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SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

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Title - Sujet ARTICULATED 114' AERIAL PLATFORM	
Solicitation No. - N° de l'invitation W8476-165339/B	**Amendment No. - N° modif.** 005
Client Reference No. - N° de référence du client W8476-165339	**Date** 2016-02-11
GETS Reference No. - N° de référence de SEAG PW-$$HP-912-68615	
File No. - N° de dossier hp912.W8476-165339	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2016-03-01**	**Time Zone** **Fuseau horaire** Eastern Standard Time EST
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
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Canada

This solicitation amendment 005 is raised to address bidders questions and to amend Annex B Purchase description.

Question 1 : Page 4, paragraph 3.3.1 b): National Safety Mark - The Apparatus shall have safety compliance certification label with a National Safety Mark (NSM), as a seal of compliance. The Apparatus is fully built in US and be imported as a complete unit, please consider inspection by Registrar of Imported Vehicle (R.I.V) as a proof of compliance.

Answer 1 : Yes, inspection by Registrar of Imported Vehicle (R.I.V) is compliant. Paragraph 3.3.1 b) has been amended to reflect this clarification.

Question 2 : Page 10, paragraph 5.1 a): The driver and officer seated positions ***shall*** be protected from impact with front and side impact air bags. Please consider removing the phrase "impact" and replacing with side airbags.

Answer 2 : Acceptable, paragraph 5.1 a) has been updated.

Question 3 : Page 13, paragraph 5.4.4 a): rotating, pivoting interior sun visors ***shall*** be provided for the driver and officer. Please allow pivoting interior sun visors to be consider equal or equivalent, our design does not allow for a rotating sun visor.

Answer 3 : Acceptable, paragraph 5.4.4 a) has been updated.

Question 4 : Page 14, paragraph 5.4.5 c) i: Speedometer/Odometer (right). Our gauge cluster locates speedometer in the center with the odometer in a digital screen located below the speedometer (centered). Please consider this configuration as equivalent.

Answer 4 : Acceptable, paragraph 5.4.5 c) i. has been updated.

Question 5 : Page 14, paragraph 5.4.5 c) ii: Tachometer with hourmeter (left). Our gauge cluster locates tachometer with hourmeter in a digital screen located below the speedometer (centered). Please consider this configuration as equivalent.

Answer 5 : Acceptable, paragraph 5.4.5 c) ii. has been updated.

Question 6 : Page 16, paragraph 6.4.1 e): Compartments ***shall*** be equipped with accessible equipment holders, for all of the miscellaneous equipment required in this Purchase Description, designed to secure the equipment under all vehicle operating conditions. Please clarify what the miscellaneous equipment is that will be required or provide sections this equipment is listed in.

Answer 6 : Paragraph 6.4.3 lists the required miscellaneous equipment.

Question 7 : Page 17, paragraph 6.4.1 i) i: Compartment lights ***shall*** be wired to a master on/off switch on the cab instrument panel. Our design will locate compartment light master on/off switch in the Vista display monitor.

Answer 7 : Acceptable, paragraph 6.4.1 i) i. has been updated.

Question 8 : Page 19, paragraph 6.5.1 a) ii: 182 metres (600 feet) of 64 mm (2.5 inch) diameter double jacket fire hose. Please clarify the quantity that is required to be stored. Previously a request was made that the hose load carrying capacity be as follows:

1. 50' x1 ¾" on the aerial platform pre-connected with a nozzle
2. 200' x 1 ¾" pre-connected with a nozzle transverse bed
3. 200' x 1 ¾" pre-connected with a nozzle transverse bed
4. 200' x 2 ½" pre-connected with a nozzle transverse bed
5. 150' x 1 ¾" pre-connected with a nozzle on front bumper
6. 600' x 4" located in the hose bed
7. 200' x 2 ½" located in the hose bed

Please consider changing the specification for the hose load to the seven lengths and location listed above and allow the 2 ½" hose listed as #7 to be stored as a dry lay near the transverse bed, as the hose bed on these aerial vehicles will only allow for the 600' x 4" hose outlined.

Answer 8 :

1. Required in paragraph 10.5.6 a).
2. Required in paragraph 6.5.2 c).
3. Required in paragraph 6.5.2 c).
4. Required in paragraph 6.5.2 c).
5. Required, paragraph 4.7 a) has been added.
6. Required in paragraph 6.5.1 a) i.
7. Required, paragraph 6.5.1 has been updated.

Question 9 : Page 20, paragraph 6.6.2 h): One (1) aluminum extension ladder shall be Alco-Lite PEL-36. Please clarify the model that is required, the PEL-36 is not a current model number available from Alco-Lite. Recommend using the model PEL-35 two section since the three section is 31 pounds heavier than the two section model.

Answer 9 : Acceptable, paragraph 6.6.2 h) has been updated.

Question 10 : Page 23, paragraph 7.6: A pump priming system ***shall*** be provided, with and electrically driven, positive displacement pump, and primer selector valve. Please define the primer selector valve requested or its function. Is the intent to prime each intake individually?

Answer 10 : The intent is to prime each intake individually. Paragraph 7.6 b) has been updated.

Question 11: Page 30, paragraph 9.5.2 a): The cab ***shall*** be equipped with amber front turn signal lights which include running light functions. Please allow the running light feature to be provided through front head lights (Section 9.5.1) which is typical of the vehicles we have provided into the Canadian market. FMVSS standards state a front turn signal is required to only flash as a turn indicator and not also function as a running light.

Answer 11: Acceptable, paragraph 9.5.2 a) has been updated.

Question 12 : Page 38, paragraph 10.6 h): To compensate for a control system failure, the aerial shall be equipped with aircraft style servo hydraulic controls, with manual overrides on the servo valve. Please consider removing the verbiage "aircraft style" from the specification as this description is indefinable.

Answer 12 : Acceptable, paragraph 10.6 h) has been updated.

Question 13 : Page 38, paragraph 10.6.1 a): Hydraulic power for the outlets shall be provided by the aerial hydraulic system, and activate when the aerial hydraulics are engaged. The aerial hydraulic fluid for our elevating device is not compatible with hydraulic tools listed. Hurst uses a special Hurst Blue fluid and introducing a foreign fluid would damage the seals of the tools making them inoperable.

Answer 13 : Paragraph 10.6.1 has been removed.

Question 14 : Page 40, Section 10.11 b): A high quality, aircraft grade, servo hydraulic control valve shall provide rotation control. Please consider removing the verbiage "aircraft grade" from the specification as this description is indefinable.

Answer 14 : Acceptable, paragraph 10.11 b) has been updated.

Question 15 : Page 49, Section 12.10.1 b) iii: Be delivered three times at each Apparatus delivery location; Please clarify the requirements of the training, will this be for three shifts during the three days or three separate three day training sessions at certain frequency intervals?

Answer 15 : Three operator training sessions are required at each location, each with minimum three day duration. Preference is for training sessions to be held back to back accommodating shifts.

Question 16 : b) **Industry Acceptability** - The Apparatus design ***shall*** have demonstrated industry acceptability by having been sold commercially in North America, and ***shall*** be equipped with an aerial device proven in service for a minimum of two (2) years.
Will DND allow a vehicle with a chassis and body built and sold in North America for more than 20 years, our aerial device has been in service in Northern Europe for more than 20 years but not in North America. Will this be acceptable?

Answer 16 : An acceptable apparatus is required to have been sold in North America, including the Aerial Device. Paragraph 3.1 b) has been updated.

Question 17 : Page 19, paragraph 6.5.1 a) i. 182 metres (600 feet) of 101mm (4inch) diameter double jacket fire hose; Do you want 6 X 100ft long or 12 X 50 foot long of 4 inch diameter double jacket fire hose?

Answer 17 : Preference is for 12 x 50 foot long hoses.

Question 18 : Page 20, paragraph 6.5.2 c) The preconnected hose storage ***shall*** contain a minimum of three (3) 60 metre (200 feet) long diameter double-jacket fire hoses, two (2) 45mm (1.75 inch) diameter and one (1) 65mm (2.5 inch) diameter. On Item 6.5.1 Hose bed and fire hose, it is mentioning "and be delivered with". Is the fire hose on 6.5.2 c) required to be provided at the time of Apparatus delivery?

Answer 18 : The hoses referenced in paragraph 6.5.2 c) are required at the time of delivery. Paragraph 6.5.2 c) has been updated for clarity.

Question 19 : Page 37, paragraph 10.5.7 Stokes Basket/Receiver – A stokes style basket and receiver ***shall*** be provided for rescue operations, with a minimum capacity f 544kg (1200 lbs).
a) The platform shall be equipped with a receiver and mounting bracket assembly in the front corner of the platform.
b) The receiver shall be designed to secure the stokes basket for transportation of a casualty.
c) The system shall provide for a minimum of 250 degree of basket rotation while it is secured to the platform

Our manufacturer's standard stokes basket receiver is designed for a payload of 250 Kg (550 lbs). The standard stokes receiver mounts inside of the floor of the platform does not have the ability to swivel independently of the Platform Cage. The Platform Cage is always capable of rotating 90 degrees.
We can provide (2) additional options:
1- We can provide the requested 544KG stokes basket receiver by reinforcing the receiver and mounting locations however this will be a rigid mount and not capable of swiveling but platform rotation of 90 degrees will still be available.
2- We can provide you 360 degrees of rotation by offering you an upper railing mounted stokes basket receiver but the payload will be limited to 150 Kg (330 lbs).
Would one of the options be acceptable? A rapelling arm (descending device) can be added on platform corner for rescue.

Answer 19 : Paragraph 10.5.7 has been updated to clarify the requirement.

Question 20 : Page 39, paragraph 10.8.1 a) iv. Variable short-jacking for partial deployment for stabilizers in tight spaces. Is your expectation to be able to operate the Apparatus at its rated platform capacity through the entire working envelope, specifically over the short jacked side?

Answer 20 : No, there is an expectation that there will be limits on the working envelope on the short jacked side of the Apparatus.

Question 21 : Page 44, paragraph 11.2 Decal Package: Will the Crest on driver and officer doors will be the same Crest for all of the eight (8) Apparatus? Is the Crest available in ".ai format"? Is the National Defence logo available in ".ai format"?

Answer 21 : The crests will be the same on all Apparatus. File formats are unknown at this time, DND will work with the Contractor and internal graphics staff to provide usable file formats.

At Annex B Purchase description;

Delete: Annex B Purchase Description dated 14 October 2016

Insert: the attached Annex B Purchase Description updated 20 Jan 16

ALL OTHER TERMS AND CONDITIONS REMAIN THE SAME

National Défense
Defence nationale

14 October 2015
Updated 20 Jan 2015

NOTICE

This documentation has been reviewed by the technical authority and does not contain controlled goods.

AVIS

Cette documentation a été révisée par l'autorité technique et ne contient pas de marchandises contrôlées.

PURCHASE DESCRIPTION
FOR
ARTICULATED 114 FOOT AERIAL PLATFORM
FIRE APPARATUS

ECC 189216

1. SCOPE

1.1 Scope - This Purchase Description describes an Articulating Aerial Fire Fighting Apparatus, including a minimum 114 foot articulating arm, ladder, aerial platform, and waterway. The Apparatus will be the primary response for aerial suppression, aerial access, aerial rescue, and aerial casualty extraction, occurring at Canadian Forces Operating Bases. The Apparatus may also be called upon to provide support to other Fire Departments under Mutual Aid Agreements.

1.2 Instructions

a) Requirements, which are identified by the word "***shall***", are mandatory. Deviations will not be permitted.

b) Requirements identified by "***shall*** $^{(E)}$" are mandatory. The Technical Authority will consider substitutes/alternatives for acceptance as an equivalent.

c) Requirements identified by "**will**" define actions to be performed by Canada and require no action/obligation on the Contractor's part.

d) In this document "**provided**" ***shall*** mean provided and installed.

e) Where a standard or specification is required and the contractor offers an equivalent, that equivalent standard ***shall*** be provided upon request.

f) Metric measurements are used to define the requirement. Other measurements are for reference only and may not be exact conversions.

g) Nominal dimensions reflect a method by which materials or products are generally identified, but which differ from the actual measured dimensions.

1.3 Definitions - The following definitions apply to the interpretation of this Purchase Description:

a) "Technical Authority" (TA) - The government official responsible for technical content of this requirement.

b) "Apparatus" and "Vehicle" – The entire vehicle including all systems and sub-systems, in a complete manufactured state which will be deployed in fire fighting operations as intended for the built configuration.

c) "Manufacturer" – The Company responsible for the Apparatus and/or sub-system design, development, assembly, test and evaluation, and performance verification.

