

ANNEXURE B

City of Johannesburg Red Fleet Specification:

Water Tanker

6 x 4

Fire Vehicle

Specification for 6x4 Water Tanker Fire vehicle.

1. GENERAL

1.1 SCOPE

- 1.1.1 This specification describes City of Johannesburg Red Fleet requirements for 6x4 Water Tanker Fire vehicle.

1.2 DESIGN STANDARDS

- 1.2.1 The vehicle shall be designed and manufactured to meet the National Road Traffic Act 93 of 1996 as amended.
- 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 shall be manufactured with the following material:
- 1.2.6 Light weight for increased power to weight ratio
- 1.2.7 Low maintenance
- 1.2.8 Corrosion resistant
- 1.2.9 High strength
- 1.2.10 The manufacturer shall be registered with, Manufacturer, Importer and Builder (MIB) of fire engines.
- 1.2.11 The manufacturer should comply with ISO 9001:2008 quality certified manufacturer.
- 1.2.12 The unit manufactured shall comply fully with the Road Traffic Act of 1989, SABS Compulsory and CKS 928 Specifications. As far as possible, comply with NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition) requirements.
- 1.2.13 The vehicle should comply with NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition) as listed in the specification.
- 1.2.14 The complete vehicle 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): Standard for Automotive Fire Apparatus: Standard , including pumps and certification to be provided.

1.3.2 Testing

1.3.2.1 The following tests should be performed on all products that are manufactured by service provider/s.

- A. An electrical system performance testing
- B. Welding 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 test
- I. Power train testing
- J. Superstructure integrity test
- K. Paint sample test
- L. Complete operational test
- M. Emergency lighting system test

1.3.3 All products should undergo a quality assurance program and be fully inspected for compliance to specifications.

1.4 Warranty

1.4.1 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.

1.4.2 The overall warranty period on the apparatus superstructure must be at the minimum standard of five years (5) from the date of delivery.

1.4.3 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.

- 1. Structural Integrity Warranty
- 2. Power Train
- 3. Transmission
- 4. Painting
- 5. Plumbing
- 6. Fire Pump

1.4.1 All components and spares utilised in the manufacturing process must be approved by the Original Equipment Manufacturer (OEM).

1.4.2 All defects encountered due to poor workmanship and manufacturing deficiencies will be replaced at the cost of service provider/s during the warranty period.

1.5 Free Service/ Inspection

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

1.6 Training and Skill Transfer

1.6.1 Training will be provided free of charge, on-site for sixty (60) personnel members, by professionals and will be based on the following:

1. Driving Techniques
2. Fire Fighter Safety
3. Operating Instructions - Warrior
4. Water & Foam Supply Systems
5. Pumping Operations & Techniques
6. Basic Vehicle Care & Preventative Maintenance
7. Basic Equipment Care & Preventative Maintenance
8. Basic Vehicle & Equipment Specifications

1.7 Licensing & Registration

1.7.1 The vehicle shall be register and licence as per the COJEMS requirements, and the cost will be included on the price of the unit.

1.8 FUNCTIONAL SPECIFICATION FOR A WATER TANKER

1.8.1 Chassis Cab

- 1.8.1. The Water Tanker shall be manufactured on a single cab chassis.
- 1.8.2. Spare parts must be readily available in South Africa.
- 1.8.3. Drive Configuration: 6x4

1.8.2 Engine Governor

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

1.8.3 Engine Hour Meter

1.8.3.1 An engine hour meter shall be supplied and fitted in the cab.

1.8.4 Crew Seating

1.8.1 The standard seating in the cab is for three persons only.

1.8.5 Battery Master Switch

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

1.8.6 General

1.8.6.1 Type

Table A

No	Description	Comment
1	Product class	truck
2	Chassis adaptation	Basic
3	Wheel configuration	6x4, 3-axle vehicle with drive on two rear axles
4	Duty class	Medium
5	Chassis height	Semi high (S)

1.8.7 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

1.8.8 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 weight 2nd rear axle	Not less than 10500 kg
4	Legal GVW	Not less than 25700 kg
5	GCM Legal	Not less than 66000 kg
6	Technical gross vehicle weight (GVW)	Not less than 29500 kg
7	GCM Technical (kg)	Not less than 28500 kg
8	Gross train weight, technical	28001-29000 kg
9	GTW actual	0-20 tons

1.8.9 Engine

Table D

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

1.8.10 Cooling system

Table E

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

1.8.11 Fuel system

Table F

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

1.8.12 Exhaust system

Table G

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

1.8.13 Gearbox

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

1.8.14 Power Take Off (PTO)

Table H

No	Description	Comment
1	EG-power take off	compulsory

1.8.15 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 21000kg
2	Differential lock	compulsory

1.8.16 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 11.00 disc
5	Rim quantity rear axle	4
6	Rim size rear axle	Minimum 9.00 disc
7	Rim quantity second rear axle	4
8	Rim size second rear axle	9.00-22.00 disc
9	Rim quantity spare	1
10	Rim spare	9.00-22.00 disc

1.8.17 Tyres

Table L

No	Description	Comment
1	Tyres	compulsory
2	Tyre quantity front	2
3	Tyre size front	Minimum 385/65 R22.5
4	Tyre type front axle	Minimum 385/65 R22.5
5	Tyre quantity rear 1	4
6	Tyre size R1	Minimum 315/80 R22.5

