EN 60601-1, EN 60601-1-2 and ISO 13485, ISO 9001 • P55 dust-water ingress rating • Passed the 1-meter drop test • Three-lead patient monitoring
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		<ul style="list-style-type: none"> • Manual override offer flexibility in monitoring, analysing, and delivering treatment. • Real-time feedback on both the rate and depth of chest compressions to enhance CPR resuscitation quality. Internal recording of up to four events • The supplier must ensure the product is in compliance with the requirements South African Health Products Regulatory Authority (SAHPRA) – WENDY TO REMOVE INTERNATIONAL STANDARD • SCREEN • High-resolution LCD display. • Screen Size: not less than 76.7mm Width x 57.7 mm Height. • Sweep Speed: not more than 25 mm/sec. • Viewing Time: not more than 3 seconds. • Displayed Information on Heart rate, ECG waveform, CPR bar graph, battery gauge, elapsed time, number of shocks delivered • Defibrillator Energy: 50, 70, 85 joules (paediatric); 120, 150, 200 joules (adult) • Type: Internal non-volatile memory. • Memory Capacity: With audio recording enabled, minimum of 20 minutes of ECG, operator and device actions; • Without audio recording, minimum of 1.45 hours each for 4 patients records or a minimum of 5.8 hours for a single record of ECG and event data. • Expanded external data storage and transfer available with a slot for a USB memory stick • Event Review & Reporting: Code Review software version 3.30 or higher. • Communications: IrDA infrared wireless for communication with personal computer or external
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		<ul style="list-style-type: none"> • Charge Time: not more than 30 minutes with a new battery.
28	4 x BIC female adaptors	<ul style="list-style-type: none"> • Must be made out of cast aluminum • Must be female 65mm BIC to female 65mm NST coupling • Must be male 65mm BIC to male 65mm NST coupling • must be male 65mm BIC to male 38mm NST • must be male 65mm NST to 65mm NST • Must be female 65mm NST to male 38mm NST
31	1 x PPV fan	<ul style="list-style-type: none"> • Must be made out of cast aluminum 7-blade air foil propeller • Blade must have low noise, high output design • Power from standard, variable speed gasoline motor • Direct drive system eliminates shaft for years of trouble-free operation • Cart style design with rear mounted wheels and pull-up full height, full width handle for easy maneuverability • Locking step brake to make setup lightning fast • The airflow test must be certified by the Third party.
32	1 x chain saw	<ul style="list-style-type: none"> • Must have on/off switch • It must have 68-80cc two stroke engines • Must be a low fuel consumption • Must have a reduced exhaust emission levels in accordance with environmental regulations. • Must have an active vibration reduction • Must have an air purge system to assist with easy start

		<ul style="list-style-type: none"> • Must have a visible fuel level indicator • Must have 400mm to 500mm guide bars • Must be fitted with chainsaw chains with the following pitch 3/8 • Must be fitted with chain guards • Must have instant manual chain breaks • Must have inertia chain break automatic chain break if an automatic kick back is experienced • Must have a tool less chain and adjuster to be easy to reach • Must be fitted with decompression valve for easy starting • Must be fitted with a cold start device (choke manual or automatic) • Must have a tool kit consisting of plug spanner, screw driver and tools required for maintenance • Must be provided with chain protector • Must be supplied with one spare chain and a sharpening kit.
33	1 x Carborundum cutter	<ul style="list-style-type: none"> • Must have on and off Switch • 2.5- 3.7 kw petrol motor (two stroke) • Must be fitted with a cold start device (Choke manual or automatic) • Must be air cooled • Must have active triple air filtration in cases of concrete cutting • Must fit 300mm to 400mm abrasive disks • Must have decompression switch for easy start • Must have a reversible cutting arm • Must have easy adjustable blade guard • Must have active vibration dampening system • Must have clearly visible Fuel indicator