2. APPLICABLE DOCUMENTS - The following documents form part of this Purchase Description. Effective dates ***shall*** be the version specified. Sources are as shown:

Anthropometric Survey of the Land Forces Report 98-CR-15
Defence and Civil Institute of Environmental Medicine
1133 Sheppard Avenue West
North York, Ontario
Canada M3M 3B9

ASTM D4956 Standard Specification for Retroreflective Sheeting for Traffic Control
ASTM International
West Conshohocken, PA

Canadian Motor Vehicle Safety Standards (CMVSS)
Transport Canada,
Road Vehicle and Motor Vehicle Regulation,
330 Sparks Street, Tower C,
Ottawa, Ontario K1A 0N5

NFPA 1901 – 2016 – Standard for Automotive Fire Apparatus
NFPA 1931 – 2015 - Standard for Manufacturer's Design of Fire Department Ground Ladders
NFPA 1983 – 2012- Standard on Fire Service Life Safety Rope and System Components
National Fire Prevention Association (NFPA)
1 Batterymarch Park
Quincy, Massachusetts
USA, 02169-7471

Society of Automotive Engineers Inc. (SAE)
400 Commonwealth Drive
Warrendale, PA
USA, 15096

Tire and Rim Association Inc.
3200 West Market Street
Akron, Ohio
USA, 44313

United Nations Economic Conditions for Europe (UNECE)
Regulation No. 29, Addendum 28, Revision 1, "Uniform Provisions Concerning the Approval of Vehicles with Regard to the Protection of the Occupants of the Cab of a Commercial Vehicle"
Palais des Nations
CH-1211 Geneva 10

ULC-S515- 2013 - Automobile Fire Fighting Apparatus
Underwriters Laboratories of Canada (ULC)
7 Underwriters Road
Toronto, Ontario, M1R 3A9

3. REQUIREMENTS

3.1 Standard Design

a) **Latest Model** - The Apparatus design ***shall*** be the manufacturer's latest model year at the time of production.

b) **Industry Acceptability** - The Apparatus, including aerial device, ***shall*** have demonstrated industry acceptability by having been sold commercially in North America, and proven in service for a minimum of two (2) years.

c) **Regulations** - The Apparatus ***shall*** conform to all applicable laws, regulations, and industry standards governing manufacture, safety, noise levels, and pollution, in effect in Canada at time of production or have a professional Engineer's certificate where equivalent standards are used.

d) **Published Ratings** - The vehicle ***shall*** have system and component capacities equivalent to published ratings (i.e. product or component brochures).

e) **Couplings** – Unless otherwise specified, all intakes, inlets, discharge outlets, and hoses ***shall*** be equipped with Storz couplings, with cap and chain.

f) **Mounting Bolts** – Unless otherwise specified, all equipment mounting ***shall*** utilize high-strength grade 8 bolts, for durability and ease of repair.

3.2 Operating Conditions – The Apparatus ***shall*** operate safely, by day, night, and during periods of artificial obscuration, in all weather conditions and in fire suppression operations.

3.2.1 **Weather** - The Apparatus ***shall*** operate in temperatures ranging from -46 to +44 degrees Celsius, in all climatic conditions found in Canada.

3.2.2 **Terrain** – The Apparatus ***shall*** operate safely, under all load conditions, on highways, paved secondary roads, and airfield hard standing surfaces.

3.3 Safety

3.3.1 **Vehicle Safety Regulations**

a) **CMVSS** - The Apparatus ***shall*** comply with all applicable Canada Motor Vehicle Safety Standards (CMVSS) in effect and applicable by law in Canada at the time of manufacture.

b) **National Safety Mark** - The Apparatus ***shall*** have safety compliance certification label with a **National Safety Mark (NSM)**, as a seal of compliance, or be accompanied by a Vehicle Import Form containing proof of Inspection by the Registrar of Imported Vehicles.

c) **CAN/ULC–S515** - The Apparatus ***shall***$^{(E)}$ conform to the Underwriters Laboratories of Canada CAN/ULC-S515 Standard for Automobile Fire Fighting Apparatus, 2013 edition. For the purposes of this Apparasus, CAN/ULC-S515 references to NFPA 1901 ***shall*** be NFPA 1901 2016 edition.

3.3.2 **Noise Level** - The Apparatus noise level ***shall*** meet the requirements of legislation relative to Occupational Safety and Health.

3.3.3 **Human Factors Engineering –** The Apparatus will be operated by the DND Fire Service wearing the CF Fire Fighter Personal Protective Ensemble (PPE) Turnout gear (Scale D01402CFS Protective Clothing – Fire Fighters dated 5 Mar 12), which fall within the range of dimensional characteristics as collected by the Anthropometric Survey of the Land Forces Report 98-CR-15. Systems and components of the Apparatus ***shall:***

a) Be designed for safety and ease of use by operators, as described above, including Self Contained Breathing Apparatus (SCBA), with anthropometric characteristic measurements ranging from 95th percentile male to 5th percentile female, under all operating conditions;

b) Have entry and exit points equipped with handles and steps sized and positioned to accommodate operators, as described above, with anthropometric characteristic measurements ranging from 95th percentile male to 5th percentile female, with three points of contact; and

c) Be equipped, with caution, warning and instruction plates, non-slip walking surfaces, and heat shields, for operator safety.

3.4 Maintainability

a) The Apparatus ***shall*** be designed to permit access to all items required for servicing and maintenance.

b) The Apparatus ***shall*** be designed to allow the manufacturer’s recommended daily maintenance without having to raise the cab.

c) Spin on style filters ***shall*** be provided where available.

3.5 Vehicle Performance, Ratings, and Dimensions

3.5.1 **Performance**

a) The Apparatus, at GVWR, ***shall*** sustain a minimum top speed of 80 km/h (50 MPH) on a level paved road, in accordance with ULC-S515.

b) From a standing start on level ground, the Apparatus laden with the maximum payload ***shall*** attain a minimum speed of 55 km/h (35 MPH) within 25 seconds, in accordance with ULC-S515.

c) The Apparatus, while laden with the maximum payload, ***shall*** be able to maintain a minimum speed of 30 km/h, on a grade up to and including 6 percent, in accordanc with ULC-S515.

d) The Apparatus ***shall*** have both an angle of approach and an angle of departure of at least 8 degrees.

3.5.2 **Weight Ratings**

a) The Gross Vehicle Weight (GVW), while laden with the maximum payload, ***shall*** not exceed the **vehicle's Gross Vehicle Weight Rating (GVWR)**.

b) The Gross Axle Weights (GAWs), while laden with the maximum payload, ***shall*** not exceed the **Gross Axle Weight Ratings (GAWR)**.

3.5.3 **Dimensions**

a) The maximum overall **height** of the Apparatus, with the aerial assembly in stowed position, ***shall*** be 3.75 metres (12.5 feet).

b) The maximum overall **length** of the Apparatus ***shall*** be 12.8 metres (42 feet).

c) The maximum overall **width** of Apparatus ***shall*** be 2.59 metres (8.5 feet).

d) The **centre of gravity** of the Apparatus ***shall*** be within the chassis manufacturer's allowable conditions

4. CHASSIS SYSTEMS

4.1 Chassis Engine - The chassis engine ***shall:***

a) Be diesel powered;

b) Be turbocharged;

c) Have sufficient power to meet the specified performance requirements;

d) Be equipped with a fast idle system to raise engine speed when required for operations, with an override control at the pump operator's panel;

e) Be equipped with a system to limit the maximum speed of the vehicle; and

f) Have a replaceable engine intake air filter(s).

4.1.1 **Cooling System** – The chassis engine ***shall*** have a cooling system, to maintain an engine temperature at or below the OEM's maximum temperature rating under the required operating conditions.

a) The cooling system ***shall*** be equipped with secure coolant drain valve(s) at the lowest point(s) to allow for full drainage of the system.

b) A shrouded corrosion resistant cooling system fan ***shall*** be provided, meeting the engine OEM design recommendations.

c) The cooling system ***shall*** be provided with coolant filtration.

4.1.2 **Cold Weather Starting Aids**

a) The Apparatus ***shall*** be equipped with a block heater.

b) The Apparatus ***shall*** be equipped with an in-line fuel heater.

c) The block heater and in-line fuel heater ***shall*** be powered through a dedicated auto-eject shoreline receptacle.

4.1.3 **Fuel Fired Preheat System** – The vehicle ***shall*** be equipped with a fuel fired preheat system, drawing diesel fuel from the engine fuel tank.

4.2 Transmission - The Apparatus ***shall*** be equipped with a heavy-duty automatic transmission, designed to match engine torque, speed and load demand/requirement.

a) The transmission ***shall*** be provided with an oil cooler and oil filter.

b) The transmission ***shall*** be equipped with a lock-up feature, automatically activated when the pump is engaged, and deactivated when the pump is disengaged.

4.3 Power Take-Off (PTO) – The Apparatus ***shall*** be equipped with a power take off (PTO), rated to allow powered systems to meet their rated performance.

a) The PTO ***shall*** be capable of engagement while the Apparatus is in motion.

b) A PTO activation switch ***shall*** be provided in the cab within reach of the driver.

4.4 Fuel System - The vehicle fuel supply system ***shall*** include a fuel tank sized to meet or exceed the requirements of ULC-S515 Chapter 11, mounted on heavy-duty support brackets.

a) The fuel tank ***shall*** not interfere with the operation of any equipment installed on the vehicle.

b) The system ***shall*** include a fuel filter water separator, incorporating a thermostatically controlled heater.

4.5 Exhaust System

a) The Apparatus ***shall*** be equipped with an exhaust system.

b) A manual or parked regeneration feature ***shall*** be provided, for diesel particulate filter cleaning.

4.6 Frame - The Apparatus ***shall*** be provided with a heavy duty hot dip galvanized frame, cross-members, and brackets, designed to support the total Apparatus weight, under all loading conditions.

4.7 Front Bumper - The Apparatus ***shall*** be provided with a one-piece polished stainless steel bumper, secured to the frame and equipped with curved bumper guides.

a) The front bumper ***shall*** be delivered with storage, holding a minimum of 45 metres (150 feet) of 45mm (1.75 inch) diameter preconnected fire hose and nozzle.

4.8 Axles – The axles ***shall*** be equipped with oil lubricated wheel bearings, with front axle hub caps incorporating visual oil level indicator.

4.9 Suspension Systems

a) The Apparatus ***shall*** be equipped with front springs sized to match the rated axle capacity.

b) The vehicle ***shall*** be equipped with an air ride suspension, sized to match the rated axle capacity

c) The Apparatus ***shall*** be equipped with heavy-duty, double acting shock absorbers, compatible with the chassis characteristics.

4.10 Steering System - The Apparatus ***shall*** be equipped with a powered steering system, with mechanical backup function.

a) The steering system ***shall*** be controlled with steering wheel, equipped with a horn, and mounted on a telescopic/tilt steering column.

b) The steering system ***shall*** be rated to statically steer at least the maximum front axle load.

c) The steering mechanism ***shall*** be capable of turning the front wheels to an angle of at least 45 degrees right and left.

4.11 Wheels and Tires

a) The vehicle ***shall*** be equipped with steel-belted, tubeless radial tires.

b) The tires ***shall*** be mounted and balanced on polished aluminum hub pilot disc wheels, with tire pressure monitoring valve stem caps.

c) The tires ***shall*** be sized to meet or exceed the load requirements.

d) The rear tires ***shall*** be mud and snow type tread.

e) The wheels and tires ***shall*** conform to the Tire and Rim Association requirements for the Apparatus application.

f) The wheels ***shall*** be equipped with a chrome wheel trim package.

4.12 Braking System - The braking system ***shall***:

a) Be a full air actuated service brake system and spring actuated parking brake system that complies with Canadian Motor Vehicle Safety Standards (CMVSS);

b) Include all wheel anti-lock (ABS) brakes;

c) Include an air dryer, with heated automatic moisture ejector;

d) Include automatic slack adjustors on all wheels;

e) Include visual brake stroke indicators on all wheels;

f) Include dust shields, if available;

g) Be equipped with air pressure protection preventing the use of air-operated accessories, when the system air pressure drops below 550 kPa (80 PSI);

h) Be equipped with a quick buildup section in the air reservoir system to enable the Apparatus to move within 60 seconds of start-up, when it has a completely discharged air system, in accordance with ULC-S515; and

i) Be provided with sealed electrical connections.

4.12.1 **Air Tank Reservoirs** - The Apparatus ***shall*** be provided with air tank reservoirs.

a) Where applicable, air tank reservoirs ***shall*** be equipped with heated automatic moisture ejectors.

b) Air tank reservoirs ***shall*** be equipped with back-up manual pull type drains.

4.13 Alternator - The Apparatus ***shall*** be equipped with an alternator which is compliant with the requirements of ULC-S515 Chapter 12.

4.14 Batteries - The Apparatus ***shall*** be supplied with heavy-duty, maintenance free batteries, compliant with ULC-S515 Chapter 12.

a) Batteries ***shall*** be mounted in an accessible, protected and ventilated location.

b) The batteries ***shall*** be rated to exceed the draw, in the required operating conditions.

c) Protected battery jumper studs ***shall*** be provided to allow jump starting of the engine without having to tilt the cab.

d) A master disconnect switch ***shall*** be provided, and be accessible without having to tilt the cab.

e) When operationally required, the Apparatus ***shall*** be jump started with the cab raised.

4.14.1 **Battery Charger -** The Apparatus ***shall*** be equipped with a combination battery charger, air compressor system.

a) The charging system power ***shall*** be provided through an auto-eject shoreline receptacle.

b) The battery charging system ***shall*** provide a visual voltage signal indicator.

c) The shoreline receptacle and remote charge indicator ***shall*** be provided on the driver's side of the vehicle exterior.