7	Tyre type rear axle	Minimum 315/80 R22.5
8	Tyre quantity R2	4
9	Tyre size 2nd rear	Minimum 315/80 R22.5
10	Tyre type tandem/tag/steer	Minimum 315/80 R22.5
11	Tyre quantity spare	1
12	Tyre size spare	Minimum 315/80 R22.5
13	Tyre type spare wheel	Minimum 315/80R22.5

1.8.17 Brakes

Table M

No	Description	Comment
1	ABS intelligent compressor	Air management
2	Wheel brake	Drum
3	Brake control combination	Pneumatic
4	Brake control	Pneumatic
5	ABS, Anti-lock brakes	Compulsory
6	Slack adjuster	Automatic (3-axe)
7	Retarder	Compulsory
8	Exhaust brake control	Manual/automatic

1.8.18 Anti-roll bar

Table N

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

1.8.19 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
	Steering wheel air bag	compulsory

1.8.18 Power Supply

Table P

No	Description	Comment
1	Battery Power	180 Ah, 2x12 V batteries in series for 24 V
2	Battery	Lockable
3	Alternator charge	A powerful 150A alternator which produces 86A straight away at idling speed and is designed for vehicles with very high electricity consumption.

1.8.19 Battery master switch

1.8.19.1 An electronic double switch must be installed 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.

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

1.8.20 Body work system (BWS)

1.8.20.1 BWS must have an extra control/ fuse box unit for additional electrical components that will be fitted on the vehicle.

1.8.21 Battery connection bodybuilder

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

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

1.8.22 Cable harness additional switches

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

1.8.21 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 and shall be located in the instrument panel on the passenger side. Extra 24 volt socket in the switch panel, which must be located by the lower bunk in sleeper cabs.

1.8.23 Communications

a.8.23.1 Vehicle based Two-way radio

a.8.23.2 A two-way radio shall be installed in the cab.

Cab

Table R

No	Description	Comment
1	Roof height	Low
2	Roof rack	Without

1.8.24 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	Shall be integrated in the left-hand side of the lower front grille panel, folds out for use.
5	Bumper protruded execution	Shall be a 50 mm High-mounted bumper which must be fitted 50 mm ahead of vehicle front. The bumper must be made of steel.
6	Towing device in bumper	Shall be centre-mounted towing device rated not less than 24000kg
7	Signal horn	Compressed air

8	Boarding step front, foldable	The folding boarding step shall be secured in the front edge and fitted in the bumper.
9	Front mudguard, execution	shall be in two pieces
10	Splash guard, front	shall be provided

1.8.25 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

1.8.25 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	<ul style="list-style-type: none"> a. Shall consists of dome lamps. b. Lamps in the roof shelf. c. Reading lamps. d. Lighting under the long instrument panel and lamps in the outer storage compartments. e. The background lighting shall comprise of red LEDs integrated in the dome lamps. f. The lighting under the instrument panel and the boarding step lighting. g. Switched off and on via a separate switch.

5	Gear selector position	To be located in the suitable position where a driver can easily reach.
6	Protective mats floor	Non slippery rubber

1.8.26 Seats

Table V

No	Description	Comment
1	Driver seat	Must have air suspension with several setting options. Adjustable for legroom and height. Must be equipped with adjustable backrest, with integrated head restraint, quick-release function for rapid air release, as well as integrated safety belt.
2	Upholstery driver seat	Upholstery all in black leather, dirt repellent and easy to clean.
3	Passenger seat	Unsprung seat with several setting options, which can be moved backward and forward, raised and lowered, must be equipped with an adjustable backrest with integrated head rest and safety belt.
4	Upholstery passenger seat	Upholstery all in black leather, dirt repellent and easy to clean.
5	Warning signal for unconnected seat belt	Lamp and audio signals (which shall warn an unbelted driver and passengers with an acoustic signal and a warning lamp when speed exceeds a minimum of 25 km/h).
6	Seat belt pretensioner	Driver + passenger side.
7	seat belt colour	Driver's, passenger and crew seats shall be equipped with a safety belt with a fabric coloured red.

1.8.31 Storages

Table W

No	Description	Comment
1	Dashboard passenger side	with lid

1.8.32 Climate system

Table X

No	Description	Comment
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1	Climate system control	manual
2	Air conditioning	Compulsory for all seats

1.8.33 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

1.8.34 Accessories

Table Z

No	Description	Comment
1	Reverse alarm	Compulsory

1.8.35 Cab_accessories

Table AA

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
	Fire extinguisher	1 x 2 kg DPC
4	Tool Case	<ul style="list-style-type: none"> • Jack • Wheel Spanner • Spanner size 13 and 10 • Reversible Screwdriver Star and Flat

1.8.5.1 Dash mounted GPS.

The vehicle shall have a GPS mounted on the dashboard.

