City of Courtenay

Request for Proposal
R21-10 Aerial Fire Apparatus

March 5, 2021

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SUMMARY OF KEY INFORMATION

RFP Reference	RFP R21-10 Aerial Fire Apparatus
Overview of the Opportunity	The purpose of this RFP is to invite proposals from qualified aerial fire apparatus suppliers for the construction of one (1) Aerial Fire Apparatus to be used by the Courtenay Fire Department.
Questions?	Questions are to be submitted in writing quoting the RFP number and name, send to email purchasing@courtenay.ca
Addenda	Proponents are to check the BC Bid and City websites for any updated information and addenda issued, before the Closing Date at the following websites **www.bcbid.gov.bc.ca** and/or **www.courtenay.ca/bids**
Closing Date and Time	**2:00 pm Pacific Standard Time** **Thursday, April 29, 2021**
Instructions for Submission	Submissions are to be consolidated into one PDF file and sent electronically to purchasing@courtenay.ca 1. In the subject field enter: **R21-10 Aerial Fire Apparatus** 2. Phone 250-338-1766 Ext. 7646 should assistance be required
Participation	The guidelines for participation that will apply to this RFP are included in this RFP.
Obtaining RFP Documents	RFP documents are available for download from these websites **www.bcbid.gov.bc.ca** and/or **www.courtenay.ca/bids**

1.0 INTENT

The City of Courtenay (the "City") invites proposals from qualified aerial fire apparatus suppliers for the construction of one new (1) Aerial Fire Apparatus to be owned and operated by the Courtenay Fire Department.

2.0 DOCUMENT AVAILABILITY AND RESPONSIBILITY

This RFP is being issued electronically through the BC Bid website and the City of Courtenay website where interested firms may download the RFP documents directly. No registration, tracking or other recording of RFP documents will be performed by the City. All addenda, amendments or further information will be published on www.bcbid.gov.bc.ca and www.courtenay.ca. It is the sole responsibility of the Proponent to monitor the websites regularly to check for updates.

3.0 DEFINITIONS

"City", "Owner" or "Purchaser" means the City of Courtenay;

"Contract" means the written agreement or purchase order resulting from this RFP awarded to and/or executed by the City and the successful Proponent;

"Contract Documents" means the Request for Proposal documents, that part of the Proposal which is accepted by the City, the purchase order and executed agreement, if any, an all applicable specifications and drawings including those issued by the City to the Proponent and those submitted by the Proponent during the performance of the work and accepted by the City, whether produced before or after the date of award of the Contract as the same may be modified, amended, substituted or replaced in accordance with the provisions of the Contract from time to time;

"Council" means the City of Courtenay Council;

"must", "mandatory", "required", "shall", means a requirement that must be met in order for a Proposal to receive consideration;

"Proponent", means a party, a company or an individual that has obtained a copy of this Request for Proposal and submits, or intends to submit, a Proposal in response to this "Request for Proposal";

"Proposal" means the documents of the Proponent delivered to the City offering to perform the work as required under this RFP;

"RFP" means Request for Proposal;

"should" or "desirable" means a requirement having a significant degree of importance to the objectives of the RFP;

4.0 CODES & REGULATIONS

The aerial fire apparatus shall be manufactured in compliance with:

- CAN/ULC S515 Standard for Automobile Fire Fighting Apparatus
- Underwriters Laboratories Inc. / Underwriters Laboratories of Canada
- International Association of Fire Chiefs
- National Fire Protection Association 1901
- Fire Apparatus Manufacturer's Association
- Federal Motor Vehicle Safety Standards / Canada Motor Vehicle Safety Standards
- Society Of Automotive Engineers
- Department of Transportation / Transport Canada
- American Society for Testing and Materials

5.0 SPECIFICATIONS & ALTERNATIVES

5.1 Wherever the specifications state a brand name, make, name of manufacturer, trade name, or vendor catalogue number, it is for the purpose of establishing a grade or standard. It is not intended to rule out competition from equal brands or makes. If a product other than that specified is offered, it is the Proponent's responsibility to provide information in its proposal that enables the City to confirm equivalency and acceptance.

5.2 Except where stated otherwise, the specifications describe what is considered necessary to meet the performance requirements of the City and Proponent should consider this in its proposal or, if the Proponent cannot meet specifications, the Proponent may identify and offer an alternative which it believes to be an equal or better alternative.

5.3 Proponents shall clearly indicate any variances from the City's specifications or conditions on a separate page labelled **"Specification Alternatives or Variances"** and attach descriptive literature.

5.4 A listing of the specifications for this vehicle are attached as Schedule B – Aerial Fire Apparatus Specifications.

6.0 SUBMISSION FORMAT

6.1 Title Page

Showing RFP title and number, closing date, company name of the Proponent, address, contact name, email address and phone number.