4.15 Automatic Greasing System - The Apparatus ***shall***$^{(E)}$ be equipped with a Groenveld auto-lubrication system, servicing the maximum number of grease points.

a) The system ***shall*** include:

i. A grease reservoir, positioned for ease of level checking refilling;

ii. A grease level indicator, indicating when the reservoir requires refilling;

iii. A pump for grease distribution; and

iv. An adjustable timer, to control the greasing intervals.

b) The grease reservoir ***shall*** be full on delivery.

4.16 Miscellaneous Equipment - The Apparatus ***shall*** be equipped with:

a) **License plate mounting** provisions, front and rear. The Rear licence plate ***shall*** be illuminated;

b) Heavy duty unmarked front and rear **mud flaps**, sufficiently sized and positioned to prevent body damage from wheel splash and stone throw;

c) Frame mounted **tow hooks** at the front and rear, of sufficient strength to permit towing;

d) Heavy-duty accessible **towing eyes**, bolted to the frame rails at the front and rear, of sufficient strength to secure the Apparatus during shipping or towing; and

e) Mid-frame mounted **tie down points** on both sides and of sufficient strength to secure the Apparatus during shipping/transit.

5. APPARATUS CAB

5.1 Cab Crashworthiness - The Apparatus cab ***shall*** meet load and impact tests required for compliance certification with Economic Commission for Europe (ECE) Regulation No. 29, Addendum 28, Revision 1, "Uniform Provisions Concerning the Approval of Vehicles with Regard to the Protection of the Occupants of the Cab of a Commercial Vehicle".

a) The driver and officer seated positions ***shall*** be protected from impact with front and side air bags.

5.2 Cab Construction – The Apparatus ***shall*** be equipped with an aluminum tilt cab, fully enclosed, designed for the fire service, and compliant with ULC-S515 Chapter 13.

a) The cab ***shall***$^{(E)}$ be manufactured using a high-strength extruded aluminium alloy substructure.

b) The cab floor, walls, roof, doors, and outer shell ***shall***$^{(E)}$ be constructed of aluminum alloy, welded to the substructure.

c) The aluminum alloy ***shall*** have sufficient thickness to provide structural rigidity to withstand the intended use of the Apparatus in fire service.

d) A chrome finish cooling air intake grill ***shall*** be provided at the front of the cab, sized to meet the engine OEM recommendations.

e) Front fenders ***shall*** be equipped with a corrosion resistant trim, with a brushed aluminum appearance.

f) The wheel wells ***shall*** be equipped with composite liners.

5.2.1 **Doors** - The cab ***shall*** be equipped with a minimum of four side-opening doors.

a) The cab door hinges ***shall***$^{(E)}$ be stainless steel heavy duty hinges, for long service life and corrosion resistance.

b) Interior door handles ***shall*** be configured to prevent accidental opening.

c) Exterior side door handles ***shall*** be pull-type, installed on each door.

d) The cab door latching mechanism ***shall*** be accessible for servicing and repairs.

i. Access panels ***shall*** be equipped with re-usable hardware.

e) All doors ***shall*** be equipped with a full perimeter weather seal.

5.2.2 **Windows** - The windshield and stationary side windows ***shall*** be manufactured from laminated safety glass with a light transmittance automotive tint allowable in Canada.

a) Front and rear door windows ***shall*** be powered and open fully.

b) Stationary side windows ***shall*** be provided between the front and rear doors on each side of the cab, to limit blind spots ensuring visibility.

c) An electric windshield washer sprayer, and intermittent windshield wipers, ***shall*** be provided with a sweep designed to maximize coverage of the windshield area.

5.2.3 **Steps** – Steps ***shall*** have an aggressive non-slip surface and be sized in accordance with ULC-S515 Chapter 14.

a) The lowest step height ***shall*** be between 457 mm (18 inches) and 610 mm (24 inches) from the ground level.

b) The stepping height between platforms ***shall*** be a maximum of 457 mm (18 inches).

5.2.4 **Handrails** - Access handrails ***shall*** be provided at each entrance and at each step or ladder location, sized and located in accordance with ULC-S515 Chapter 14.

a) Access handrails ***shall*** be slip-resistant, and noncorrosive.

b) Access handrails ***shall*** be positioned to permit three points of contact for ascending and descending (two hands and one foot or one hand and two feet).

5.2.5 **Rear View Mirrors** – The cab ***shall*** be equipped with two heavy-duty, heated, remotely adjustable, external rear-view mirrors, with a convex section, a polished aluminum appearance, and marker lights.

a) Rear view mirrors ***shall*** provide the driver with visibility of the vehicle from the cab (left and right side) to the rear of the vehicle, and the view **shall** not be obstructed by seated passengers.

b) Each mirror ***shall*** be vibration resistant and fold both forward and rearward against the vehicle.

c) Mirror glass ***shall*** be replaceable.

5.2.6 **Rear View Camera System** - The apparatus ***shall***$^{(E)}$ be provided with a rear view camera system, including three colour cameras.

a) One (1) camera ***shall*** be installed on the road side of the apparatus, oriented to provide a minimum view from the rear view mirror to the rear outside bumper area.

b) One (1) camera ***shall*** be installed on the curb side of the apparatus, oriented to provide a minimum view from the rear view mirror to the rear outside bumper area.

c) One (1) camera ***shall*** be installed near the centre rear of the apparatus, oriented to provide an unobstructed rear facing view.

   i. The rear facing camera ***shall*** provide audio to the system monitor.

d) All cameras ***shall*** be protected from damage occurring during routine operation of the apparatus.

e) The camera images ***shall*** be displayed on a monitor mounted in the cab, providing a clear view to the driver.

f) The rear view camera system ***shall*** be controlled from the cab.

5.3 Cab Mounting and Tilt System

a) The cab tilt system ***shall*** be powered and provided in accordance with ULC-S515 Chapter 13.

b) The cab ***shall*** be provided with an independent mounting system, isolating the cab from the body and chassis induced stress.

c) The cab ***shall*** tilt forward, a minimum 40 degrees to provide access to the engine and transmission for maintenance.

d) The cab tilt system ***shall*** have manual backup controls and be equipped with devices to prevent the sudden motion of the cab, in the event of system failure.

e) A parking brake interlock ***shall*** be provided to prevent the cab from being tilted unless the parking break is set.

f) A positive-engagement safety latch ***shall*** be provided to lock the cab in the full tilt position.

g) A "cab ajar" indicator ***shall*** be provided to warn the driver when the cab is not locked into the lowered position.

h) A safety switch ***shall*** be provided to prevent tilting of the cab when the boom is stowed in the cradle.

5.4 Cab Interior - The cab interior ***shall*** be an open concept design, with an insulated low-rise contoured engine cover, maximizing interior space.

5.4.1 **Interior Surfaces**

a) The cab ***shall*** be lined with materials designed for durability in an extreme duty environment.

b) The cab ***shall*** be insulated to block the noise and heat of fire service conditions.

c) The cab floor ***shall*** be covered with a dark floor covering that provides an aggressive slip-resistant surface.

d) High contact areas ***shall*** be protected with fire, scuff, and abrasion resistant material. High contact areas include the dash, overhead console, windshield posts, headliner, door panels, and door posts (as applicable).

5.4.2 **Seating** – The Apparatus cab ***shall*** be equipped with seating for a total of six (6) occupants, and be compliant with ULC-S515 Chapter 13.

a) One (1) fully adjustable **driver's seat *shall*** be provided, with a high back.

b) One (1) fully adjustable, Self-Contained Breathing Apparatus (**SCBA**) style, **officer's seat *shall*** be provided, with a high back.

c) Four (4) SCBA style high back seats ***shall*** be provided, two(2) rear facing **mid cab** and two (2) forward facing **rear cab**.

d) All seating ***shall*** be upholstered with flame-retardant, water repellent, and wear resistant material, applicable to fire fighting applications.

e) All SCBA style seats or SCBA backs ***shall*** be provided with matching seat covers and equipped with a flip-up split headrest, for ease of SCBA bottle release upon exit.

f) All seating ***shall*** be equipped with easily accessible, retractable 3-point seat belt assemblies.

5.4.3 **Interior Lighting**

a) Interior cab lighting ***shall*** include a minimum of four (4) white/red, individually switched, LED lights in the ceiling, two (2) in the front area and two (2) in the rear area.

b) The interior cab lighting ***shall*** have controls.

c) White dome lights ***shall*** activate automatically when any cab door is opened, and turn off automatically when the door(s) are closed.

d) Each dome light ***shall*** be individually controlled with three selections, red activation, white activation, or off.

5.4.4 **Interior Components**

a) Pivoting interior sun visors ***shall*** be provided for the driver and officer.

b) Enclosed and latched storage areas ***shall*** be provided near the driver and officer seats.

c) A map pocket ***shall*** be provided in the cab.

d) A plug-in type receptacle ***shall*** be provided in the cab within reach of the officer's seat.

e) The cab interior ***shall***$^{(E)}$ be equipped with OnScene Solutions, Talon helmet brackets.

f) A minimum of six (6) Knucklehead Streamlights, ***shall***$^{(E)}$ be provided, with a charging station, mounted in the cab.

g) A radio ***shall*** be provided, including CD/AM/FM, with speakers.

h) Mobile radio power leads and antennae cable wired into the cab ***shall*** be provided, with a service loop terminating at the location of future installation of radio equipment.

i. An antennae base ***shall*** be mounted high on the cab exterior.

i) Two (2) fans ***shall*** be mounted inside the cab, facing the driver and officer without obstructing vision.

i. The fan controls ***shall*** be in the cab.

5.4.5 **Controls and Instruments**

a) Controls and instruments ***shall*** be illuminated and mounted in the cab, in a location clearly visible and reachable by the driver.

b) Gauges indicating both metric and SAE ***shall*** have a metric predominance, except where indicating pressure or vacuum where Pound per Square Inch (PSI) ***shall*** have predominance.

c) The Apparatus ***shall*** be equipped with sufficient controls, gauges, and/or indicators to provide positive control of the Apparatus, in accordance with ULC-S515, including:

i. Speedometer/Odometer;

ii. Tachometer with hour meter;

iii. Oil pressure gauge, with an oil pressure warning indicator and audible alarm;

iv. Coolant temperature gauge with a high temperature indicator and audible alarm;

v. Transmission oil temperature gauge, with high temperature indicator and audible alarm;

vi. Voltmeter;

vii. Air pressure gauge(s), with warning indicator and audible alarm;

viii. Turn signal controls, with indicators;

ix. Headlight controls, including dimmer, high beam controls and indicator;

x. Fuel level gauge(s);

xi. Master battery switch / master ignition switch, with engagement indicator;

xii. Master Emergency lighting and siren controls;

xiii. Windshield wipers with intermittent control and washer controls;

xiv. PTO engagement indicator;

xv. Vehicle dimension label;

xvi. Air filter restriction indicator;

xvii. Pump shift control, with indicators identifying when pump is in gear and pumping can begin;

xviii. Parking brake controls with red indicator;

xix. Cab ajar, Door ajar, and cabinet door ajar warning indicators;

xx. Controls to transfer power to the aerial device, including a visual indicator identifying when operating mechanisms are engaged; and

xxi. A visual indicator, indicating that the outriggers are engaged.

5.4.6 **Heating, Ventilation, and Air Conditioning (HVAC)** – An in-cab HVAC system ***shall*** be provided, and equipped with all components and controls required for regulation of the cab interior temperature.

a) The air conditioning system ***shall*** not use ozone-depleting refrigerants (chlorofluorocarbons (CFCs)).

b) The HVAC system ***shall*** include windshield defrost vents, positioned to optimize defrosting.

6. APPARATUS BODY

6.1 General

a) The Apparatus body ***shall*** be constructed with an extruded aluminum mainframe as the main structural support for the body.

b) Where dissimilar metals are mounted together, the mounting base material ***shall*** have an isolation barrier prior to assembly, to prevent dissimilar metal reaction.

6.2 **Steps, Standing, and Walking Surfaces** - The Apparatus ***shall*** be equipped with steps, standing, and walking surfaces designed in accordance with requirements in ULC-S515 Chapter 14.

6.2.1 **Aerial Access Steps** - The Apparatus ***shall*** be equipped with two (2) staircases.

a) One staircase ***shall*** be provided on the driver side of the Apparatus to access the aerial platform.

b) A second staircase ***shall*** be provided to access the aerial turntable.

6.3 **Rub Rail** - The Apparatus body ***shall*** be provided with rub rail along the bottom edge of both sides and the rear of the body, with a reflective material for increased visibility.

a) The rub rail ***shall***$^{(E)}$ be an anodized aluminum C-channel, spaced away from the body using nylon spacers, and have rounded ends/corners.

6.4 **Miscellaneous Equipment Storage** – The Apparatus body ***shall*** be equipped with enclosed, weather resistant, equipment storage compartments, in accordance with ULC-S515 Chapter 5 and Chapter 14.

a) The storage compartments ***shall*** be sized to store the required miscellaneous equipment, with a minimum total storage space of 2.8 cubic meters (100 cubic feet).

b) The storage compartments ***shall*** maximize the space available, be exterior opening, and be located along each side and the rear of the Apparatus.