- 1.8.36.1 Dimension 9.2" x 6.4" x 3" (23.3 x 16.2 x 7.6 cm)
- 1.8.36.2 The device shall have touchscreen capabilities
- 1.8.36.3 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)
- 1.8.36.4 Display resolution shall not less than 1280 x 720 pixels
- 1.8.36.5 Display type shall be WXGA
- 1.8.36.6 Minimum 1.6 kg
- 1.8.36.7 Water rating shall not be less than ipx7
- 1.8.36.8 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.
- 1.8.36.9 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
- 1.8.36.10 The unit shall have built-in maps-in auto guidance, bluechart (coastal), lakevu (inland)
- 1.8.36.11 The unit connections shall have one NMEA 2000 ports, NMEA 0183 input ports, NMEA 0183 input (tx) ports, video input ports , bnc j1939 ports 1, garmin marine network ports, 12-pin transducer ports, USB port, BNC external GPS antenna port. Bluetooth, ant+ (connectivity), Wi-Fi network (local connection)
- 1.8.36.12 The unit shall have an electrical power input between 10 to 32 VDC at a typical current draw at 12 vdc 1.37, maximum power usage at 10 VDC 40.2W

1.8.37 Vehicle Camera System

- 1.8.37.3 It must be 360-degree surround view camera,
- 1.8.37.2 The camera image/s must be displayed on the driver's full colour Mux display. All cameras must be able to operate in the dark/night and over exposed lighting.

1.8.38 Bulbar

- 1.8.38.2 A chromed bulbar with provision for the fitment of an electric winch must be mounted to the chassis frame of the vehicle.
- 1.8.38.3 The bulbar must be fitted with four (4) galvanized towing eyes.

1.8.39 Electric Winch

- 1.8.39.2 An electric winch with a single line pulling capacity minimum of 8 165kg must be fitted to the bulbar:
 - a) Minimum wire rope diameter : 11.7mm

- b) Minimum wire rope capacity : 30m
- c) Electric requirement : 24V

1.8.39.3 The winch must be supplied with a snatch block and winch blanket

1.8.40 Controls and Indicators in the Cab

1.8.40.1 A double acting battery master switch must be provided with a visual warning when switched on.

1.8.40.2 Two (2) 75mm x 25mm red light must be positioned in the cab.

1.8.40.3 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 or extended.

1.8.40.4 A visual warning must be provided in the cab to indicate when the pump is engaged.

1.8.40.5 In addition to chassis standard controls and indicators the following items must be installed in the driver's cab:

- 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 and audio warning for low water level in radiator.

1.8.41 Mudflaps

1.8.41.1 Black linear low density polyethylene mud flaps shall be installed on the rear body wheel wells and on the front directly behind the wheels.

1.8.41.2 CoJ EMS logo must be affixed to the flap itself.

1.8.42 Deck Gun/Monitor

1.8.42.1 The pump panel must include all electric 12 VDC controls.

1.8.42.2 The Deck gun must include the automatic stow feature.

1.8.42.3 A remote control must be installed on the pump operator's panel and a wireless radio remote.

1.8.42.4 The Deck gun must match the colour of the vehicles.

1.8.42.5 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.

Extender

1.8.42.6 The monitor must be fitted to an electronic actuated extender that must allow the monitor to extend up to 450mm from the stowed position.

1.8.42.7 The Extender must operate from a push button control that must be pump panel mounted.

1.8.43 Nozzle

1.8.43.1 An electronic controlled master stream selector nozzle should be provided.

1.8.43.2 The deluge riser will have male National Standard Threads for mounting the monitor.

1.8.44 Pump System

1.8.44.2 Pump Compartment

1.8.44.2.1 The pump compartment must be a separate module from the vehicle body and hose bed compartments.

1.8.44.2.2 This must allow each module to move independently of the other. The pump compartment module must extend the full width of the body.

1.8.44.2.3 The pump operator's panel and side panel must be constructed of brushed stainless steel for lasting appearance and ease of maintenance.

1.8.44.2.4 Pump panel light shields must be provided for each side panel.

1.8.44.3 Pump System

1.8.44.3.1 The pump must be a mid-ship mounted single stage centrifugal pump.

1.8.44.3.2 The pump must be mounted on the chassis frame rails and shall be PTO driven.

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

- 1.8.44.3.4 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.

1.8.53 Pressure Relief Valve

- 1.8.45.1 The pump must be equipped with an automatic pressure control device.
- 1.8.45.2 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 NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition): Standard for Automotive Fire Apparatus: STANDARD FOR AUTOMOTIVE FIRE APPARATUS.
- 1.8.45.3 The relief valve must be normally closed and must open against pump pressure.
- 1.8.45.4 A relief valve control wheel with a control light to signal when open, must be mounted on the pump operator's panel.

1.8.54 Discharge Manifold

- 1.8.46.1 The pump system shall utilize a stainless steel discharge manifold, the system must allow a direct flow of water to discharge valves.
- 1.8.46.2 The manifold and fabricated piping systems must be constructed of a minimum of Schedule 10 stainless steel, to reduce corrosion.

1.8.55 Primer System

- 1.8.47.1 The electronic driven priming pump must be a positive displacement vane type.
- 1.8.47.2 One (1) priming control, located at the pump operator's position must open the priming valve and start the priming motor.
- 1.8.47.3 The primer must be oil-less type.
- 1.8.47.4 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.

1.8.56 Pressure Gauge System

- 1.8.48.1 A minimum 114mm master suction gauge and a minimum 114mm master discharge gauge must be mounted on the pump panel.
- 1.8.48.2 These compound gauges must be liquid filled.
- 1.8.48.3 A throttle must be mounted on the pump operator's panel and must be used to control the engine RPM.

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

1.8.57 Pressure Governor

1.8.49.1 This vehicle 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. The "total pressure governor" is to operate as a pressure sensor (regulating) governor (PSG).

1.8.49.2 A special preset feature must permit a predetermined pressure or RPM to be set. The preset pressure or RPM must be displayed on the message display of the "total pressure governor".