		<ul style="list-style-type: none"> • The noise must be below 120db • Must have automatic Lubrication of Clutch bearing
34	1 x Low expansion foam branch	<ul style="list-style-type: none"> • Must be minimum 850 L/min at 7 bar • The Branch Pressure must be between 3 Bar and 8 Bar • Expansion ratio minimum 10:1 • The Flow Rate must be of minimum 300L/min • The branch must be of minimum 14-meter throw • The output must be minimum 15m³/min • The Inlet side must be 65mm female NST inlet. • The couplings must be made out of Light alloy • Epoxy painting aluminum handle. • It must have a maximum weight 4 Kg
35	1 x medium expansion foam branch	<ul style="list-style-type: none"> • Must be a minimum of 450 L/min at 7 bar • Branch Pressure must be a minimum 2.5 Bar • Expansion ratio must be a minimum 55:1 • Flow Rate must be a minimum 270L/min • Must have a minimum of 8-meter throw • Output must be a minimum 15m³/min • Must have an inlet of 65mm female NST. • Must be made of Stainless steel • Couplings must be made light alloy • Must be chrome plated brass nozzle. • Must be Epoxy painting aluminum handle. • Must have a Stainless-steel gauze.

		<ul style="list-style-type: none"> The branch must be Maximum weight of 7 Kg
36	1 x 225l/m inline inductor with a pick-up tube	<ul style="list-style-type: none"> Must produce a minimum of 225 L/min at 7 bar Must have a setting between 1-6% induction of foam concentrate It must be adjustable at a Minimum of 4.5 Bar pressure It must have Maximum operating pressure 10 Bar Must be a Venturi-type inductor devices, Inlet must be a 65mm female NST Outlet must be a 65mm Male NST
37	1 x 450l/m inline inductor with a pick-up tube	<ul style="list-style-type: none"> Must produce a minimum of 450 L/min at 7 bar Must have a setting between 1-6% induction of foam concentrate It must be adjustable at a Minimum of 4.5 Bar pressure It must have Maximum operating pressure of 10 Bar Must be a Venturi-type inductor device Inlet must be a 65mm female NST Outlet must be a 65mm Male NST
38	1 x reciprocating saw	<ul style="list-style-type: none"> It must be Rugged rubberized Constructed It must operate at 220v It must have a Minimum of 1200watt It must have a Minimum of 2300 strokes under no load The Strokes length must have a minimum of 25mm It must have an active anti vibration It must have variable strokes rate settings it must have keyless blade clamp

		<ul style="list-style-type: none"> • it must have keyless Adjustable contact shoe for depth setting • it must have Orbital action • it must have a Removable handle for stabilizing tool • it must be below 5kg in weight • it must be supplied with a rugged case. • it must supplied with 15 packets of metal and 5 packets of wood blades. • it must have a minimum of 1m electrical cord with 3- point plug
39	1 x angle grinder	<ul style="list-style-type: none"> • It must fit a minimum of 230mm Cutting Disks • It must be 14mm Spindle Thread • Cutting depth must be a minimum of 60mm disk when new. • It must be able to operate at 220 Volt • It must have a smart power technology to ensure constant high cutting performance • The Cutting power must be minimum of 2300 Watt • The Blade Speed without load must be minimum of 6400 rpm • It must have quick-acting brake to stop the disc within 2.5 seconds. • It must be Double Insulated. • It must have a fully rotatable disk guard. • It must have a rugged dust removal hood and soft grips for virtually dustless operation and greater safety • It must have a vibration reducing side Handle • It must have a rotatable grip for a comfortable working position • It must have a Minimum 4m Power cord • It must have an Operating sound level not greater than 105 dB if measured in accordance to EN 60745