6.4.1 **Storage Compartment Construction**

a) Body compartments ***shall*** be constructed of corrosion resistant aluminium alloy.

b) Compartment floors and shelves ***shall*** be sufficiently thick, and supported to hold the intended equipment capacity without deformation.

c) Compartments with a height between 914 mm (36 inches) and 1219 mm (48 inches) ***shall*** be equipped with one adjustable, sliding shelf, labelled with a minimum capacity of 226 kg (500 pounds).

d) Compartments with a height 1219 mm (48 inches) or greater ***shall*** be equipped with two adjustable, sliding shelves, each labelled with a minimum capacity of 226 kg (500 pounds).

e) Compartments ***shall*** be equipped with accessible equipment holders, for all of the miscellaneous equipment required in this Purchase Description, designed to secure the equipment under all vehicle operating conditions.

i. Compartments ***shall***$^{(E)}$ provide Safe-T-System purpose built racks for secure and safe transportation of 60 minute pressurized SCBA bottles, with a minimum 6 bottle capacity.

ii. Storage ***shall*** be provided for two (2) backboards, with a slide pad installed to facilitate backboard removal.

iii. Storage, accessible from ground level ***shall*** be equipped with a rack consisting of six (6) pike pole storage tubes.

f) The compartments ***shall*** provide ventilation and have provisions for drainage of moisture.

g) All electrical junctions or wiring within the compartments ***shall*** be protected from damage resulting from equipment stored within the compartment.

h) Storage compartments ***shall***$^{(E)}$ be equipped with turtle track matting.

i) Compartments ***shall*** be equipped with internal LED strip type lighting that is automatically activated when the door is opened and automatically deactivated when the door is closed.

i. Compartment lights ***shall*** have a master on/off control in the cab.

ii. A red flashing compartment “door open” indicator with audible alarm ***shall*** be provided, in a location visible to the seated driver.

iii. The compartment door open indicator ***shall*** be interlocked with the parking brake, to prevent flashing during vehicle servicing and on scene operation.

6.4.2 **Storage Compartment Doors**

a) Compartment doors ***shall*** be either hinged or roll-up design, as appropriate for the intended use and accessibility of stored equipment.

b) Compartments that have a vertical door opening of less than 610 mm (24 inches) ***shall*** be equipped with hinged doors.

i. Hinged doors ***shall***$^{(E)}$ be a box pan configuration.

ii. Hinged doors ***shall*** be equipped with a weatherproof seal.

iii. Drain holes ***shall*** be provided in the lower corners of all inside door pans, for drainage.

iv. Polished stainless steel, D-ring style, twist lock door handles and latches ***shall***$^{(E)}$ be provided on hinged doors.

v. Hinged doors ***shall*** be securely attached with full length heavy duty stainless steel piano type hinges.

vi. All hinged doors ***shall*** be provided with a hold open device.

vii. A drip rail ***shall*** be provided over each compartment opening to redirect water runoff.

c) Compartments that have a vertical opening of 610 mm (24 inches) or more ***shall***$^{(E)}$ be provided with AMDOR roll-up doors, equipped with:

i. A means to hold the door in the open position;

ii. A strap/rope to assist with door closure;

iii. Interior door seals;

iv. An anodized aluminum track with finishing flange;

v. A top gutter; and

vi. A latch bar, operable with a gloved hand.

6.4.3 **Miscellaneous Equipment** - The Apparatus ***shall*** be delivered with miscellaneous equipment secured in dedicated storage locations. As a minimum, the Apparatus ***shall*** be delivered with:

a) One 2.7 kg (6 lb) flathead axe;

b) One 2.7 kg (6 lb) pick head axe;

c) Two (2) pike poles with a nominal length of 1.8 metres (6 feet);

d) Two (2) pike poles with a nominal length of 2.4 metres (8 feet);

e) Two (2) pike poles with a nominal length of 3.6 metres (12 feet);

f) Two (2) AKRON SceneStar LED Scene lights, rated at 20,000 Lumens;

g) One dry chemical portable fire extinguisher with a minimum 6A:80 B:C rating;

h) One basic vehicle first aid kit;

i) Four combination spanner wrenches;

j) Two hydrant wrenches;

k) One double female 65 mm (2.5 inch) adapter;

l) One double male 65 mm (2.5 inch) adapter;

m) One rubber mallet, suitable for use on suction hose connections;

n) Two salvage covers each a minimum size of 3.7 m by 4.3 m (12 feet by 14 feet);

o) Two wheel chocks, mounted in readily accessible locations;

p) Four ladder belts which comply with NFPA 1983, Standard on Fire Service Life Safety Rope and System Components; and

q) One (1) powered cable reel assembly, holding a minimum 60 metres (200 feet) of 110 volt cable, with an electrical rewind, in a curb-side compartment.

i. The cable ***shall*** be equipped with a junction box, containing a minimum of one (1) twist lock and three (3) 110-volt receptacles.

ii. The cable reel ***shall*** be equipped with an adjustable cable stop.

iii. The cable reel ***shall*** be provided with top, bottom and side guide rollers to prevent chaffing of the cable during operation.

6.5 Fire Hose and Hose Storage - The Apparatus body ***shall*** be equipped with hose storage, provided in accordance with ULC-S515 Chapter 5 and Chapter 14.

6.5.1 **Hose Bed and Fire Hose** - The Apparatus ***shall*** be equipped with ~~a~~ body hose storage.

a) The body hose storage ***shall*** be sized to accommodate, and be delivered with, a minimum of:

i. 182 metres (600 feet) of 101 mm (4 inch) diameter double jacket fire hose; and

ii. 60 metres (200 feet) of 64 mm (2.5 inch) diameter double jacket fire hose.

b) The body hose storage ***shall*** incorporate a track and adjustable hose bed dividers.

c) The sides of the hose storage ***shall*** be constructed of aluminum.

d) The hose storage design ***shall*** allow for loading and unloading of the hose without having to raise the aerial device from the stored position and without obstruction from reels, handrails, ladders, or equipment holders.

6.5.2 **Pre-Connected Hose Bed and Fire Hose –** The Apparatus ***shall*** be provided with accessible pre-connected hose storage.

a) The hose lays ***shall*** be separated by aluminum vertical dividers.

b) A hose guides ***shall*** be provided, installed horizontally and vertically, to facilitate deployment of the hose.

c) The preconnected hose storage ***shall*** be sized to accommodate, and be delivered with a minimum of three (3) 60 metre (200 feet) long

double-jacket fire hoses, two (2) 45mm (1.75 inch) diameter and one (1) 65mm (2.5 inch) diameter.

6.6 Ground Ladders and Storage

6.6.1 **Ground Ladder Storage** - The rear of the Apparatus body ***shall*** be equipped with a ground ladder storage tunnel, accessible from ground level.

a) The ladder storage tunnel ***shall*** have a minimum storage capacity for 35 metres (115 feet) of ground ladders, in accordance with ULC-S515 Chapter 5.

b) The ladder storage design ***shall*** provide for ladders to be removed individually, without having to remove any other ladder.

c) An aluminum tunnel lining ***shall*** be provided.

d) The ladders ***shall*** be held at the top and bottom by tracks, equipped with a friction reducing material.

e) A quick release device ***shall*** be provided to keep the ladders secured in the storage area.

f) The tunnel ***shall(E)*** be equipped with a hinged, aluminum, door, and gas assist piston type cylinders.

g) The door ***shall*** open a minimum of 90 degrees to allow removal of ground ladders.

6.6.2 **Ground Ladders**

a) Ground ladders meeting the requirement of NFPA 1931 ***shall*** be provided, in accordance with ULC-S515 Chapter 5.

b) A minimum total of 35 metres (115 feet) of ground ladders ***shall*** be provided, including two (2) attic ladders, two (2) roof ladders, and three (3) extension ladders.

c) One attic ladder ***shall(E)*** be aluminum Alco-Lite FL-10, with slip-resistant rubber feet and carrying handles.

d) One attic ladder ***shall(E)*** be aluminum Alco-Lite AEL-12, with heavy-duty swivel safety shoes.

e) One roof ladder ***shall(E)*** be aluminum Alco-Lite PRL-16, with folding roof hooks and steel spiked feet.

f) One roof ladder ***shall(E)*** be aluminum Alco-Lite PRL-18, with folding roof hooks and steel spiked feet.

g) One (1) aluminum extension ladder ***shall(E)*** be Alco-Lite PEL-24.

h) One (1) aluminum extension ladder ***shall(E)*** be Alco-Lite PEL-35.

7. PUMP AND COMPARTMENT

7.1 Fire Pump - The Apparatus ***shall*** be equipped with a fire pump system compliant with ULC-S515 Chapter 15.

a) The fire pump ***shall*** have a minimum rated capacity of 4,732 litres per minute (1250 US-gpm).

b) The fire pump ***shall***$^{(E)}$ be a Waterous Model, S100 Series pump or HALE 8FG series.

c) Bolt flanges or Victaulic couplings ***shall*** be installed on the suction and discharge sides of the pump, for ease of fire pump removal without disturbing piping.

7.2 Pump Compartment

a) The Apparatus ***shall*** be equipped with a pump compartment mounted in front of the Apparatus body.

b) The pump compartment ***shall*** be provided as a module, separate from the Apparatus body, to reduce body stress by allowing independent movement.

c) The pump operator’s panel with controls and gauges ***shall*** be on the road side of the Apparatus.

d) The pump compartment ***shall*** allow visual inspection of the fire pump and plumbing area, through access door(s).

7.3 Pump Operator’s Panel – The pump operator’s panel ***shall***$^{(E)}$ be provided on the road side of the Apparatus and compliant with ULC-S515 Chapter 15.

a) LED pump panel lighting ***shall*** be provided, interlocked with the park brake, and controlled at the pump operator’s panel.

b) Pump controls, gauges, and instruments required for pump operation ***shall*** be provided at the pump operator's panel, located as far as practical from hose connections.

c) All gauges, discharge outlets, intakes, inlets, and controls ***shall*** be identified and illuminated.

d) Panel identification ***shall***$^{(E)}$ be permanently colour coded, and bilingual (English and French) and/or make use of graphic symbols, as defined in SAE J1362.

e) All gauges ***shall*** be resistant to vibration, pressure pulsation dampened, and corrosion, shock, and condensation resistant. Liquid filled gauges are preferred.

f) Gauges indicating both metric and SAE ***shall*** have a metric predominance, expect where indicating Pound per Square Inch (PSI), PSI ***shall*** have predominance.

g) Warning signs identifying electrocution hazards ***shall*** be provided at the pump operator's panel.

h) The pump operator's panel ***shall*** include:

i. One master suction pressure gauge, with a minimum range of -30 to 400 psi and -100 to 2800 kPa. If the gauge is analogue, it ***shall*** have a minimum diameter of 101 mm (4 inches);

ii. One master discharge pressure gauge, with a minimum range of -30 to 400 psi and -100 to 2800 kPa. If the gauge is analogue, it ***shall*** have a minimum diameter of 101 mm (4 inches);

iii. Pump discharge pressure gauges, with a minimum range of -30 to 400 psi and -100 to 2800 kpa, adjacent to each discharge outlet. If the gauges are analogue, they ***shall*** have a minimu m diameter of 65 mm (2.5 inches);

iv. A corrosion resistant master manual fire pump drain, allowing simultaneous draining of the fire pump and all water-carrying lines, and accessories;

v. Quarter-turn valves, controlling bleeder valve assemblies, to drain water from the gauge pressure lines to prevent freezing of the line;

vi. Two test plugs to facilitate third party vacuum and pressure tests of the pump;

vii. Pump pressure and RPM control(s);

viii. Pump priming system controls, with visual activation indicator;

ix. Water tank to pump valve control;

x. Water tank fill valve control;

xi. A water tank level gauge, using high-intensity LEDs to visually indicate full, 3/4, 1/2, 1/4, and refill levels of the water tank level;

xii. Aerial waterway flowmeter digital display; and

xiii. A pump test plate listing the rated discharges and pressures with the engine speed, as determined by the certification test, in accordance with ULC-S515 Chapter 15.

7.3.1 **Engine Systems Monitor** - The Apparatus ***shall*** be provided with an electronic engine systems monitor, connected to the engine Electronic Control Module (ECM), functioning as a throttle operating the pressure sensor governor.

a) The systems monitor ***shall*** be adjustable, housed in a single waterproof unit, and have a highly visible digital display.

b) The systems monitor ***shall*** be mounted at the pump operator's panel and display engine information and critical warnings, including:

i. Engine coolant temperature indicator, with audible and visual high temperature warning;

ii. Engine oil pressure indicator, with audible and visual high pressure warning;

iii. Engine RPM;

iv. Engine throttle control; and

v. Battery voltage.

c) The systems monitor ***shall*** by programmable for predetermined pressure or RPM settings.

d) Programmed pressure or RPM settings ***shall*** be readable in a message display area on the monitor.

7.4 Pump Operator's Platform – The pump operator's panel location ***shall*** be equipped with a means to prevent the pump operator from contacting the ground, such as a slide out or fold down platform.

a) The platform ***shall*** be a minimum of 500mm (20 inches) deep, equal in width to the pump operator's panel, and have a slip resistant surface.

b) The platform ***shall*** support a minimum of 136 kg (300 pounds).

c) The platform ***shall*** be equipped with a locking system to securely hold the platform when placed in both the open and closed positions.