1.8.49.3 The preset must be easily adjustable by the operator.

1.8.49.4 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.

1.8.49.5 The pressure sensor governor system must have two (2) modes of operation: pressure mode or rpm mode.

1.8.49.6 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).

1.8.49.7 In the rpm mode, the PSG system will automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

1.8.49.8 A pump cavitation protection feature must be provided which must return the engine to idle should the pump cavitate.

1.8.49.9 The pressure controller must incorporate monitoring for engine coolant temperature, oil pressure, and battery voltage.

1.8.50 Auxiliary Engine Cooler

1.8.50.1 An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator's panel shall be provided.

1.8.50.2 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.

1.8.50.3 Cooler inlet and outlet must be continuous, preventing intermixing of engine coolant and pump water.

1.8.51 Pump Cooler

- 1.8.51.1 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.
- 1.8.51.2 The pump cooler line shall be controlled from the pump operator's panel by a minimum of 10mm snubber valve.

1.8.52 Pump Certification

- 1.8.52.1 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): Standard for Automotive Fire Apparatus: STANDARD FOR AUTOMOTIVE FIRE APPARATUS.
- 1.8.52.2 The pump must be tested at the manufacturer's facility by an independent, third-party testing service.
- 1.8.52.3 The conditions of the pump test must be as outlined in current NFPA 1901: Standard for Automotive Fire Apparatus (2016 edition): Standard for Automotive Fire Apparatus: Standard for Automotive Fire Apparatus.
- 1.8.52.4 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): Standard for Automotive Fire Apparatus: Standard for Automotive Fire Apparatus:
 - 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

1.8.53 Water Tank Level Gauge

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

1.8.54 Pump Control Panel (Left Side Control)

- 1.8.54.1 All pump controls and gauges must be located at the left (passenger) side of the vehicles and properly identified.
- 1.8.54.2 Layout of the pump control panel must be ergonomically organized.
- 1.8.54.3 The pump operator's control panel must be removable in two (2) main sections for ease of maintenance.
- 1.8.54.4 The upper section must contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, and electrical switches.
- 1.8.54.5 Sub panels must be removable from the face of the pump panel for ease of maintenance.
- 1.8.54.6 Below the sub panels must be located all valve controls and line pressure gauges.
- 1.8.54.7 The lower section of the panel must contain all inlets, outlets, and drains.
- 1.8.54.8 All push/pull valve controls must have 1/4 turn locking control rods with polished chrome plated zinc tee handles.
- 1.8.54.9 Guides for the push/pull control rods must be chrome plated zinc castings securely mounted to the pump panel.
- 1.8.54.10 Push/pull valve controls will be capable of locking in any position.
- 1.8.54.11 The control rods must pull straight out of the panel and must be equipped with universal joints to eliminate binding

1.8.55 Crosslay Hose Compartment

- 1.8.55.1 A hose bed compartment must be provided and must traverse the vehicle directly behind the cab.
- 1.8.55.2 The hose bed must be capable of accommodating 5 x 30m x 38mm and 5 x 30m x 38mm (NST Double jacket hose) attack lines.
- 1.8.55.3 The hose bed must be divided with a fixed hose bed divider.

1.8.56 Supply Line Hose Bed

- 1.8.56.1 Two (2) supply line hose beds must be provided directly above the pump compartment.
- 1.8.56.2 The hose bed will accommodate 10 x 30m x 65mm (NST Double jacket) and 5 x 30m x 100mm (Stortz Double jacket) supply lines

1.8.57 Left Side Discharges

- 1.8.57.1 Two (2) 65mm discharge outlets with manually operated valves must be provided at the left side pump panel.
- 1.8.57.2 These discharge valves must be fitted with 65mm NST male couplings with blank cap and chain.

- 1.8.57.3 One (1) 100mm high volume discharge outlet with manually operated valves must be provided at the left side pump panel.
- 1.8.57.4 This discharge valve must be fitted with 100mm Stortz coupling with a minimum 115mm lug distance with blank cap and chained.
- 1.8.57.5 The valve controls must be located at the pump operator panel and must visually indicate the position of the valve at all times.

1.8.58 Right Side Discharges

- 1.8.58.1 Two (2) 65mm discharge outlets with manually operated valves must be provided at the left side pump panel.
- 1.8.58.2 The discharge valves must be fitted with 65mm NST male couplings with blank cap and chained.
- 1.8.58.3 One (1) 100mm high volume discharge outlet with manually operated valves must be provided at the left side pump panel.
- 1.8.58.4 This discharge valve must be fitted with 100mm Stortz coupling with a minimum 115mm lug distance with blank cap and chained.
- 1.8.58.5 The valve controls must be located at the pump operator panel and must visually indicate the position of the valve at all times.

1.8.59 Suction Inlets

- 1.8.59.1 Two (2) 127mm diameter suction port with 127mm RT male threads and removable screens must be provided on each side of the pump panel.

1.8.60 Intake left side:

- 1.8.60.1 The left side pump intake must be fitted with a 100mm x 115mm lug distance Stortz adaptor, and a gated valve.

1.8.61 Collecting Head – add to MAJOR BUMPER

- 1.8.61.2 One (1) Collecting Head must be supplied. The unit must have three (3) 65mm female NST inlets and a 127mm female RT outlet.