		<ul style="list-style-type: none"> • It must have an Operator controlled Start up switch • It must have an Active Torque Control to protect operator • It must have an Active Vibration Reduction
40	1 x 30m extension cord	<ul style="list-style-type: none"> • Must be housed in a steel drum frame. • Must be 2 x 3 point electrical outlets fitted in the steel drum • The Electrical cable must have a minimum of 15A • It must be 30 meter length of cable • It must have 3 point plug fitted
41	1 x Pick headed axe (with a robust plastic handle)	<ul style="list-style-type: none"> • Must have a high grade tool steel • The Head must be heat treated • The Handle must be rated at a minimum 500 kg • Must have a strong protruded fiberglass core with an injection molded jacket for added strength • The axe head must be bonded to the fiberglass handle with strong two part epoxy • The axe head must be a drop forged with high carbon steel • The fibre glass handle must be a minimum of 850mm • The flat cutting blade must a minimum of 1.5 kg • It must have a minimum of 80mm pick side.
42	1 x Flat headed axe (with a robust plastic handle)	<ul style="list-style-type: none"> • Must have a high grade tool steel • The head must be heat treated • The handle must be rated at a minimum of 500 kg • Must have a strong protruded fiberglass core with an injection molded jacket for added strength

		<ul style="list-style-type: none"> • The axe head must be bonded to the fiberglass handle with strong two part epoxy • The axe head must be a drop forged with high carbon steel • The fibre glass handle must be a minimum of 850mm • The flat cutting blade must a minimum of 1.5 kg
43	1 x Pry axe	<ul style="list-style-type: none"> • It must be lightweight • It must be multi-purpose, slam, ram tool designed to pry and twist. • It must chop, cut metal, twist off locks or latches • The head and claw must be from a separate sections • Must be forged from high-alloy steel • Must be heat treated for maximum strength. • Solid steel shaft must extends the axe to a minimum of 71cm • Sure grip machine-grooved must have rubber Grips • The maximum weight must be 5kg • It must be a standard claw • Duckbill must have long, smooth incline to force windows and interiors doors. • Pike must be long, sharp, tapered and gently curved to fit a lock or latch. • Must have the following: <ul style="list-style-type: none"> - Pike - Recessed blade - Axe blade - Teeth - Spanner wrench - Extended shaft - Claw shaft - Shaft release

		- Standard claw with gas shutoff
44	1 x Haligan tool	<ul style="list-style-type: none"> • It must be made out of Heavy duty Steel or steel alloy • The machine grooved must have non- slip grips • The Inclined duckbill must be Long and smooth • The Pike must be long, tapered and gently curved to fit a lock or a latch • Must be Fitted with standard claw and metal cutting claw
45	1 x Spine board	<ul style="list-style-type: none"> • Must be a full length adult plastic spine board: minimum Length of 185cm, minimum Width of 45cm and minimum thickness of 5cm. • The load capacity must be minimum of 150kg whilst the board is supported only at the head and feet. • Must be made of strong plastic and sealed with a smooth finish. • Minimum of 12 hand-holds around the board and support runners on the under-side (inside) of the board. • Must be usable in any weather condition (e.g. hot and cold) and within water without any loss of innate strength and/or load capacity. • Must include a test certificate regarding the ability of the spinal board to carry a capacity of not less than 150kg loads whilst being supported only at the head and feet. • It must be suitable to be used with a spider harness. • Must be made of durable polycarbonate and polypropylene • It must be suitable for X-ray Translucent • Must have Angled edges for Log Rolling • Must have a Central Slot in lower half of the board, allowing for immobilizing each leg

		<ul style="list-style-type: none"> • Must have a Narrow Foot end
46	1 x Scoop stretcher	<ul style="list-style-type: none"> • It must be suitable for moving, immobilizing, lifting and carrying patient in the pre-hospital care environment. • The stretcher must allow the EMS practitioner to place a stretcher beneath the patient without moving the patient, therefore reducing the risk of further injury. • Length Opened must be maximum of 166cm • Length Folded must be maximum of 120cm • Width Open must be maximum of 43cm • Weight must be maximum of 7kg • Minimum Load Capacity of 160g whilst the board is supported only at the head and feet. • Must fold for compact storage • The unit must have telescoping tubes to allow length adjustments to fit patients of various heights. • The unit must have a narrow foot frame for handling in confined areas. Foot frame handles to be tapered upwards to allow ease of lifting. • It must be able to uncouple at two ends • It must have a narrow foot end • Open center design to allow for x-rays to be taken • Must be made from high quality aluminium • Each scoop must be designed with a minimum of 8holes to fit a standard spider harness.
47	2 x Portable oxygen cylinder	<ul style="list-style-type: none"> • Must have Pin index connection • Must be made of Aluminium body