7.5 Intake and Discharge Manifolds - The pump system ***shall*** be provided with stainless steel intake and discharge manifolds and piping systems.

7.6 Priming System - A pump priming system ***shall*** be provided, with an electrically driven, positive displacement pump, and primer selector valve.

a) The primer ***shall*** be controlled at the pump operator's panel.

b) The selector valve controls **shall** provide a means to selectively prime the pump and intakes.

7.7 Pump Shift

a) The pump shift ***shall*** be provided with a pneumatic control using a power shift cylinder.

b) The power shift control valve ***shall*** be provided in the cab, and be labelled "PUMP SHIFT".

c) A green indicator light labelled “PUMP ENGAGED” ***shall*** be provided in the cab, indicating that the pump is engaged.

d) A second green indicator light labelled “OK TO PUMP” ***shall*** be provided in the cab.

e) An indicator light ***shall*** be provided at the pump operator’s panel, to indicate when the drive unit has fully shifted from road to pump position.

7.8 Pump Compartment Cold Weather Package - The Apparatus ***shall*** be equipped with a pump compartment cold weather package to maintain sufficient heat to facilitate operations, within the required operating conditions.

a) The cold weather package ***shall*** incorporate a pump compartment heat pan, which is:

i. Installed under the fire pump and pump compartment;

ii. Securely attached to the underside of the Apparatus body; and

iii. Removable for servicing.

b) The cold weather package ***shall*** incorporate compartment heaters mounted in the pump area.

c) Gauges ***shall*** be configured to prevent freezing.

7.9 Pumping System Cooling - The pump system **shall** be provided with cooling systems to ensure all components and major assemblies operate within their designed ranges, while the unit is operating in the highest required ambient temperatures during prolonged pumping operations.

7.10 Auxiliary Engine Cooler – An auxiliary engine cooler ***shall*** be provided for lowering the engine temperature during prolonged pumping operations, controlled at the pump operator’s panel.

8. WATER TANK AND PLUMBING

8.1 Water (Booster) Tank

8.1.1 Water Tank Design

a) The Apparatus ***shall*** be equipped with a water (booster) tank, compliant with ULC-S515 Chapter 16.

b) The water tank ***shall*** have a minimum certified capacity of 1135 litres (300 USG).

c) The water tank ***shall***$^{(E)}$ be constructed of Polyprene® copolymer, treated to prevent degradation from exposure to sunlight (heat

and UV), and flexible enough to resist cracking and fatigue due to movement.

d) Material ***shall*** be of sufficient thickness to provide complete structural integrity of the tank for the expected life of the vehicle, for the required use.

8.1.2 **Water Tank Mounting** - The water tank ***shall*** be independent of the body. The mounting method ***shall*** be designed and constructed to:

a) Prevent tank shifting;

b) Withstand the maximum gross loading under specified operating conditions;

c) Allow for the independent differences in vehicle and tank flexion (Cradled, cushioned, spring-mounted, etc.); and

d) Allow removal without disturbing or dismounting the Apparatus body structure.

8.1.3 **Tank Filling** - The Apparatus ***shall*** be equipped with a valved tank fill line to allow water from external sources to be pumped into the water tank.

a) The valve ***shall***$^{(E)}$ be an Akron 8800HD series electric actuated valve, with a manual backup system.

b) An Akron 9323 valve controller ***shall***$^{(E)}$ be provided at the pump operator’s panel, to activate valve.

8.1.4 **Tank-to-Pump Valve** - The water tank ***shall*** be connected to the intake side of the pump with a valve, controlled at the pump operator’s panel.

a) The valve ***shall***$^{(E)}$ be an Akron 8800HD series electric actuated valve, with a manual backup system.

b) An Akron 9323 valve controller ***shall***$^{(E)}$ be provided at the pump operator’s panel, to activate the valve.

8.1.5 **Fill Opening** - The water tank ***shall*** be equipped with a readily accessible, covered fill opening allowing insertion of a minimum of a 65 mm (2.5 inch) hose with coupling.

a) The fill opening/cover ***shall*** be permanently labelled with “water fill/remplissage d'eau” and identify the tank capacity.

b) A minimum 6mm mesh debris screen ***shall*** be installed in the opening, and be removable for cleaning.

c) The cover or another device ***shall*** open as a vent to release pressure build-up in the tank.

8.1.6 **Vent/Overflow**

a) The water tank ***shall*** be equipped with a vent/overflow that is sized to allow water to be drawn from the tank or pumped into the tank without pressure build-up, under the required operation.

b) The overflow ***shall*** direct water behind the rear wheels.

8.2 Plumbing General

a) The Apparatus ***shall*** be provided with a plumbing package to support aerial suppression at elevated heights.

b) All plumbing ***shall*** be stainless steel or heavy-duty high-pressure hose, to prevent corrosion, and decrease friction loss.

c) All bolts, nuts, washers and associated fasteners used in the Apparatus plumbing system ***shall*** be selected for maximum corrosion resistance.

8.3 Discharge Outlets

a) One (1) 102 mm (4 inch) diameter discharge outlet ***shall*** be provided at the curb side pump panel.

   i. The discharge ***shall(E)*** be equipped with an Akron 8840E series electric actuated valve, with a manual backup control.

   ii. The curb side pump panel ***shall(E)*** be equipped with an Akron 9325 electric valve controller, for the discharge valve control.

b) Three (3) 65 mm (2.5 inch) diameter discharge outlets ***shall*** be provided, one on the road side at the pump operator's panel, one at the curb side pump panel, and one at or near the rear of the Apparatus.

   i. The discharges ***shall(E)*** be equipped with Akron 8800HD series electric actuated valves, with a manual backup control.

   ii. The pump operator's panel ***shall(E)*** be equipped with Akron 9325 electric valve controllers, for discharge valve control.

c) Two (2) 45 mm (1.75 inch) diameter and one (1) 65mm (2.5 inch) diameter pre-connected discharge ***shall*** be provided.

   i. All pre-connected discharges ***shall(E)*** be equipped with Akron 8800HD series electric actuated valves, with a manual backup control.

   ii. The pump operator's panel ***shall(E)*** be equipped with Akron 9325 electric valve controllers, to control each discharge.

8.4 Suction Intakes

a) Two (2) 152 mm (6 inch) diameter suction intakes ***shall*** be provided, one on the road side at the pump operator's panel and one at the curb side pump panel.

i. The intakes ***shall***$^{(E)}$ be equipped with Akron 7960 electric actuated butterfly valves, with manual back-up control.

ii. The pump operator's panel ***shall***$^{(E)}$ be equipped with an Akron 9323 electric valve controllers, for intake valve control.

iii. Nominal ¾ inch (19 mm) air bleeder valves ***shall*** be provided and controlled at the pump operator's panel.

iv. Each intake ***shall*** be provided with a pressure relief valve, set at 125 psi (861.8 kPa), and providing overpressure protection for the suction hose.

b) Two (2) 65 mm (2.5 inch) diameter suction intakes ***shall*** be provided, one on the road side at the pump operator's panel and one at the curb side pump panel.

i. The suction intakes ***shall***$^{(E)}$ have a manually operated 65 mm (2.5 inch) Akron valve, with a swing-out design.

8.5 Inlets

a) One (1) 101 mm (4 inch) diameter inlet ***shall*** be provided at the curb side of the front bumper, equipped with a 90 degree swivel.

i. The inlet ***shall***$^{(E)}$ be equipped with an Akron swing out valve, controlled at the pump operator's panel.

b) One (1) 101 mm (4 inch) diameter inlet***shall*** be provided at the rear of the Apparatus near the road side, connected to the waterway plumbing, to supply water to the aerial device from an outside source.

i. The inlet ***shall*** be equipped with NST chrome-plated male adapter, with a long-handle chrome-plated cap.

ii. A weatherproof 64 mm (2.5 inch) compound vacuum pressure gauge with a minimum range of 300 to 600 psi (2000 to 4200 kpa) ***shall*** be provided adjacent to the waterway inlet.

8.6 Aerial Water Tower Plumbing – The Apparatus ***shall*** be equipped with a water tower, providing a large capacity elevated water delivery system at the aerial platform, for high-level fire fighting in accordance with ULC-S515 Chapter 17.

a) There ***shall*** be no restriction on extension, retraction, rotation, or elevation of the aerial device with the platform loaded to rated capacity and water flowing at the maximum rated monitor flow.

b) There ***shall*** be no restriction on monitor movement while flowing at the maximum rated monitor flow, regardless of the extension, elevation, or position of the aerial device.

c) A 102 mm (4 inch) diameter aerial waterway **shall** be provided.

i. The aerial waterway discharge ***shall*** be equipped with an Akron 8840 series electric actuated valve, with a manual backup control.

ii. The pump operator's panel ***shall***$^{(E)}$ be equipped with an Akron 9325 electric valve controller.

iii. The aerial waterway ***shall*** be equipped with a Flowmeter, measuring the flow of water in Litres per Minute, and the total volume of water discharged through the waterway, displayed at the pump operator's panel.

d) An aerial waterway drain valve, with a minimum 38 mm (1.5 inch) diameter, ***shall*** be provided and operated from the rear of the Apparatus.

i. The drain ***shall***$^{(E)}$ be equipped with an Akron 8800HD series valve, controlled at the drain.

8.6.1 **Platform Discharge Outlet** - One (1) 65 mm (2.5 inch) diameter discharge outlet ***shall*** be provided at the front of the aerial platform.

a) The discharge outlet ***shall*** be provided with a reducing adapter to allow connection of 65 mm (2.5 inch) diameter or 45 mm (1.75 inch) diameter hose.

8.6.2 **Waterway Monitor -** The waterway ***shall***$^{(E)}$ be equipped with an Akron 3482 StreamMaster II Monitor, equipped with a SaberMaster Nozzle style 1577 (straight stream to fog), located at the aerial platform.

a) The monitor ***shall*** be capable of discharging a minimum of 4,000 litres per minute (1056 GPM) from the nozzle at a pressure of 700 kPa (100 psi).

b) The waterway plumbing shall$^{(E)}$ be provided with an AKRON valve directly below the monitor, controlled using a hand wheel at the platform.

8.6.3 **Waterway Relief Valve** - The aerial waterway ***shall*** be provided with an automatic relief valve, which protects the waterway system by reliving pressure through the dumping of water to the environment, away from the pump operator's panel.

9. Electrical System

9.1 Wiring - All electrical equipment installed by the Apparatus manufacturer ***shall***$^{(E)}$ conform to the requirements of ULC-S515 Chapter 12 and associated SAE standards.

a) All Apparatus electrical circuits ***shall*** be protected from overload.

b) Wiring harnesses ***shall*** conform to SAE J-1128 with GXL temperature properties.

c) All exposed wiring ***shall*** be run in a loom covering.

d) Jacketed cables ***shall*** be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C) except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

e) All wiring looms ***shall*** be supported and attached along the entire run of the loom.

f) All wiring ***shall*** be mounted in a manner that provides protection from water, heat, and vibration induced failure.

g) All connection and terminations ***shall*** have a positive mechanical and electrical connection.

h) Weather-resistant connectors ***shall*** be provided throughout.

i) At any point where wire or looms must pass through metal holes, protective grommets ***shall*** be provided in the holes, to prevent wire abrasion.

j) Wiring passing through frame members ***shall*** not be subjected to angular bends less than 120 degrees unless contained within a protective rigid framed loom, to ensure wiring insulation break down does not occur.

k) Wiring ***shall*** be individually identified every 152 mm (6 inches), permanently function-labelled, and colour-coded, on the insulation, to facilitate identification.

l) A main low voltage chassis-to-body interface point and distribution panel ***shall*** be provided at the front of the body, in an accessible location, with a distribution panel labelled and containing body electrical relays and wire connection.

m) The chassis-to-body electrical interface ***shall*** be equipped with a quick-disconnect harness, to facilitate future removal of the body from the chassis.

n) Circuits ***shall*** be provided with automatic reset circuit breakers to ensure reliability of the system.

9.2 Multiplex Main Control System - The Apparatus ***shall*** be provided with an in-vehicle electrical networking multiplex system, providing current-state diagnostic capability to expedite troubleshooting and reduce Apparatus down time.

a) The system ***shall***$^{(E)}$ deliver multiple signals via a CAN-Bus, complying with SAE J1939. The system ***shall*** provide:

i. Integrated load management functions, including load shedding;

ii. Power Distribution nodes;and

iii. Diagnostic display for warning message indication, fault display, apparatus condition messages, and complete diagnostic capability.;

b) The electrical system ***shall*** provide a modem/wire connection to facilitate remote diagnostics, troubleshooting, or program additions.

9.3 Load Management System - The Apparatus ***shall*** be equipped with an automatic electrical load management system, to monitor the electrical system voltage and automatically shed predetermined loads, in a selected order, to prevent over discharging of the Apparatus batteries.

a) The load manager ***shall*** provide main battery monitoring.

b) A low voltage visual indicator and audible alarm ***shall*** be provided to warn of low voltage condition.

c) The load manager system ***shall*** be equipped with a control, diagnostics, and status display.

d) The load manager ***shall*** incorporate a test system to cycle all loads and verify load-shedding sequences.