6.2 Schedule B – Aerial Fire Apparatus Specifications

The Schedule B – Aerial Fire Apparatus Specifications must be completed and submitted with the Proponent's proposal. Providing an alternative document to Schedule B **will not** be accepted.

6.3 Specification Alternatives or Variances

If applicable, a separate page labelled "Specification Alternatives or Variances" must be included summarizing each section that an alternative or variance from the specified specification was proposed. All descriptive literature and supporting documentation must be included. Note, the order of presentation as defined in Schedule B must be maintained.

6.4 Manufacturer's Set of Specifications

Proposals shall be accompanied by a set of manufacturer's specifications consisting of a detailed description of the apparatus, construction methods, materials and equipment proposed to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all components parts and equipment, providing proof of compliance with the items in Schedule B – Aerial Fire Apparatus Specifications.

6.5 Qualifications & Experience

- Include a list of at least 3 relevant completed projects, within the past 3 years, with client references and telephone number/email contact information for each project. By submitting a Proposal the Proponent consents to the City contacting these references at its discretion, and consents to the City also contacting any other organizations for the purposes of evaluating the Proposal.
- Proposals shall only be considered from companies that have an established reputation in the field of aerial fire apparatus construction and have been in business for a minimum of 10 years. Each proponent shall furnish satisfactory evidence of their ability to construct the apparatus specified.
- Proponents shall state the number of years they have been building 100 ft. fire aerial platforms. They shall also state the number of years the company has been under its current ownership.
- Proponents shall state the number of years the company has been producing their own chassis and body.
- Manufacturers shall provide proof of current membership with the Fire Apparatus Manufacturer's Association.

6.6 **Schedule A – Form of Submission**

The Schedule A – Form of Submission must be submitted with the Proponent's proposal. The Schedule A - Form of Submission must be signed by an authorized representative of the company.

7.0 INSTRUCTIONS TO PROPONENTS

7.1 An electronic submission of the proposal in .pdf format must be submitted to:

"purchasing@courtenay.ca" no later than 2:00pm PST, Thursday, April 29, 2021, the RFP closing date. The email subject line shall read "**R21-10 Aerial Fire Apparatus".**

It is the sole responsibility of the Proponent to ensure that their proposal is received by the City within the proper time allocation. Late responses will be rejected by the City of Courtenay. All proposals, including Form of Submission, must be signed by an authorized Proponent representative.

Submission of a proposal indicates acceptance by the Proponent of the conditions contained in this RFP, unless clearly and specifically noted in the proposal submitted.

7.2 Questions are to be submitted in writing up to 2 business days prior to the RFP Closing Date quoting the RFP name, number and contact person below, and sent to email purchasing@courtenay.ca.

Graham Peterson, Procurement Specialist
City of Courtenay
purchasing@courtenay.ca

Any verbal communications will be considered unofficial and non-binding to the City. Proponents should rely only on written statements issued by the contact person listed above.

7.3 Notwithstanding any custom or trade practice to the contrary, the City reserves the right to, at its sole discretion and according to its own judgement of its best interest to waive any technical or formal defect in a proposal and accept that proposal.

7.4 Bid Protest Mechanism

The Bid Protest Mechanism (BPM) is an administrative review process that provides proponents submitting bids with a process to avoid disputes and resolve complaints that a specific procurement by a City division was not conducted in compliance with the rules of an applicable trade agreement or the City's Purchasing Policy. Contact the City's Purchasing Division at 250-338-1525 for further information.

8.0 EVALUATION CRITERIA

8.1 **General**

An evaluation committee made up of City staff will be reviewing proposal submissions. The City reserves the right to accept any or none of the proposals submitted and will evaluate proposals based on best value and not necessarily the lowest cost.

8.2 Evaluation Criteria & Weighting

The City reserves the right to accept any or none of the proposals submitted and will evaluate proposal submissions based on "best value" using the following criteria:

Proposal Evaluation Criteria Description	Criteria Weight
Financial Cost to the City	30 points
Adherence to the Specifications	40 points
Delivery Schedule	10 points
Qualifications & Experience	20 points

9.0 GENERAL TERMS & CONDITIONS

9.1 Not a Tender Call

This RFP is not a tender call, and the submission of any response to this RFP does not create a tender process. This RFP is not an invitation for an offer to contract, and it is not an offer to contract made by the City. Proposals will not be opened in public.