		<ul style="list-style-type: none"> • Must Hold a D-sized tank. • Dimensions must be at minimum of: Diameter 11cm, Length 40cm. • Must have a black body with white neck • Must include the rust plastic casing.
48	2 x Pin index oxygen regulator	<ul style="list-style-type: none"> • Must have a Dial Click Stop Constant Flow with Pressure Gauge to Register Cylinder Pressure. • Oxygen must be delivered through Click Stop; Hand Dial marked 0-25 l/min. • Construction must be : Outer body -Aluminium, Inner Liner - Brass • Regulator must be supplied 3 x BODOC seals. • Pressure Dial must be protected by a rubber type ring. The device must be able to operate input pressure of at least 200 bars. • Must carry a minimum of 2 years Warranty • Must have a Therapy flow rate selector • The flow rate must be indicated in the display window to choose from ½, 1, 2, 3, 4, 6, 8,10 or 15 litres per minute
49	1 x Kendrick Extrication Device adult	<ul style="list-style-type: none"> • The item should be Ideal for immobilizing and extricating the patient from Motor Vehicle Incidents and/or confined spaces. • Rigid Spinal (back) support extrication device with built-in neck support and chest flaps. • Unit must be capable of immobilization of spinal cord when correctly applied. • Weight should not exceed 3 kg. Must include 2 forehead/chin restraints that attach to a movable head immobilization system, and carry case. • Chest and extremity straps must be color- coded with sewn-in securing straps and snap-lock quick release buckles.

		<ul style="list-style-type: none"> • Carrying handles must be securely attached to the device in such a way as to withstand a patient's weight up to minimum of 40kg with no loss of integral strength. • Covering material must be heavy-duty, vinyl-coated nylon or similar, durable and washable. • Should secure a patient in the seated and/or standing position. • Must be able to be used for multiple patient sizes. • The adjustable, fold-back sides permit easy access to patient chest. • The wraparound design should provide horizontal flexibility for easy application and vertical rigidity for maximum support of the spine, neck and head during extrication. • Maximum load capacity must not be less than 60 kg • Restraint straps must be a minimum of 25mm nylon webbing with snap-lock quick release buckles. • The device must carry a minimum of a two year guarantee. • X-ray, MRI (Magnetic resonance imaging) and CT (computed tomography) Scans as well as advanced life support procedures should be able to be performed with the device in place. <ul style="list-style-type: none"> • Pediatric/Child <ul style="list-style-type: none"> - Length: between 790 mm -1170 mm - Width: not less than 200 mm - Height: between 50 mm-200 mm - Weight: not more than 3 kg • Adult <ul style="list-style-type: none"> - Length: between 890 mm-1370 mm - Width: not less than 230 mm
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		<ul style="list-style-type: none"> - Height: between 80 mm-230 mm - Weight: not more than 3kg
	1 x Kendrick Extrication Device child	
50	1 x Traction splint adult	<ul style="list-style-type: none"> • The unit must be a light weight femoral traction splint for use in the pre-hospital environment. • The unit must be capable of immobilization and traction of fractured femurs. • The unit must be easily applied. (one person application) nothing to assemble – always ready to use. • Incorporate an articulating ischial perineal cushion that is comfortable and conforms to the pelvis, simplifying pelvic procedures. • It must permit traction to decrease as the spasm releases. • The child unit must be adjustable for a range to fit an infant to a child of 6 years. • The unit must be able to be applied with minimum movement of the legs. <p>Construction</p> <ul style="list-style-type: none"> • It must be lightweight aluminium and stainless steel constructed. • It must be compact to allow for easy storage. • It must have a telescoping frame for adjusting length. • All points of possible contact with patient must be protected to prevent pressure injury. • It must be completed with a carry case • It must provide inline mechanical traction by means of a quick release ratchet strap • It must have an adjustable length