1.8.62 Compound Pressure/Vacuum Kilopascal Gauges

- 1.8.62.1 Two (2) weatherproof minimum of 114mm dual faced compound vacuum pressure gauges with a range of 100-0-4140 KPA shall be installed on the pump panel.
- 1.8.62.2 The gauges shall be filled with a liquid solution. One (1) gauge shall record total pump pressure and the other gauge shall record vacuum during deep lift operations.

1.8.62.3 In addition, each discharge shall have an individual pressure gauge, and shall be labelled accordingly on the pump panel.

1.8.63 Engine Gauge Package

1.8.63.1 A gauge package shall be supplied at the pump operator's panel to monitor the vehicle's engine. The gauges shall include the following:

- a) Tachometer - to monitor engine revolutions per minute.
- b) Oil pressure gauge - to monitor engine oil pressure.
- c) Water temperature gauge - to monitor the engine water temperature.
- d) Voltmeter - connected to the vehicle electrical system.
- e) Engine hour meter

1.8.64 Hose Reels

1.8.64.1 Two (2) all aluminium electric rewind hose reels, each complete with a minimum 50m x 25mm high pressure hose, terminating in a flow selectable nozzle must be supplied.

1.8.64.2 The nozzle must be adjustable from straight stream to full fog.

1.8.64.3 The reels must be fitted, one left, one right, on the rear deck.

1.8.64.4 Each reel must be supplied with chrome guide rollers to allow for ease of rewinding and to protect the superstructure and paint work when using the hose on the reel.

1.8.64.5 Each reel is fitted with a manual rewinding system.

1.8.65 Plumbing

1.8.65.1 All fabricated piping must be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

1.8.66 Tank Fill

1.8.66.1 A 65mm pump-to-tank fill line must be controlled at the pump operator's position. Piping must be stainless steel.

1.8.66.2 It must be possible to fill the tank without having to loop a hose.

1.8.67 Tank to Pump

1.8.67.1 A 100mm inline valve must be installed between the pump and the booster tank.

- 1.8.67.2 The valve must be operated by a pneumatic valve with the control positioned on the pump operator's panel. Piping must be stainless steel.

1.8.68 Booster Tank

- 1.8.68.1 The booster tank must have a capacity of 10 000 litres. The tank must be constructed in stainless steel.
- 1.8.68.2 The tank must independent of the compartments and must be fitted to the chassis by an approved cradle system.
- 1.8.68.3 The tank must have a combination vent, inspection and manual fill tower.
- 1.8.68.4 The tank overflow must be 100mm diameter and must dump behind the rear wheels to permit maximum traction.
- 1.8.68.5 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 line.
- 1.8.68.6 Baffles, both longitudinal and latitudinal must be interlocking and welded to minimize water surge during travel, enhancing road handling stability.

1.8.69 Dump Valve

- 1.8.69.1 A minimum of 250mm x 250mm square dump Zico type valve, a minimum of 600mm long, must be installed on the rear of the booster tank.
- 1.8.69.2 The valve must be constructed of stainless steel and must be manually controlled from the left side of the valve. The valve closure type must be of a flip-up back plate.

1.8.70 Dump Valve Extension

- 1.8.70.1 A stainless steel telescopic extension must be provided to extend the dump 900mm beyond the valve to avoid dumping on the apparatus.
- 1.8.70.2 The extension must be manually controlled.

1.8.71 Aluminium Construction

- 1.8.71.1 The apparatus body must be constructed entirely of aluminium extrusions with interlocking aluminium plates.
- 1.8.71.2 An extruded modular aluminium body must be provided to ensure high strength to weight ratio, corrosion resistant body structure, easy

damage repair, and lighter overall body weight to allow for increased equipment carrying capacity.

- 1.8.71.3 The interlocking framework must be constructed from bevelled extrusions and must be seam welded both internally and externally at each joint using aluminium alloy welding wire.
- 1.8.71.4 All horizontal surfaces must be constructed from aluminium fire apparatus quality diamond plate.
- 1.8.71.5 The wheel well frame must be constructed from formed aluminium and must be fitted with an aluminium wheel arch.
- 1.8.71.6 Aluminium tread plate shall finish off the skirt.
- 1.8.71.7 The entire exterior body must be completely sanded and deburred to assure a smooth finish prior to painting.
- 1.8.71.8 The superstructure must have a raised height of at least 50% of the elliptical tank height.

1.8.72 Rub rail

- 1.8.72.1 The body must have a body side protection rub rail along the length of the body on each side. The rub rail shall be constructed of aluminium extrusion.
- 1.8.72.2 The rub rail must extend beyond the body width to protect compartment doors and the body side.
- 1.8.72.3 The rub rail must be of a C-channel design to allow marker and warning lights to be recessed inside for protection.
- 1.8.72.4** Reflective tape must be applied to the rub rail to enhance vehicle visibility and in compliance with SABS.

1.8.73 Rear Steps

- 1.8.73.1 Auxiliary steps must be bolted and welded to the tank at the rear for access to the deck of the water tank.

1.8.74 Rear Platform

- 1.8.74.1 A rear platform must be provided. The platform must be covered with aluminium tread plate and must be wide enough to accommodate two (2) electric rewind hose reels.

1.8.75 Handrails

- 1.8.75.1 Access handrails must be provided at all step positions. All body handrails must be constructed of maintenance free, corrosion resistant, extruded aluminium.