9.3.1 **Load Shedding**

a) Loads being shed ***shall*** be in accordance with ULC-S515 Chapter 12.

b) Electrical load shedding **shall** only occur if required during stationary operations.

c) Electrical loads shed during stationary operation ***shall*** be reactivated when the park brake is released.

d) Automatic fast idle activation ***shall*** occur before load shedding.

9.4 Exterior Vehicle Lighting – Emergency - The Apparatus ***shall*** be equipped with an LED emergency lighting package, including upper and lower warning levels, required for the optical warning system, in accordance with ULC-S515 Chapter 12.

9.5 Exterior Vehicle Lighting - Non-Emergency – The Apparatus ***shall*** be provided with an LED cab and body lighting package, in accordance with ULC-S515 Chapter 12.

9.5.1 **Headlights** - The cab ***shall*** be equipped with automatic low beam headlights and driver controlled high beam headlights, with chrome finished housing, including front fog lights.

9.5.2 **Front Signal Lights**

a) The cab ***shall*** be equipped with amber front turn signal lights.

b) The cab ***shall*** be equipped with amber turn signal marker lights, on each side of the cab, forward of the front doors.

9.5.3 **Rear Tail Lights** - The Apparatus ***shall*** be equipped with rear tail light assemblies, including running, brake, turn, and back-up light functions, with chrome finished housing.

9.5.4 **Clearance Lights** - At a minimum, lights ***shall*** include:

a) Two (2) red clearance lights, one on each side of the rear portion of the Apparatus body;

b) Three (3) red clearance lights evenly spaced across the rear rub rail on the Apparatus body;

c) Two (2) red clearance lights, one on each side at the rear of the body, recessed in the rub rail;

d) Two (2) amber marker lights, one on each side of the Apparatus body, forward of the rear axle;

e) Five (5) amber clearance lights on the cab roof; and

f) Two (2) amber clearance lights, one on each side of the body as far forward as practical, and recessed into the rub rail.

9.5.5 **Work Lighting** - The Apparatus ***shall*** be provided with LED lights to illuminate the work areas, steps, walkways and ground areas around the Apparatus in accordance with ULC-S515 Chapter 12.

a) Lights ***shall*** have controls in the cab, interlocked with the park brake, programed to deactivate when the park brake is released.

9.5.6 **Telescopic Scene Light** – The Apparatus ***shall***$^{(E)}$ be equipped with three (3) AKRON SceneStar LED Scene lights, rated at 20,000 Lumens.

a) The light heads ***shall*** be mounted on telescopic aluminum poles, with an up indicator and lock to hold at a desired height.

b) The light assemblies ***shall*** rotate 360 degrees.

c) The lights ***shall*** be mounted externally with:

   i. One (1) on the curb side at the front corner jack position;

   ii. One (1) on the road side at the front corner jack position; and

   iii. One (1) near the platform, with a weather resistant control connected to the aerial tip power circuit.

d) The lights ***shall*** be controlled in the cab and at the pump operator’s panel.

9.5.7 **Aerial Ladder Tip Spotlight** – The tip of the aerial ladder ***shall*** be equipped with a corrosion resistant LED spotlight, on a swivel base to allow movement of the light head, to illuminate the monitor nozzle stream.

a) The spotlight ***shall*** be controlled at the platform and the turntable control station.

9.5.8 **Ladder Base Lighting** – The aerial device ***shall*** be equipped with lighting arranged to illuminate the aerial device in any position of operation, including four (4) LED floodlights.

a) Two (2) floodlights ***shall*** be provided at the bottom of the ladder base section, with one light on each side to illuminate the main booms.

b) Two (2) floodlights ***shall*** be provided on the outermost articulating boom section with one light on each side to illuminate the knuckle and boom tip.

9.5.9 **LED Beacon Lights** - The aerial platform ***shall*** be equipped with two (2) red LED beacon lights, mounted on opposite sides of the platform, automatically activated with the use of the ladder controls.

9.6 Audible Warning Devices – The Apparatus ***shall*** be equipped with audible warning devices, in accordance with ULC-S515 Chapter 12.

9.6.1 **Electronic Siren and Speaker** - The Apparatus ***shall***$^{(E)}$ be provided with a Federal Signal Q2B solid-state electronic siren, with attached noise-cancelling microphone and siren speaker with stainless steel faceplate.

a) The Siren operating modes ***shall*** include hi-lo, yelp, wail, P.A., air horn, and radio re-broadcast.

9.6.2 **Air Horns** – The Apparatus ***shall*** be equipped with air horns, connected to the chassis air system, mounted near the front bumper.

9.6.3 **Back-Up Alarm** - The Apparatus ***shall*** be equipped with a back-up alarm, with a minimum audible sound level of 87dB, in accordance with ULC-S515 Chapter 12.

9.7 Hydraulic Generator System - The Apparatus ***shall*** be provided with a hydraulic generating system sized to provide sufficient output for concurrent high demand use, plus a minimum twenty percent spare capacity.

a) A Harrison generator ***shall***$^{(E)}$ be provided with;

i. A modular generator unit;

ii. A hydraulic motor;

iii. A filter assembly;

iv. A cooler assembly; and

v. A variable displacement hydraulic pump.

b) The hydraulic generator and components ***shall*** be enclosed in a corrosion resistant housing which is lined for noise reduction.

c) The hydraulic oil reservoir ***shall*** be sized to suit the generators requirements, as specified by the generator manufacturer.

d) A generator gauge panel ***shall*** be provided, displaying voltage, frequency, amperage, total hours operated, and hydraulic oil reservoir level.

e) The hydraulic pump motor ***shall*** be driven by the chassis transmission mounted power take-off (PTO).

f) Generator controls ***shall*** be provided in the cab.

9.7.1 **Generator Breaker Panel** - A hydraulic generator breaker panel ***shall*** be provided with a minimum of ten (10) GFI circuit breakers.

a) The breaker panel ***shall*** include a master breaker, sized to the generator output.

b) The breaker panel ***shall*** be housed in a compartment near the generator.

9.7.2 **Aerial 110 Volt Receptacle** - A 110-volt power receptacle ***shall*** be provided at the platform.

a) A breaker panel with a GFI protected 15-amp breaker ***shall*** be provided.

b) The receptacle ***shall*** have a weather resistant cover and be wired to the hydraulic generator system through a breaker.

9.7.3 **AC Receptacle** - The Apparatus ***shall*** be provided with an alternating current (AC) electrical system.

a) A 220 volt receptacle ***shall*** be hard wired into the hydraulic generator system.

b) Six (6) 20-amp 110 volt twist lock receptacles ***shall*** be wired into the hydraulic generating system.

i. Three (3) receptacles ***shall*** be located on the road side.

ii. Three (3) receptacles ***shall*** be located on the curb side.

c) Receptacles ***shall*** be provided with GFI protected circuits.

9.8 Three-Way Intercom - A three-way Atkins Dynamics or FRC ACT 3-way intercom system ***shall***$^{(E)}$ be provided for communications between the turntable control station, the pump operator's panel, and the platform control station.

a) The intercom ***shall*** incorporate waterproof speakers and microphones.

b) The turntable control station and pump operator's panel ***shall*** be provided with a volume control and a push to talk button.

c) The speaker / microphone at the platform control station ***shall*** be provided with hands free operation capability.

9.9 Radio Integrated Crew Intercom – A Setcom intercom system ***shall***$^{(E)}$ be provided.

a) One headset with microphone ***shall*** be provided for each crewmember.

i. The headsets ***shall*** be equipped with coiled cord and be designed to be worn under helmets.

b) The driver and officer headsets ***shall*** transmit and receive over the radio.

c) The push to talk control ***shall*** be mounted is a location accessible to the seated driver and officer.

d) The driver's headset ***shall*** be operated through a weatherproof, remote foot operated control.

9.10 Platform Camera System - The Apparatus ***shall*** be provided with an aerial camera system.

a) The system ***shall*** include:

a. A colour camera overlooking the platform, and capable of zoom; and

b. A thermal imaging camera.

b) The colour and thermal imaging cameras ***shall*** be provided on a single mount which allows for pan and tilt motion.

c) Two (2) displays ***shall*** be provided.

i. One (1) display ***shall*** be provided at the turntable.

ii. One (1) display ***shall*** be provided at the platform.

d) A video data recorder (VDR) ***shall*** be provided record automatically when the platform is active, and have the capacity to store a minimum of twelve (12) hours of recording.

10. AERIAL DEVICE - The Apparatus ***shall*** be equipped with a telescopic, articulating aerial device with an elevating platform, rescue ladder, and waterway system, compliant with ULC-S515 chapter 17.

10.1 Structural Safety Requirements - The aerial device ***shall*** meet the stability requirements of ULC-S515 Chapter 17.

a) The aerial device ***shall*** have a minimum 2:1 structural safety factor, applicable to all aerial components including torque box, turntable, and outrigger components.

b) An independent engineering firm ***shall*** verify the aerial safety factor, through computer modeling and analysis, and strain gauge testing performed by an independent registered professional engineer.

c) Written certification from the independent engineering firm verifying that the aerial device has met safety standards ***shall*** be provided. Certification will form part of the Apparatus acceptance documentation.

10.2 Interlock - An interlock ***shall*** be provided to prevent operation of the aerial device until the parking brakes have been set and the transmission has been placed in neutral.

10.3 Aerial Ladder – The Apparatus ***shall*** be equipped with a telescopic articulating aerial ladder, with a minimum rated platform height of 34.74 metres (114 feet), compliant with ULC-S515, which together with steps and platforms on the Apparatus will provide continuous egress for fire fighters and civilians from an elevated position to the ground.

a) The ladder ***shall*** be a ladder-rung design with skid-resistant surface.

b) The ladder ***shall*** be constructed of aluminum.

c) The outer most section of the rescue ladder ***shall*** be equipped with folding handrails, deployable from the platform and/or the top portion of the boom section.

d) The aerial device ***shall*** be equipped with a safety interlock system preventing storage with the handrails deployed.

e) The ladder ***shall*** be accessible from both the platform and turntable, to provide maximum manoeuvrability during fire fighting or rescue operations.

10.4 Aerial Boom Device - The Apparatus ***shall*** be equipped with telescopic aerial boom, sized to support the Aerial ladder.

a) The outer boom of the aerial device ***shall*** articulate through a minimum of 160 degrees, to allow high reach, including up and over fire fighting and rescue operations, and reach a minimum of 4.57 metres (15 feet) below grade.

b) The articulating boom section ***shall*** be equipped with a self-levelling platform.

c) The boom ***shall*** be equipped with access panels to accommodate servicing of wiring, hydraulics and waterway.

d) The boom ***shall*** be provided with a low maintenance slide system.

e) For vehicle manoeuvrability, the full length of the stowed aerial device ***shall*** be within the vertical plane of the front and rear vehicle bumpers.

f) The aerial platform ***shall*** reach the ground within 3.65 m (12 feet) of the Apparatus through 360 degrees of rotation, for operation in congested areas.

g) The aerial device ***shall*** be equipped with a self-controlling limit system, to keep the platform within the operational envelope, and be equipped with back-up controls.

h) The boom elevation system ***shall*** provide minimum boom angles from 0 to 80 degrees above horizontal, and be equipped with a retarder system that senses the boom nearing full elevation and reduces operating speed to provide a smooth stop.

i) The main boom section ***shall*** be equipped with dual double action hydraulic cylinders, for boom elevation.

10.4.1 **Extension/Retraction System** - The boom extension and retraction system ***shall:***

a) Be fully enclosed within the boom assembly to avoid exposure to the elements;

b) Be equipped with a safety interlock system to monitor extension systems; and

c) Provide covered service access at the base of the boom to facilitate repairs and inspection of the system.

10.5 Aerial Platform – The Apparatus ***shall*** be equipped with a passenger-carrying aerial platform assembly, mounted on the outermost section of the articulating ladder and aerial boom device, to support fire fighting and rescue operations.

a) The platform ***shall*** have a minimum rated capacity of 408 kg (900 lbs), including 340 kg (750 lbs) for three (3) personnel and 680 kg (150 lbs) for equipment worn or used, during fire fighting and rescue operations, rated with the water delivery system full of water.

b) The rated capacity ***shall*** be available through the entire working envelope of the platform.

c) The platform ***shall*** rotate 45 degrees to either side of centreline, to enhance fire fighting and rescue operations.

10.5.1 **Platform Construction** – The platform ***shall*** be constructed in accordance with ULC-S515 Chapter 17.

a) The platform ***shall*** provide a minimum of 1.67 square metres (18 sqft) of platform working area.

b) To assist with rescue operations an external stepping platform ***shall*** be mounted on the forward face of the main aerial platform, with a minimum capacity of 181.4 kg (400 lb).

10.5.2 **Platform Heat Shield** – The platform ***shall*** be equipped with a heat reflective shield, in accordance with ULC-S515 Chapter 17.

10.5.3 **Water Curtain System** – The platform ***shall*** be equipped with a water curtain system, providing a cooling spray on the underside of the entire platform floor, in accordance with ULC-S515 Chapter 17.