		<ul style="list-style-type: none"> • It must have a simple adjustable wrap around ankle hitch designed to allow for the monitoring of pedal pulses • It must have soft padded leg straps • It must have low-profile ischial pad allowing the splint to be applied with minimum movements of the injured leg • It must have a Folding Heel stand: Folding flat for storage and instantly locks in place for support
	1 x Traction splint child	
51	4 x Standpipes (key and bar)	<ul style="list-style-type: none"> • Must be made out of steel alloy • Must be between 1m and 1.5m long • The swivel head must be 65mm diameter Female instantaneous • Must fit the London V thread (LVT) 65 mm • London Round Thread to London V thread adaptor to standpipe. • Must be supplied with key and bar
52	2 x Hydrant wheels	<ul style="list-style-type: none"> • It must be constructed from Aluminium Alloy • Minimum Dimension: Diameter 150mm, Thickness 20mm • Finishing must be red powder coated • Must indicate close and open directions
53	2 x Hydrant keys (X shape)	<ul style="list-style-type: none"> • Must be made out of Stainless steel. • Must be wheel spanner shape
54	2 x High volume hose spanner	<ul style="list-style-type: none"> • Must fit 100mm Storz Couplings and 65mm NST Couplings

55	1 x 65mm collecting breeching	<ul style="list-style-type: none"> • Must be made out of Lightweight aluminum alloy • Must have 2 x 65mm NST female inlets • Must have a self-locking valves for positive handle positioning. • 1 x 65mm NST Male outlet
56	1 x 65mm dividing breeching	<ul style="list-style-type: none"> • Must have 65mm NST female inlet • 2 x 65mm NST male outlets • Must be made of hard anodized metal • It must have an Aluminum Shut off valves with high tensile control handles • It must have Self-locking valves for positive handle positioning • It must have a minimum weight of 7 Kg • Must be flow efficient at a minimum of 2400L/min through each valve.
57	1 x Set of general spanners (10, 11,12,13,14,15,17,19, battery pliers, normal pliers, long nose pliers, and shifting spanner)	<ul style="list-style-type: none"> • All spanners must be made of stainless steel: - Spanner sizes 10, 11, 12, 13, 14, 15, 17,19 - Battery plyers - Normal plyers - Long nose plyers - 250mm shifting spanner
58	1 x Woodlands hydrant adaptor	<ul style="list-style-type: none"> • Must be made out of steel alloy • Inner diameter must be 100mm • Must be fitted with 100mm Stortz coupling and blank cap.

59	2 x 65mm hose ramps	<ul style="list-style-type: none"> • Bridges must give you economical hose line protection for up to 65mm hose lines. • It must be not less than 30cm wide and must be interlocked to any width • Must be equipped with reflective safety strips for added visibility. • Must be made of fibre reinforced rubber. • Must accommodate two hoses.
60	2 x Dry chemical powder extinguisher	<ul style="list-style-type: none"> • Must be suitable for Class A, B and C fires. • The cylinder must be made out of steel • Must be 9kg
61	2 x CO2 extinguisher	<ul style="list-style-type: none"> • Must discharge a white cloud of “snow” which smothers a fire by eliminating its oxygen. • Must be suitable for Class A, B and C fires. • The cylinder must be made out of steel • Must be 9kg.
62	1 x Electrical generator	<ul style="list-style-type: none"> • Must have an on/off Switch • Must have minimum of 4.5Kva • Must operate at 220 volt • Must have a petrol driven motor (four stroke) • Must be fuel efficient with at least 2 hours per 5 litre of fuel • Must have 2 x three point plug ports in a wear resistant housing fitted to steel frame. • Must have an electronic circuit breaker • Must have a Steel Framed protecting the mechanical operating parts • Must be Fitted Petrol tank with a shut off valve