1.8.76 Apparatus Compartmentation

- 1.8.76.1 The following compartmentation shall be provided:

1.8.77 Left Side

- 1.8.77.1 There must be one (1) compartment behind the pump compartment.
- 1.8.77.2 There must be two (2) compartments over the rear wheels.
- 1.8.77.3 There must be one (1) compartment behind the rear wheels.

1.8.78 Right Side

- 1.8.78.1 There must be one (1) compartment behind the pump compartment.
- 1.8.78.2 There must be two (2) compartments over the rear wheels.
- 1.8.78.3 There must be one (1) compartment behind the rear wheels.
- 1.8.78.4 All body compartments must be constructed from welded aluminium alloy plate.
- 1.8.78.5 Each compartment must be modular in design and must not be a part of the body support structure.
- 1.8.78.6 Compartment floors must be constructed of aluminium fire apparatus quality diamond plate welded in place and must be supported by aluminium extrusions.
- 1.8.78.7 A drain hole must be provided in each compartment floor.
- 1.8.78.8 A grommet must be fitted around all electrical wiring to prevent the ingress of dust.
- 1.8.78.9 An anodized aluminium drip rail must be mounted over each compartment opening to assist with water runoff.
- 1.8.78.10 The interior of all compartments must be finished in spatter grey non chip paint.

1.8.79 Roll-Up Doors

- 1.8.79.1 All compartments must be fitted with roll-up doors. The door slats must be double wall box frame and manufactured from anodized aluminium.
- 1.8.79.2 The slats must have interlocking end shoes on each slat.
- 1.8.79.3 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.

- 1.8.79.4 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.
- 1.8.79.5 The track must have a replaceable side seal to prevent water and dust from entering the compartment.
- 1.8.79.6 The doors must be counterbalanced for ease in operation.
- 1.8.79.7 A full width latch bar must be operable with one hand, even with heavy gloves.
- 1.8.79.8 Securing method must be a positive latch device.
- 1.8.79.9 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.
- 1.8.79.10 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.

1.8.80 Portable Dam and Rack (left side)

- 1.8.80.1 A foldable portable dam of 10,000 litre capacity shall be supplied and fitted to a suitable holding bracket or rack.
- 1.8.80.2 The portable dam shall fit to the side of the booster tank, above the raised body structure.
- 1.8.80.3 The system shall be hydraulically operated, and shall raise/ lower the portable dam from/ to ground height.

1.8.81 Hydraulic Ladder Rack (right side)

- 1.8.81.1 A hydraulic / electric ladder gantry must be mounted on the right side of the body.
- 1.8.81.2 The ladder gantry must allow for removal of the ladders from the ground position without having to get onto the vehicle.
- 1.8.81.3 An interlock must be provided to prevent operation of the ladder gantry unless the parking brake is activated.

- 1.8.81.4 The gantry must be fitted with the following ladders
 - a) Two section extension ladder.
 - b) Roof Hook ladder.

1.8.82 Electronic Connection System

- 1.8.82.1 All electronic equipment installed by the apparatus manufacturer must conform to current automotive electronic system standard.
- 1.8.82.2 All wiring must be colour coded for functionality.
- 1.8.82.3 All exposed wiring must be run in a loom.
- 1.8.82.4 All wiring looms must be properly supported and attached to body members along the entire run.
- 1.8.82.5 At any point where wire or looms must pass through metal, rubber grommets shall be installed to protect the wire from abrasion.
- 1.8.82.6 Electronic connections in exposed areas must be made using heat shrink or weather proof connections.
- 1.8.82.7 All circuits shall be protected with automatic reset circuit breakers.
- 1.8.82.8 All electronic equipment switches must be mounted on a switch panel mounted in the cab convenient to the operator.
- 1.8.82.9 Light switches must be of the rocker type with integral indicator light to show when the circuit is energised.
- 1.8.82.10 All switches must be appropriately identified as to function.

1.8.83 Cab and Body Lighting

- 1.8.83.1 Clearance lights and reflectors must include the following recessed in the rub rail:
 - b) Two (2) red clearance lights
 - c) Four (4) red rectangular reflectors
 - d) Two (2) amber rectangular reflectors, and
 - e) Three (3) red marker lights centred at the rear step.
- 1.8.83.2 A rectangular shaped marker light with an amber coloured lens must be installed on either side of the apparatus body, recessed in the rub-rail at the front of the body.
- 1.8.83.3 The marker light must be wired to the turn indicator.
- 1.8.83.4 A rectangular shaped marker light with a red coloured lens must be installed at the trailing edge on either side of the apparatus body, recessed in the rub-rail.
- 1.8.83.5 One (1) minimum of 177mm red, one (1) amber and one (1) minimum of 177mm clear light must be installed on each side of the vehicle rear.
- 1.8.83.6 Light functions must include running lights, brake lights, turn signal lights and back-up lights.

- 1.8.83.7 One (1) minimum of 100mm circular single bulb light must be mounted in each body compartment and must be wired to a master on/off rocker switch on the cab dash.
- 1.8.83.8 The light must be in a resilient shock absorbent mount for improved bulb life.
- 1.8.83.9 The wiring connection must be made with a weather resistant plug in style connector.
- 1.8.83.10 A single water and corrosion resistant switch with a polycarbonate actuator and sealed contacts must control each compartment light.
- 1.8.83.11 A compartment light with a switch must be installed to illuminate the pump area for service.
- 1.8.83.12 The compartment light must be fitted with a protective grid.
- 1.8.83.13 A license plate light must be installed on the rear of the vehicle.