9.2 No Obligation to Proceed

a) Though the City fully intends at this time to proceed through the RFP process in order to select the goods or services, the City is under no obligation to proceed to the purchase, or any other stage. The receipt by the City of any information (including any submissions, ideas, plans, drawings, models or other materials communicated or exhibited by any intended Proponent, or on its behalf) shall not impose any obligations on the City. There is no guarantee by the City, its officers, employees or agents, that the process initiated by the issuance of this RFP will continue, or that this RFP process or any RFP process will result in a contract with the City for the purchase of the product, service or project.

b) The City reserves the right to accept or reject any and all proposals and to waive irregularities and informalities at its discretion.

c) The City reserves the right to negotiate with any Proponent, or more than one Proponent. If the parties after having negotiated in good faith are unable to conclude a formal agreement, the City and the Proponent will be released without further obligations other than any surviving obligations regarding confidentiality and the City may, at its discretion, contact the Proponent of the next best rated proposal and attempt to conclude an agreement with it, and so on until an agreement is reached.

The City may at its discretion:

1) Negotiate with a Proponent to award a contract for all or the majority portion of the Work;

2) Cancel this RFP and issue a new RFP with a new scope of work, or;

3) Cancel this RFP in its entirety.

d) Further, a proposal may be rejected on the basis of the Proponents past performance, financial capabilities, completion schedule and non-compliance with federal, provincial and municipal legislation.

e) The City reserves the right to accept or reject a proposal where only one proposal is received.

f) The City reserves the right to award the contract to other than the lowest cost Proponent.

g) Award of the contract resulting from this RFP is subject to City of Courtenay Council approval and successful borrowing for funding purposes.

h) The City reserves the right to cancel this RFP at any time.

9.3 **Cost of Preparation**

Any cost incurred by the Proponent in the preparation of the proposal will be solely at the expense of the Proponent.

9.4 **Confidentiality and Freedom of Information and Protection of Privacy Act**

The proposal should clearly identify any information that is considered to be confidential or proprietary information (the "Confidential Information"). However, the City is subject to the Freedom of Information and Protection of Privacy Act. As a result, while the Act offers some protection for third party business interests, the City can't guarantee that any Confidential Information provided to the City can be held in confidence if a request for access is made under the Freedom of Information and Protection of Privacy Act.

9.5 **Irrevocability of Proposals**

By submission of a written request, the Proponent may amend or withdraw its proposal prior to the closing date and time. Upon closing time, all proposals become irrevocable and are valid for a minimum of **90** days. By submission of a proposal the Proponent agrees should the proposal be successful, the Proponent will enter into a contract with the City. Prices will be firm for the entire contract period, unless otherwise agreed to by both parties.

9.6 **Pricing**

Prices are to be quoted in Canadian funds with the Goods and Services Tax (GST) shown as a separate line item, if requested. Prices must be quoted inclusive of all shipping, duty and other applicable costs F.O.B. the location indicated in the RFP.

9.7 **Sub-Contracting**

Under no circumstances may the provision of goods or services, or any part thereof be sub-contracted, transferred, or assigned to another company, person, or other without the prior written approval of the City of Courtenay.

9.8 **Accuracy of Information**

The City makes no representation or warranty, either express or implied, with respect to the accuracy or completeness of any information contained or referred to in this RFP.

9.9 **Default**

a) The City may, by notice of default to the Contractor, terminate the whole or any part of this Contract if the Contractor fails to make delivery of the Services within the time specified, or to perform any other provisions of this Contract.

b) In the event the City terminates this Contract in whole or in part as provided in clause 9.9(a), the City may procure goods or services similar to those so terminated, and the Contractor shall be liable to the City for any excess costs for such similar goods or services.

c) The Contractor shall not be liable for any excess costs under clause 9.9(a) or 9.9(b) if failure to perform the Contract arises by reason of Force Majeure or acts of the City.

9.10 **Misrepresentation or Solicitation**

If any director, officer or employee or agent of a Proponent makes any representation or solicitation to any Councillor, officer, employee or agent of the City of Courtenay with respect to the RFP, whether before or after the submission of the proposal, the City shall be entitled to reject or not accept the proposal.

9.11 **Applicable Laws and Agreements**

a) The laws of the Province of B.C. shall govern this request for proposal and any subsequent Contract resulting.

b) This RFP is subject to the terms and conditions of the Canadian Free Trade Agreement and the New West Partnership Agreement.

9.12 **Payment Terms**

The successful Proponent shall invoice the City in an acceptable format and will be paid as per the City's standard payment terms, net 30 days from date of invoice and acceptance of the delivered aerial fire apparatus by the City of Courtenay Fire Department representative.

The City of Courtenay shall not pre-pay for any goods, or services for any period.

All invoices must be emailed to finance@courtenay.ca, please do not mail invoices in addition to emailing.

9.13 **Performance Bond**

The successful Proponent will supply a Performance Bond in the amount of 50% of the Contract Price, covering the performance of the Work, issued by a surety licensed to carry on the business of suretyship in the province of British Columbia, and in a form acceptable to the Owner.