		<ul style="list-style-type: none"> • Must be Fitted with an cold start device (choke manual or automatic) • Must have low oil protection with automatic shutdown • Must have a minimum of 2 years warranty
63	1 x Large bolt cutter	<ul style="list-style-type: none"> • Must have a minimum of 750mm long • Must have heavy duty jaw bolts • Must have heavy duty straps • Must have rounded edge cutters to Brinell 400 and Rockwell C42 hardness • It must have nose Straps
64	1 x Small bolt cutter	<ul style="list-style-type: none"> • Must have a minimum of 450mm long • Must have heavy duty jaw bolts • Must have heavy duty straps • Must have rounded edge cutters to Brinell 400 and Rockwell C42 hardness • It must have nose Straps
65	1 x Bow saw	<ul style="list-style-type: none"> • It must have a minimum of 500mm cutting length • It must have a blade tensioner
66	1 x Hack saw	<ul style="list-style-type: none"> • It must have a minimum of 300mm cutting length • It must have a steel wrap around handle
67	2 x Safety belt cutters	<ul style="list-style-type: none"> • It must cuts through seat belts. • Its must be made of high strength Aluminum alloy. • The Tip must be fitted with Dzus Key for opening aircraft panels.

		<ul style="list-style-type: none"> • Must cut 4500kg strength webbing with one stroke.
68	1 x Pitch fork	<ul style="list-style-type: none"> • Must be made out of Malleable iron head • The handle must be Fibreglass and round • It's butt must be made out of rubber
69	1 x Combination fuel/oil can	<ul style="list-style-type: none"> • Must be SABS Approved for combustible liquids • Must be made from a durable material • Fuel capacity must be of no less than 4 litres and not more than 6 litres • Must hold up to 2 litres of oil • Pouring spouts must be incorporated into closing lids
70	5 x 100mm double jacket high volume supply hoses	<ul style="list-style-type: none"> • Must be a Storz Couplings • Must be 15 Meter long • Must be Double Jacketed • Must be Canvas Hose • Must be 100% Synthetic high tensile all polyester double jacket • Must be single-ply synthetic polyurethane liner which resists ozone • Must be mildew resistant • It must be lightweight • It must have an increased flexibility • It must be tested and stenciled in accordance with NFPA Standard 1961
71	2 x Pike poles	<ul style="list-style-type: none"> • Must be made out of malleable iron head and fiberglass round handle • Must have hook and tooth

		<ul style="list-style-type: none"> • Must have a Rubber Butt
72	1 x Ground monitor	<ul style="list-style-type: none"> • Must be Portable and Manually operated • Must have 2x 65mm NST Female inlet fittings. • Must have high flow rate • Must be Fitted with nozzle • The nozzle must be adjustable from fog to jet • Must have adjustable height • It must rotate at a minimum of 180 degree
73	1 x Battery suction unit	<ul style="list-style-type: none"> • Must have a minimum battery operational time of 60 minutes (High Capacity rechargeable). • Must have a Capacity of the aspiration container at a minimum of 800ml • Must have a Protection for electrical shock • Must have integrated filter: Internal bacterial filter/fluid shut off. • Must have the following Electrical requirement: 100-240Volt AC, 47- 63Hertz, 0.5A max.12Volt DC, 33Watt max.
74	2 x Stabilizing head blocks sets	<ul style="list-style-type: none"> • Must have a large ear hole in each head support. • It must have an attachment base system that allows for the head blocks to be attached to a trauma board or scoop stretcher. • It must have reusable head and chin straps which are fully adjustable for length (Velcro or clip attachment to the head blocks). • Device must be X-ray lucent and must have minimal interference with Magnetic Resonance Imaging (MRI), or computerized tomography (CT) scanning procedures.