10.5.4 **Aerial Platform Breathing Air System** - The aerial device ***shall*** be provided with a breathing air system, in accordance with ULC-S515 Chapter 17.

a) The Contractor ***shall*** deliver the Apparatus with all air cylinders, piping, hoses, reels, and other fixed equipment charged with breathing air.

10.5.5 **Platform Levelling System** - An automatic platform levelling system ***shall*** be provided, to maintain a level condition with the platform loaded to the rated capacity. A manual backup levelling system ***shall*** be provided.

10.5.6 **Platform Hose and Storage** - The platform ***shall*** be equipped with covered hose storage, delivered containing a minimum of:

a) Fifteen (15) metres (50 feet) of 45 mm (1.75 inch) diameter preconnected double jacket fire hose;

b) One (1) Protek Style #333 Multi-purpose nozzle; and

c) Wrenches.

10.5.7 **Stokes Basket/Receiver** - A stokes style basket and receiver ***shall*** be provided for rescue operations.

a) The platform ***shall*** be equipped with a receiver and mounting bracket assembly.

b) The receiver ***shall*** be designed to secure the stokes basket for transportation of a casualty upto a minimum of 225 kg (500 lbs).

c) The system ***shall*** have the capacity and configuration for an attendant to access the casualty during rescue oprations.

10.6 Aerial Device Hydraulic System - The hydraulic system provided ***shall*** be of the latest design and incorporate features to minimize heat build-up and provide smooth control of the aerial platform.

a) The system provided ***shall*** meet the performance requirement of ULC-S515 Chapter 17.

b) All hydraulic components, that are non-sealing, whose failure could result in the movement of the platform ***shall*** be provided

with rated pressure/bursting strengths that comply with ULC-S515 Chapter 17.

c) Hydraulic power for all operations ***shall*** be provided from a transmission mounted power take off (PTO).

d) The hydraulic pump ***shall*** be a double, load sensing, variable displacement type pump, to minimize system heat build-up.

e) The hydraulic oil reservoir ***shall*** be readily accessible for checking and filling, without the use of specialized tooling.

f) The hydraulic reservoir fill location ***shall*** be clearly marked with a label that reads “Hydraulic Oil Only / Huile Hydraulique Seulement”.

g) The hydraulic system ***shall*** be equipped with a relief valve to prevent over pressurization.

h) To compensate for a control system failure, the aerial ***shall*** be equipped with servo hydraulic controls, with manual overrides on the servo valve.

i) The hydraulic system ***shall*** be equipped with:

i. A Reservoir Breather;

ii. A Reservoir Strainer;

iii. A Pressure Filter;

iv. Turntable Pressure Filters;

v. Boom Knuckle Filters;

vi. A Return Filter; and

vii. A level gauge.

j) The hydraulic system ***shall*** be designed to keep the aerial and outriggers stationary in the event of a hydraulic pump failure or line rupture.

10.7 Torque Box – A bolt-on torque box assembly, constructed of high tensile steel, ***shall*** be provided.

a) The torque box design ***shall*** transfer all stress produced during aerial operation to the outriggers, to prevent damage to the truck chassis, frame, and body.

b) The inside of the torque box ***shall*** be reinforced for strength.

c) The torque box design ***shall*** maximize body compartment space.

10.8 Outriggers (Stabilizer System) – The Apparatus ***shall*** be equipped with a stabilizer system of outriggers, designed to function effectively in congested areas.

a) The Apparatus ***shall*** be equipped with at least 2 sets of extendible out and down, "H" style outriggers.

b) The outriggers ***shall*** have the ability to level side-to-side and front to rear to accommodate uneven surfaces such as curbs and road crowns.

c) Four (4) aluminum auxiliary ground pads, with grab handles, ***shall*** be provided, to assist with weight distribution.

d) The Apparatus ***shall*** be equipped with on board storage for all ground pads, accessible below the body.

e) Aluminum stabilizer covers ***shall***$^{(E)}$ be provided.

10.8.1 **Automatic Outrigger Control System** - An automatic outrigger control and self-levelling system ***shall*** be provided, to reduce set-up time at emergency scenes.

a) The outrigger control system ***shall*** provide the operator with a colour screen including selectable controls for:

   i. Deployment of left side outriggers;

   ii. Deployment of right side outriggers;

   iii. Level control, with indicator showing when the Apparatus is level and ground pressure is sufficient for operation; and

   iv. Variable short-jacking, for partial deployment of stablizers in tight spaces.

b) The hydraulic system ***shall***:

   i. Lock out aerial device/platform operation until the outriggers have been set;

   ii. Lock out outrigger movement until the aerial device is stored in the cradle; and

   iii. Provide controls to retract outriggers in the event of an emergency.

10.8.2 **Manual Outrigger Control System** – A manual outrigger control ***shall*** provide outrigger deployment within 90 seconds, through the use of hydraulic operated controls.

10.8.3 **Outrigger Warning Lights** - Each outrigger outboard face ***shall*** be equipped with flashing red LED warning lights, automatically activated when the outriggers are deployed.

10.8.4 **Outrigger Opening Lights** – Each outrigger and the surrounding ground ***shall*** be illuminated by LED floodlights, automatically activated when the outriggers are deployed.

10.8.5 **Outrigger Deployment Alarm** – The Apparatus ***shall*** be equipped with an audible outrigger alarm, producing a sound level between 87 and 112 dB automatically while any outrigger is in motion, turning off when outrigger motion has stopped.

10.9 Turntable Support Assembly

a) The Apparatus ***shall*** be equipped with a turntable designed to provide a continuous 360 degree rotation, in a both directions.

b) The structural design of the turntable support assembly ***shall*** be an integral part of the torque box.

c) The turntable support assembly ***shall*** be equipped with an access for servicing and inspection of the hydraulic and water supply lines.

10.10 Upper Turntable Assembly – The Apparatus ***shall*** be equipped with an upper turntable assembly, bolted to the rotation bearing, providing for mounting of the elevating platform, lift cylinders, rotation motor and turntable control station.

a) Any hydraulic components near the sides and rear of the assembly ***shall*** be protected from damage due to promixity to moving parts.

10.11 Rotation Mechanism - The Apparatus ***shall*** be equipped with a high torque, hydraulic motor to drive the rotation mechanism of the turntable/aerial assembly.

a) The turntable bearing ***shall*** be accessible for lubrication and re-torqueing of bolts.

b) A high quality servo hydraulic control valve ***shall*** provide rotation control.

c) The rotation system ***shall*** be provided with accessible manual backup controls.

10.12 Hydraulic, Electric, and Water Swivel – A swivel housing ***shall*** be provided to transfer hydraulic, water, and electrical power from the chassis to the aerial.

10.13 Control Stations - The aerial device ***shall*** be equipped with two (2) control stations, the turntable control station and the platform control station.

a) The turntable control station ***shall*** serve as the master station with the ability to override the platform control station.

b) Control stations ***shall*** be equipped with covers to protect them from environmental elements.

c) The platform control cover, when opened, ***shall*** not reduce the usable space within the platform.

d) Control Stations ***shall*** be illuminated, labelled, and conveniently arranged and spaced to be operated by an operator with a gloved hand, without disturbing other controls.

10.13.1 **Control Station Controls and Indicators** – Both the turntable and platform control stations ***shall*** meet the requirements of ULC-S515 and, as a minimum, be equipped with:

a) A low breathing air warning indicator, visual and auditable, when the breathing air is at or below 20%;

b) Platform levelling controls;

c) Ladder base lighting controls;

d) Power Take-Off (PTO) controls;

e) Signal horn controls;

f) Platform overload indicator, visual and audible;

g) Ladder rung alignment indicator, for climbing safety;

h) Emergency backup hydraulic pump system controls;

i) A cab protection indicator;

j) A cradle alignment indicator, for storing the elevating platform, with override controls;

k) Platform rotation controls, with indicator;

l) Controls for aerial device elevation, lowering, rotation, extension, retraction, and articulation;

   i. Aerial device controls ***shall*** be equipped with a means to prevent unintentional movement of the aerial device.

   ii. The operator ***shall*** use each aerial device controls to regulate the speed of elevation, extension, and rotation of the aerial device within the limits determined by the manufacturer.

   iii. The aerial device ***shall*** be equipped with a self controlling limit system, which slows the aerial movement to a stop as it approaches safe operation limits.

   iv. The aerial device ***shall*** be equipped with an obstable avoidance system, which slows the aerial movement to a stop as it approaches obstacales.

m) Auto-stow controls, allowing the platform to follow a safe path to return to the stowed position, with operator override;

n) Wind speed display;

o) Three-way intercom controls; and

p) An hour meter.

10.13.2 **Turntable Control Station** - The Turntable control station ***shall*** also be equipped with:

a) A control power switch, to route power between the platform and turntable control stations;

b) Outrigger position indicators;

c) Platform alignment indicator; and

d) Main hydraulic system pressure gauge.

10.13.3 **Platform Control Station -** The platform control station ***shall*** also be equipped with:

a) A platform control power switch;

b) Platform water curtain system controls;

c) A water flow meter display; and

d) Water monitor controls including stream pattern selection, overriding all other water monitor controls.

11. Paint, Decal, and Corrosion Protection

11.1 Paint

a) All paint ***shall*** be applied to the Apparatus in accordance with the **paint manufacturer's recommendations** and the manufacturer's best production procedures, rendering a durable finish and a smooth appearance, free from runs, sags and orange peel.

b) The surface ***shall*** include a corrosion-prevention pre-treatment to all bare metal, a sealer/primer, a minimum of two coats of base colour paint, and two coats of clear finish.

c) All painted components of the Apparatus ***shall*** be painted prior to assembly to ensure full coverage of metal treatments and paint.

d) If aluminum is penetrated after painting, for mounting purposes, the point of penetration and all mounting hardware ***shall*** be treated with a corrosion inhibiting pre-treatment.

e) The paint process ***shall***$^{(E)}$ utilize Akzo-Nobel's high-solid LV products, including:

   i. Akzo-Nobel Sealer/Primer LV - Acrylic urethane sealer/primer;

   ii. Akzo-Nobel High Solid LV topcoat - Lead free, chromate-

free, high-solid acrylic urethane topcoat; and

iii. Akzo-Nobel High Solid LV clear coat.

f) The Apparatus ***shall***$^{(E)}$ be painted two-tone, consisting of a FLNA 4006 White over FLNA 3225 Red Akzo-Nobel Lead free, chromate-free, high-solid acrylic urethane Paint applied to the upper section of the cab, with the paint break line determined at the preproduction meeting.

g) The aerial boom ***shall*** be primed and painted on both the inside and outside surfaces, prior to assembly.

11.2 Decal Package – The Apparatus ***shall*** be provided with a decaling package. The details of the decaling package **shall** be discussed at the preproduction meeting.

a) The two-tone paint break ***shall*** be covered by a nominal ¾ inch stripe (½ inch gold stripe, with $^{1}/_{8}$ inch black outline), with a clear polyurethane coating, which contours the chassis.

b) The Apparatus ***shall***$^{(E)}$ be provided with reflectives surfaces in compliance with ULC-S515 Chapter 14.

i. The cab and body ***shall***$^{(E)}$ be provided with a double white Scotchlite reflective stripe, a nominal 6 inches and 2 inches in width, horizontally around the cab and body, in accordance with ASTM D 4956.

ii. The boom knuckle shall$^{(E)}$ be provided with reflective red / white striping in compliance with NFPA 1901.

iii. All outrigger legs that protrude horizontally beyond the side of the body ***shall*** be provided with a chevron reflective pattern, visible from the front and rear.

c) All lettering ***shall*** be applied in the ARIAL BLOCK font, in sizes ranging from 2 inches to 6 inches to accommodate the required text, in the outlined areas.

d) Lettering ***shall*** be a combination of yellow/gold on red paint, and black on white paint.

e) Decals ***shall*** be applied using high quality vinyl with a clear polyurethane coating.

f) The following decals ***shall*** be provided in the following locations:

i. If space is available, “FIRE · FEU”, nominal 3 inches in height, on the front of the vehicle, horizontally centred over the grill, vertically centred between the chassis stripe and grill, and mirrored to be read in rear-view mirrors;

ii. Front identification number, nominal 4 to 6 inches in height, applied to the left and right furthermost location on the vehicle;

iii. Identification number, sized to fit available space, applied to the topside of the vehicle;

iv. Crest or door logos, horizontally and vertically centred on both the driver and officer doors;

v. National Defence logo, sized and centred to fit the available space on the sides of the body;

vi. Side identification number, sized and centred to fit the available space on the rear doors;

vii. Rear identification number, nominal 6 inches in height, applied to the rear of the vehicle;

viii. Maple Leaf Window Overlay, applied to the window between the front and rear cab doors, using high quality perforated vinyl material to allow visibility through the window; and

ix. A chevron of reflective material affixed to the inside of all doors in accordance with NFPA 1901.