1.8.84 Compartment Lighting

- 1.8.84.1 There must be a minimum of two (2) LED lighting string mounted in each body compartment. Each light must be in a resilient shock-absorbent mount.
- 1.8.84.2 There must be a compartment light with a switch installed to illuminate the pump area for service.
- 1.8.84.3 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

1.8.85 Step Lights

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

1.8.86 Pump Panel Lights

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

1.8.87 Scene Lights

- 1.8.87.1 Two (2) scene lights with clear lenses must be provided at the rear of the apparatus.
- 1.8.87.2 Each light unit must consist of two (2) 20-watt halogen lamp fixtures within a light housing.
- 1.8.87.3 The lamps, within each housing, must be adjustable horizontally and vertically to provide the desired coverage.
- 1.8.87.4 All electronic connectors must be enclosed in the housing providing protection against the elements.
- 1.8.87.5 The lights must be 24VDC, 40 watts, and provide 1050 candelas.

1.8.88 Auto Eject for Shoreline

- 1.8.88.1 One (1) shoreline receptacle must be provided to operate the dedicated 230-volt circuits on the truck without the use of the generator.
- 1.8.88.2 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.
- 1.8.88.3 The cover has magnetically loaded points for closure, preventing water from entering when the shoreline is not connected.
- 1.8.88.4 A solenoid wired to the vehicle's starter is energized when the engine is started. This instantaneously drives the plug from the receptacle.
- 1.8.88.5 The shoreline must be connected to 220v.
- 1.8.88.6 A mating connector body must also be supplied with the loose equipment.
- 1.8.88.7 The shoreline receptacle must be located on the driver side of pump panel.

1.8.89 Electronic Load Management

- 1.8.89.1 An Electronic load management must be provided on the apparatus.
- 1.8.89.2 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 electrical system.
- 1.8.89.3 The ELM will monitor the vehicle's voltage while at the scene (parking brake applied).
- 1.8.89.4 It must sequentially shut down individual electrical loads when the system voltage drops below a pre-set value.
- 1.8.89.5 Two (2) separate electrical loads will be controlled by the load manager.
- 1.8.89.6 The ELM will sequentially re-energize electrical loads as the system voltage recovers.

1.8.90 Back-up Alarm

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

1.8.91 Chevron

- 1.8.91.1 Dual chevron triangles must be provided on the rear of the apparatus body.
- 1.8.91.2 The chevrons must be reflective and must fully comply with the SABS requirements.

1.8.92 Robotic Mast Light System

- 1.8.92.1 One (1) Robotic Mast Light System complete with 4 x LED lights, must be supplied and fitted on the crew cab roof.
- 1.8.92.2 The control unit for the Mast Light must be mounted in the nearside compartment.
- 1.8.92.3 The light must go to its original position when the hand brake is released.
- 1.8.92.4 There must be a flasher in the cab when the light is extended.
- 1.8.92.5 The Mast Light must be operated remotely with a remote.
- 1.8.92.6 The remote must be attached to a 5m spiral cable.

1.8.93 Warning Lights

1.8.93.1 Rotating Beacons

- 1.8.93.1.1 Two (2) red rotating LED beacons must be fitted at the rear and must be controlled from inside the cab.

1.8.93.2 Light Bar

- 1.8.93.2.1 A High Intensity Slimline LED light bar must be fitted on the cab roof.
- 1.8.93.2.2 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.

1.8.93.3 Speaker

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

1.8.93.4 Electronic Siren

1.8.93.4.1 A minimum of 100W siren system must be provided and mounted inside the cab within easy access of the officer.

1.8.93.4.2 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 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
- g) P.A. level exceeds minimum of 115dB.
- h) PTT switch on microphone allows for siren tone override when selected.

1.8.93.5 Lower Level Warning Light Package

1.8.93.5.1 Four (4) halogen warning lights and eight (8) LED warning lights, all with red lenses, must be provided.

1.8.93.6 Lighting must be mounted as follows:

1.8.93.6.1 Zone A- (2) Two LED lights on the front of the apparatus facing forward.

1.8.93.6.2 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.

1.8.93.6.3 Zone C - Two (2) LED lights on the rear of the apparatus facing rearward.

1.8.93.6.4 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.

1.8.93.6.5 One (1) recess mounted halogen light located within the rub rail at the rearward most point (as practical).

1.8.93.6.6 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.

1.8.93.6.7 A lighted rocker switch on the cab instrument panel, labelled lower level warning, must control the lights.

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

1.8.94 Hard Suction Hose Rack

1.8.94.1 Two (2) hard suction hose racks to hold two (2) 3m section of hard suction hose constructed of extruded aluminium must be provided.

1.8.95 Hard Suction Hoses

1.8.95.1 Two (2) 3m hard suction hose must be supplied.

1.8.96 Barrel Strainer

1.8.96.1 A galvanized barrel strainer that will fit hard suction hose must be supplied.

1.8.97 Suction Wrenches

1.8.97.1 One (2) pair of suction wrenches must be provided.

1.8.98 Chassis Paint Finish

1.8.98.1 All chassis exterior components such as mirrors and bumpers must be removed prior to the finish procedure.

1.8.98.2 Paint process must feature acrylic urethane products and must be performed in the following steps:

1.8.98.3 Filler Primer shall be applied to guarantee smooth sub straight to provide good enamel hold-out of the top coat

1.8.98.4 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.