		<ul style="list-style-type: none"> • It must be a non-disposable item. • Must be applied with minimum movement of the cervical spine. • Complete system must consist of contoured head blocks, a base pad with adhesion to secure the blocks and the head and chin straps. • Blocks must be constructed of plastic coated closed cell foam which must prevent bacterial growth within components. • Must not absorb blood or body fluids. • Must be easy to clean and not affected by adverse weather conditions (moisture). • The maximum weight must be 1kg. • Dual-purpose head supports must be tapered on the one side so that they can be used with a flat backboard or scoop stretcher. • The colour of the device must be orange. • The device must carry a one year guarantee. • Must have a Minimum length of 400 mm • Must have a minimum Width of 260 mm • Must have a minimum Height of 170 mm • Must have a maximum weight of 794g
75	1 x Bag valve mask (manual resuscitator) adult, child, and infant	<p>Adult manual resuscitator</p> <ul style="list-style-type: none"> • The bag must be operable with one hand. • The Bag must be capable of rapid and full re-expansion. • It must have a swivel connector present to allow for changing angle of operation. • It must have 22mm outer diameter and 15mm internal diameter fittings. • The unit must not be affected by extremes of high/ low temperatures. • It must have an oxygen inlet which is compatible with the oxygen tubing. • It must have a bag volume of minimum 1500 ml.

		<ul style="list-style-type: none"> • It must have Stroke volume of maximum 1000 ml. • Cuffed Face mask must be clear and provide a leak proof seal. • Must have Standard 22mm Internal Diameter. Mask sizes 4 and 5 to be supplied. • Must have a compatible valve fitting to standard external (positive end-expiratory pressure) PEEP fitting W/POP-OFF 60 cmH2O • It must be made of silicone, non-disposable. • It must be suitable for sterilization by autoclave or cold chemical. • Oxygen enrichment reservoir bag must be at a minimum of 2600 ml • Must be supplied in a soft carrying case made of a durable, washable material with appropriate carrying straps. • Adult bag volume must have a minimum of 1700ml <p>Child manual resuscitator</p> <ul style="list-style-type: none"> • The bag must be operable with one hand. • The Bag must be capable of rapid and full re-expansion. • It must have a swivel connector present to allow for changing angle of operation. • It must have 22mm outer diameter and 15mm internal diameter fittings. • The unit must not be affected by extremes of high/ low temperatures. • Must allow for oxygen inlet via oxygen tubing. • It must have a bag volume of minimum 500 ml. • It must have Stroke volume of maximum 350 ml. • Cuffed Face mask must be clear and provide a leak proof seal. • Must have Standard 22mm Internal Diameter. Mask sizes 1,2 and 3 to be supplied. • Must have a compatible valve fitting to standard external (positive end-expiratory pressure) PEEP fitting W/POP-OFF 60 cmH2O
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		<ul style="list-style-type: none"> • It must be made of silicone, non-disposable. • It must be suitable for sterilization by autoclave or cold chemical. • Oxygen enrichment reservoir bag must be at a minimum of 900ml • Must be supplied in a soft carrying case made of a durable, washable material with appropriate carrying straps. • Child bag volume must have a minimum of 470ml <p>Infant manual resuscitator</p> <ul style="list-style-type: none"> • The bag must be operable with one hand. • The Bag must be capable of rapid and full re-expansion. • It must have a swivel connector present to allow for changing angle of operation. • It must have 22mm outer diameter and 15mm internal diameter fittings. • The unit must not be affected by extremes of high/ low temperatures. • Must allow for oxygen inlet via oxygen tubing. • It must have a bag volume of minimum 280 ml. • It must have Stroke volume of maximum 150ml. • Cuffed Face mask must be clear and provide a leak proof seal. • Must have Standard 22mm Internal Diameter. Mask sizes 00, 0 and 1 to be supplied. • Must have a compatible valve fitting to standard external (positive end-expiratory pressure) PEEP fitting W/POP-OFF 40 cmH2O • It must be made of silicone, non-disposable. • It must be suitable for sterilization by autoclave or cold chemical. • Oxygen enrichment reservoir bag must be at a minimum of 600ml • Must be supplied in a soft carrying case made of a durable, washable material with appropriate carrying straps.
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		<ul style="list-style-type: none"> Child bag volume must have a minimum of 150ml <p>Physical Characteristics of Adult, Pediatric and Child BVM</p> <ul style="list-style-type: none"> Transparent Facemask allows for easy monitoring of skin color, signs of vomitus or body fluids. Complete with Oxygen Reservoir System. Controlled Flow rate. Controlled Airway Pressure Controlled Ventilation. Reduced Risk of Gastric Insufflations. <table border="1"> <tr> <td>Inspiratory Resistance minimum</td> <td>3.30 mm H₂O</td> </tr> <tr> <td>Expiratory Resistance minimum</td> <td>2.20 mm H₂O</td> </tr> <tr> <td>Reservoir Volume minimum</td> <td>2700 ml</td> </tr> </table>	Inspiratory Resistance minimum	3.30 mm H ₂ O	Expiratory Resistance minimum	2.20 mm H ₂ O	Reservoir Volume minimum	2700 ml
Inspiratory Resistance minimum	3.30 mm H ₂ O							
Expiratory Resistance minimum	2.20 mm H ₂ O							
Reservoir Volume minimum	2700 ml							
76	2 x spider harness	<ul style="list-style-type: none"> The Spider Straps must provide effective immobilization of patients on a spinal board. The Spider Straps must attach to 10 positions on the spinal board using hook and loop straps. The unit must secure the patient from shoulder to foot. The spider straps must be designed for use in different types of Spinal Boards, and must be compatible with similar models. Minimum Dimension of 145cm x 66 cm Minimum Weight of less than 300 g Locking design: Velcro 						
77	4 x Shoulder pack straps	<ul style="list-style-type: none"> Must be designed for heavy-duty hose carry. 						