11.3 Corrosion Protection

a) **Corrosion Protection Design** – The vehicle ***shall*** be designed to prevent galvanic corrosion.

b) **Rust Proofing** - Aftermarket rust proofing ***shall*** be applied to the vehicle in addition to standard factory rust proofing, before vehicle delivery.

c) **Rust Preventative** - All metal surfaces on the vehicle ***shall*** be treated with a rust preventative oily film product having the following properties:

i. Moisture displacing;

ii. Creeping (capillary action);

iii. Low solvent content;

iv. Compatible with rubbers, plastics and, all other materials used in automotive construction;

v. Non-toxic; and

vi. Minimal dripping.

d) **Salt Spray Endurance Test** - Written proof of a twelve hour ASTM B117 salt spray endurance test certification by an independent test laboratory ***shall*** be provided within 30 days of vehicle delivery. Krown Rust Kontrol and Rust Check products have been previously certified, proof is not required.

e) **Application Areas** – Corrosion protection application ***shall*** include, but is not limited to the underside of fenders and hood, enclosed and boxed-in sections, seams, mouldings, crevices, weld points, underbody and exposed exterior brackets.

f) **Documentation** – Proof of application **shall** accompany each vehicle.

11.4 Identification - The following information ***shall*** be permanently affixed in a conspicuous and protected location:

a) The manufacturer's name, model number, serial number and model year; and

b) The GVWR, GCWR and GAWR ratings, in metric and imperial.

11.5 Warning and Instruction Plates

a) The vehicle ***shall***$^{(E)}$ be equipped with warning and equipment operation instruction plates that are in accordance SAE J115.

b) The plates ***shall***$^{(E)}$ be within view of the operator, be bilingual (English and French) and/or make use of graphic symbols defined in SAE J1362.

12. INTEGRATED LOGISTIC SUPPORT (ILS)

12.1 Vehicle Manuals – All manuals required for the description, operation, maintenance and repair of the Apparatus, including sub-systems, ***shall*** be provided.

a) **Operator's Manuals** – Operator's Manuals ***shall*** be bilingual (English/French). The Operator's Manual ***shall*** include:

   i. Instructions for the safe operation of the Apparatus;

   ii. Daily operator maintenance instructions/checks (including lubrication); and

   iii. Safety warnings.

b) **Parts Manuals** – The Parts Manuals ***shall*** be in English (bilingual is desirable). The Parts Manuals ***shall*** include:

   i. Illustrations showing all components of the vehicle including equipment and accessories from other manufacturers that are supplied for the requirements of the contract, with numbers for the itemization of the parts;

   ii. A listing for all itemized manufacturer's parts showing the Original Equipment Manufacturers (OEM) part number, the part name, and a brief description of the item;

   iii. Cross reference relating the OEM part number to the correct illustration and item number; and

   iv. A representation of bilingual warning signs and identification labels delivered on the equipment.

c) **Maintenance (Shop Repair) Manuals** - The Maintenance (Shop Repair) Manual ***shall*** be in English (bilingual is desirable). The Maintenance (Shop Repair) Manuals ***shall*** include:

i. A trouble shooting guide, showing the steps and tests required to determine the exact cause of a problem and an explanation of the steps required to correct a problem;

ii. A listing of the necessary tolerances, torque levels, and fluid volumes required, and a section listing special tools (including item part numbers);

iii. Information on the order of disassembly and assembly of the systems and components of the vehicle;

iv. Schematics for the Apparatus plumbing system, engine, drive train components, fire pump, and pump operator's panel; and

v. Electrical wiring diagrams, clearly showing the routing and interface of the manufacturer's electrical circuit(s) with the cab and chassis OEM electrical system (Multiplex).

d) **Manual Supplements -** The contractor ***shall*** supply manual supplements (Operator's, Maintenance and Parts) to support dealer-installed equipment (sub-components) not covered in approved manuals.

12.1.2 **Manual Delivery**

a) **Sample Manuals** - The contractor ***shall*** submit sample manuals to the Technical Authority (TA) for each equipment model and or sub-system for approval as specified above. Sample manuals will not be returned. The Crown will provide approval or comments on the manuals within 30 days.

b) **Approved Manuals (to TA)** - One (1) complete set of manuals (Operator's, Maintenance, Parts, and Supplements) in electronic format ***shall*** be delivered to the Technical Authority.

c) **Approved Manuals (With Vehicle)** - Two (2) complete sets of manuals (Operator's, Maintenance, Parts, and Supplements), in electronic format, ***shall*** be provided with every Apparatus.

12.1.3 **Electronic Format**

a) Approved copies of the electronic format manuals ***shall*** be delivered on CD/DVD-ROM.

b) CD/DVD-ROM ***shall*** be an unlocked PDF in a searchable format and ***not*** require installation, password and/or Internet connection to be accessed.

12.1.4 **Provisional Manuals**

a) In the event that manuals have not been approved at the time of delivery of the equipment, manuals marked “Provisional” ***shall*** be supplied with the equipment.

b) The contractor ***shall*** deliver replacement approved manuals to all destinations where Provisional manuals were delivered.

12.1.5 **Translation and Reproduction Rights** - The Canadian Government ***shall*** reserve the right to translate and reproduce, for Government use only, all or any part of the publications supplied, including the training packages delivered against the contract agreement.

12.1.6 **Manual Changes**

a) During the period of the Contract, changes to equipment, which affect the contents of manuals, ***shall*** be reflected in a revision of the electronic and paper version of the manuals.

b) Changes to the manuals ***shall*** conform to the same format and presentation requirements as the original approved manuals.

c) The revised electronic version of the manual ***shall*** be sent to the Technical Authority and delivery locations by the Contractor.

12.2 Data Summary

a) The contractor ***shall*** provide a bilingual (English/French) Data Summary for each make/model/configuration of Apparatus, by completing the Technical Authority’s template.

b) Information required in the data summary template ***shall*** include:

i. Apparatus pictures;

ii. Apparatus weights and dimensions; and

iii. Technical information for major systems, and sub-systems.

c) The Contractor ***shall*** provide a Data Summary, if possible, before the shipment of the vehicle(s).

12.3 Warranty

12.3.1 **Warranty Coverage –** The Contractor ***shall*** provide an extensive Apparatus warranty, including:

a) Full lifetime warranty coverage against defects in materials or workmanship on the frame, cross members, and booster tank;

b) A minimum ten (10) year cab and body structural warranty against defects in materials or workmanship;

c) A minimum ten (10) year stainless steel plumbing component warranty against defects in materials or workmanship;

d) A minimum five (5) year paint warranty, against peeling, cracking, blistering, corrosion, and UV paint fade (pro-rating is acceptable);

e) A minimum two (2) year total Apparatus system warranty including sub-system components, not including normal wear/consumption of consumables.

12.3.2 **Warranty Letter**

a) The contractor ***shall*** provide a bilingual Warranty Letter to the Technical Authority, and with each vehicle delivered, by completing the Technical Authority's template.

b) The Warranty Letter ***shall*** include:

i. A contact person and phone number, for each Canadian designated warranty service provider that will honour the warranty for the Apparatus procured under this contract; and

ii. The warranty period(s).

12.4 Photographs

a) The contractor ***shall*** provide photographs, in electronic format.

b) At a minimum, the photographs ***shall*** includes views of the front, rear, each side, left front three-quarter view, and right rear three-quarter view, with a plain background.

12.5 Dimensioned Drawings – Front, left side, right side, rear and top view drawings showing overall dimensions ***shall*** be provided to the TA.

12.6 Line Setting Ticket

a) The Contractor ***shall*** provide a Line Setting Ticket listing the components provided on the Apparatus, and Apparatus bill of materials, to the TA at the pre-delivery inspection.

d) One copy of the Line Setting Ticket ***shall*** be included with the Vehicle manuals to the final delivery point.

12.7 Special Tools List

a) The contractor ***shall*** provide an itemized list of specific special tools required for the servicing and repair of the Apparatus.

b) The list ***shall*** include the following information.

i. Item name;

ii. Manufacturer's part number;

iii. Original Equipment Manufacturer(OEM) part number;

iv. Quantity recommended per delivery location;

v. Unit price; and

vi. Unit of issue.

c) The special tools ***shall*** also be listed in the Maintenance Manual.

12.8 Recommended Spare Parts List – The Contractor ***shall*** provide, to the Technical Authority, a list detailing the spare parts deemed necessary to maintain the vehicle for a period of 12 months exclusive of any warranty period, for each configuration. The Recommended Spare Part List ***shall***:

a) Include the following information:

i. Item name;

ii. Manufacturer's part number;

iii. Original Equipment Manufacturers (OEM) part number;

iv. Quantity per equipment; and

v. Quantity recommended.

b) Be delivered to the Technical Authority for review. The list ***shall*** be supplied in a spreadsheet.

12.9 Safety Recalls and Servicing Data

a) **Safety recalls**, and manufacturer's technical service bulletins or equivalent ***shall*** be provided to the Technical Authority, throughout the life expectancy of the vehicle or for at least 15 years.

b) Replacement **part substitution** information ***shall*** be provided to the Technical Authority, as requested, throughout the life expectancy of the vehicle or for at least 15 years.

12.10 Training

12.10.1 **Initial Operator Training**

a) The Contractor ***shall*** deliver an operator training course covering, as a minimum, the operator servicing procedures, and how to operate the features of the Apparatus safely and efficiently.

b) Each operator training course ***shall***:

i. Be designed for attendance of up to twelve (12) operators;

ii. Be a minimum of three (3) days in duration, per session;

iii. Be delivered **three times** at each Apparatus delivery location;

iv. Be delivered by an instructor who is fully trained and functional on all aspects of the fire fighting package, with at least three (3) years of experience within the past five (5) years on the specific Apparatus or an Apparatus of similar design.

c) Training ***shall*** be available in French, for delivery locations in the province of Quebec.

d) Training dates ***shall*** be coordinated with the TA.

e) The contractor ***shall*** provide a copy of the training package to the TA for review and approval, a minimum of 7 days prior to training.

f) The contractor ***shall*** sign the “PROOF OF OPERATOR TRAINING” certificate presented by a Crown Representative from the training location, to indicate that training is complete.

12.10.2 **Initial Maintenance Training**

a) The Contractor ***shall*** deliver a maintenance training course covering, as a minimum:

i. Operation and safety precautions;

ii. Trouble shooting, including multiplex system;

iii. Servicing, adjustment and diagnostic procedures;

iv. Special tools and test equipment;

v. Minimum operation and features of the Apparatus;

vi. Safe and efficient maintenance of the Apparatus; and

vii. Training on the fire fighting package.

b) The maintenance training course ***shall***:

i. Be designed for attendance of up to eight (8) skilled maintenance personnel;

ii. Be a minimum of three (3) days in duration;

iii. Be delivered once at each Apparatus delivery location; and

iv. Be delivered by an instructor who is fully trained and functional on all aspects of the fire fighting package, with at least three (3) years of experience within the past five (5) years on the specific Apparatus or an Apparatus of similar design.

c) Training ***shall*** be available in French, for delivery locations in the province of Quebec.

d) Training dates ***shall*** be coordinated with the TA.

e) The contractor ***shall*** provide a copy of the training package to the TA for review and approval, a minimum of 7 days prior to training.

f) The contractor ***shall*** sign the "PROOF OF MAINTENANCE TRAINING" certificate presented by a Crown Representative from the training location, to indicate that training is complete.

12.10.3 **Operation Video –** The Contractor ***shall*** deliver an English video demonstrating an overview of the operation of all aspects of the Apparatus, to the TA at the time of vehicle delivery.

a) The training video ***shall*** be delivered in at least one of the following formats: AVI, MPEG, or WMV.

12.10.4 **Option: Factory Level Training** – The Contractor ***shall*** provide an option for in-depth factory level maintenance training, delivered at the Contractor's location.

a) The factory level training ***shall***:

i. Be designed for attendance of up to twelve (12) skilled maintenance personnel;

ii. Be a minimum of one (1) week in duration;

iii. Be delivered by an instructor who is fully trained and functional on all aspects of the fire fighting package, with at least three (3) years of experience within the past five (5) years on the specific Apparatus or an Apparatus of similar design.

b) The factory level training ***shall*** cover both theoretical and practical (hands on) experience. At a minimum, the training ***shall*** cover:

i. The design, and theory of the electrical system operation, including diagnostic trouble shooting procedures utilizing the specific wiring diagrams, and specialized tooling, as applicable;

ii. Inspection, diagnostic procedures, removal, replacement, rebuild/repair, testing and adjustments for all components of the Fire Fighting Package; and

iii. Instruction for the use of specialized tooling.

c) Training dates ***shall*** be coordinated with the TA.

13. QUALITY ASSURANCE PROVISIONS

13.1 Performance and Verification Testing

a) Prior to the DND pre-delivery inspection, the Contractor ***shall***$^{(E)}$ have the Apparatus undergo and successfully pass the required

testing, in accordance with ULC-S515, including road performance, road tests, and aerial device testing.

b) The inspection certificate ***shall*** be provided to DND during final pre-delivery inspection of the Apparatus.

c) The Contractor ***shall*** be responsible for co-ordinating the facility requirements to perform testing in accordance with ULC-S515 requirements.

13.1.2 **Contractor Testing**

a) The Contractor ***shall*** have a fully laden, fully equipped Apparatus weighed on certified scales, total weight and weight of each axle ***shall*** be furnished.