1.8.98.5 The vehicle wheels must be painted in Phoenix Red. The vehicle wheels must be trimmed in silver paint to complete the wheel finish.

1.8.99 Body and Cab Paint Finish

1.8.99.1 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.

1.8.99.2 All vertically or horizontally hinged smooth-plate compartment doors must be painted separately to assure proper paint coverage on body, door jams and door edges.

1.8.99.3 Paint process must feature acrylic urethane products and must be performed in the following steps:

- a) Corrosion Prevention – all raw materials must be pre-treated with the corrosion prevention system to provide superior corrosion resistance and excellent adhesion of the top coat.
- b) Filler Primer must be applied to guarantee smooth sub straight to provide good enamel hold-out of the top coat.
- c) 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.

1.8.99.4 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.

1.8.99.5 The pre-treatment must be applied to the aluminium sheet metal or aluminium extrusions in all locations where the aluminium has been penetrated.

1.8.99.6 All hardware used in mounting steps, handrails, doors, lights or other specified components, must be individually treated with the corrosion inhibiting pre-treatment.

1.8.99.7 The cab and superstructure must be finished in Phoenix Red.

1.9 Cab and Body Stripe

1.9.1 A straight white reflective stripe, 100mm minimum in width, must be applied horizontally around the cab and body.

1.10 Sign writing

- 1.10.1 Sign writing must be applied in accordance with the COJ corporate identity guidelines.
- 1.10.2 All signage workmanship should be guarantee for a minimum three years.

1.11 Tyre Pressure Plates

- 1.11.1 A plate indicating the recommended tyre pressure must be provided over each wheel arch.
- 1.11.2 The plate must be a minimum 12.5mm.

1.12 Confirmation and Signing off of project milestone

- 1.12.1 The successful service provider/s will be expected to confirm and sign off against the approved specification with the COJEMS representative.

1.13 Statements of Warranty

- 1.13.1 The Service provide must provide a standard statement of warranty in line with each item in the specification.

1.14 Manuals

- 1.14.1 All equipment, components and maintenance manual must be provided with the completed unit including Service Book, with the exception of the following:
 - a) Two (2) operators manuals
 - b) Two (2) maintenance manuals

1.15 EQUIPMENT

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	2 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	2 x Hydraulic large ram	<ul style="list-style-type: none"> • Minimum working pressure – 720 bar • 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) • 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 • 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	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
13	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
14	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
15	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
16	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.
17	3 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
18	6 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
19	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.
20	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.
21	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): Standard for Automotive Fire Apparatus: Standard for Automotive Fire Apparatus: STANDARD FOR AUTOMOTIVE FIRE APPARATUS (2016 EDITION) apparatus standard

22	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
23	4 x BIC male Adapters	<ul style="list-style-type: none"> • Must be made out of cast aluminum • Must be male 65mm BIC to male 65mm NST coupling
24	4 x Reduces Adapters	<ul style="list-style-type: none"> • Must be made out of cast aluminum • Must be 65mm Female BIC to 38mm Male NST coupling
25	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 • The noise must be below 120db • Must have automatic Lubrication of Clutch bearing

26	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
27	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. • The branch must be Maximum weight of 7 Kg

28	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
29	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
30	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.

31	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 • 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
32	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
33	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

		<ul style="list-style-type: none"> • 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.
34	2 x Kendrick Extrication Devise adult and Child	<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. • 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.

		<ul style="list-style-type: none"> • 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 - Height: between 80 mm-230 mm - Weight: not more than 3kg
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35	2 x Traction splint adult and child	<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 • 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

		<ul style="list-style-type: none"> • It must have a Folding Heel stand: Folding flat for storage and instantly locks in place for support
36	4 x Standpipes	<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
37	2x Key and bars	<ul style="list-style-type: none"> • Must be made out of Stainless steel construction • Must be wheel spanner shape
38	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
39	2 x Hydrant keys (X shape)	<ul style="list-style-type: none"> • Must be made out of Stainless steel. • Must be wheel spanner shape
40	2 x High volume hose spanner	<ul style="list-style-type: none"> • Must fit 100mm Storz Couplings and 65mm NST Couplings
41	Hook Roof Ladder	<ul style="list-style-type: none"> •

42	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
43	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.
44	2 x Suction spanners	<ul style="list-style-type: none"> • Must be made out of Stainless steel
45	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
46	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.

47	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.
48	2x 100mm hose ramps	<ul style="list-style-type: none"> • Must fit 100mm • Must be made out of steel alloy • Must be 100mm inner diameter • Must be fitted with 100mm Storz coupling and blank cap.
49	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
50	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.
51	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

52	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
53	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
54	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
55	2 x Safety belt cutters	<ul style="list-style-type: none"> • It must cut through seat belts. • Its must be made of high strength Aluminum alloy. • The Tip must be fitted with Dzus Key for opening aircraft panels. • Must cut 4500kg strength webbing with one stroke.
56	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

57	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
58	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 • Must have a Rubber Butt
59	4xShoulder pack straps	<ul style="list-style-type: none"> • Must be designed for heavy-duty hose carry. • 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.

		<ul style="list-style-type: none"> • It must have Adjustable side release buckles can be able to be used with the gloved hand and easy-to-operate. •
60	1 x Two section ladder	<ul style="list-style-type: none"> • Minimum length 6m • It must be an aluminium two-section extension ladder. • 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.