		<ul style="list-style-type: none"> • Straps must be interconnected by three stiff nylon spines giving the Hose Vice a strong, secure feel. • The shoulder straps must be adjustable, removable and be large enough that a firefighter can carry the bundle across the body for better balance. • The unit must have additional handles incorporated into the ends of the four shoulder straps. • Must have provisions to be carried by two firefighters. • Must have a large carrying capacity. • It must carry up to minimum of 30m of 38m hose. • It must have Adjustable side release buckles that can be used with the gloved hand and easy-to-operate.
78	1 x Roof ladder	<ul style="list-style-type: none"> • The ladder must fully comply with NFPA 1931 standard of Approval • The ladder must be made of Aluminium Alloy which is capable of withstanding intensive heat • The ladder must be at least 4200mm long and 450 mm wide • The ladder must have a maximum weight of 21kg • The ladder must be equipped with folding hooks constructed from a heat treated steel • The rungs shall be ribbed
79	1 x Submersible pump	<ul style="list-style-type: none"> • It must operate at 220 Volt • Electrical pump must have a run dry protection switch • Must have a self-primer • Outlet must be fitted with 38mm male NST coupling • Must be able to deliver a minimum of 300l/min at a 12m head

		<ul style="list-style-type: none"> • Must be made of Stainless steel/steel alloy material • It must have a minimum of 5m Electrical cord fitted
80	1 x Bowring	<ul style="list-style-type: none"> • It must have hose advancement that fits six different size hoses • Must have an emergency bailout descender - two different options • Rapid intervention team (rit) firefighter drag - hook and drag • It must have an ultimate high-rise tool-cheater bar, • It must have a stand pipe wheel, spanner wrench, • It must have a gas shut off - two different options • It must have an auto extrication – windshield removal, glass ripper • It must have oxygen (O2) cylinder wrench • It must have a door wedge • It must have a water shut off • It must have mattress hook to hook wires • It must have rocker lugs, stortz lugs • It must have sheet rock ripper - cleanly rips through while looking for hot spots
81	2 x Suction spanner	<ul style="list-style-type: none"> • Must be made out of Stainless steel
82	1 x Pick and handle	<ul style="list-style-type: none"> • The handle must be made of Polypropylene or Fibreglass • It must be a two piece set
83	1 x Two section ladder	<ul style="list-style-type: none"> • Minimum length 6m • It must be an aluminium two-section extension ladder.

		<ul style="list-style-type: none">• The fly section must be operated by a cable and must automatically extend as the centre section is raised.• The rungs must be ribbed• The ladder must meet or exceed the requirements of the current edition of NFPA 1931.
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