9.14 **Liquidated Damages for Late Completion**

If the successful Proponent fails to meet the agreed upon delivery date set forth in the Contract, then the City may deduct $400, per full day, from any monies owing the successful Proponent, until the date successful delivery and acceptance is achieved.

10.0 ATTACHMENTS

a) Schedule A - Form of Submission

b) Schedule B – Aerial Fire Apparatus Specifications

SCHEDULE A

FORM OF SUBMISSION

The Proponent offers to supply to the City of Courtenay the goods and services for the prices not including GST as follows:

A. One (1) Aerial Fire Apparatus – Per Specifications Stated In This RFP

_____
(Make, Model, Year, etc.)

For the Total Unit Price of: $_____ excluding PST, GST and Environmental Levy

Environmental Levy (All components) $_____

B. Delivery Shall Be Made Within _____ Weeks From Receipt of the Purchase Order and To Be The Guaranteed Delivery Date to the City of Courtenay (F.O.B. Courtenay Fire Department) 650 Cumberland Rd., Courtenay, B.C.

C. Nearest Service Depot and Parts Depot _____

D. Schedule B –Aerial Fire Apparatus Specifications Completed & Included Yes or No

E. References, Qualifications & Experience Included Yes or No

The above prices include and cover all duties, handling and transportation charges, and all other charges incidental to and forming part of this proposal.

Acknowledgement is hereby made of receipt and inclusion of the following addenda to the documents:

Addendum(s) No. _____ Dated: _____ No. Of Pages: _____

Legal Name: _____

Address: _____

Phone: _____ Email: _____

I/We the undersigned duly authorized representatives of the Proponent, having received and carefully reviewed the RFP, submit this proposal in response to the RFP. This proposal is offered by the Proponent this _____ day of _____, 20____.

_____ _____
Signature of Authorized Signatory Print Name and Position of Signatory

Schedule B

Aerial Fire Apparatus Specifications

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Section

1. INTENT OF SPECIFICATIONS	Compliant	Specify Alternative or Variance From Specification
It shall be the intent of these specifications to cover the furnishing and delivery of a complete fire apparatus. These detailed specifications cover the requirements as to the type of construction, finish, equipment and tests to which the fire apparatus shall conform. Images and illustrative material in this specification are as accurate as known at the time of publication, but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.		
2. QUALITY AND WORKMANSHIP		
The design of the apparatus must embody the latest regulatory approved automotive engineering practices. The workmanship must be the highest quality in its respective field. Special consideration shall be given to the following points: • Accessibility to various areas requiring periodic maintenance • Ease of operation (including both pumping and driving) • Symmetrical proportions. Construction must be rugged and ample safety factors must be provided to carry loads as specified and to meet both on and off road requirements and speed as set forth under "Performance Test and Requirements."		
3. PERFORMANCE TESTS AND REQUIREMENTS		
The complete apparatus shall be certified and tested to the ULC, *Automobile Fire Fighting Apparatus Standard*, CAN/ULC-S515-04, by Underwriters Laboratories Inc. / Underwriters Laboratories of Canada, and the vehicle shall bear the ULC Mark, indicating compliancy to the standard. **NO EXCEPTIONS** The construction of this apparatus shall be in accordance with current NFPA 1901, 2016 and ULC S-515-13 standards. If there is a conflict the higher standard shall take precedence. **NO EXCEPTIONS** A road test shall be documented with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss		

of power or overheating. The transmission drive shaft or shafts, and rear axles shall run quietly (not exceeding 90 decibels at 45 mph in all cab seat positions) and free from abnormal vibration or noise throughout the operating range of the apparatus. The apparatus, when loaded, shall be approximately 66% on the rear axle. The successful proponent shall furnish a weight certification showing weight on the front and rear axle, and the total weight of the completed apparatus at the time of delivery. • The apparatus must be capable of accelerating to 30 MPH from a standing start within 25 seconds on a level paved highway without exceeding the maximum governed engine RPM. • The service brakes shall be capable of stopping the fully loaded vehicle within 35 feet from a speed of 25 MPH on a level paved highway. • The apparatus, fully loaded, shall be capable of obtaining a speed of 50 MPH on a level paved highway with the engine not exceeding 95% of its governed RPM (full load). • The apparatus shall be tested and approved by a qualified testing agency in accordance with their standard practices for pumping engines. The successful proponent shall furnish copies of the Pump Manufacturer's Certification of Hydrostatic Test (if applicable), the Engine Manufacturer's current Certified Brake Horsepower Curve and the Manufacturer's Record of Construction Details.		
4. FAILURE TO MEET TESTS		
In the event the apparatus fails to meet the test requirements of these specifications on the first trial, a second trial may be made at the option of the City within thirty (30) days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection.		
5. GENERAL CONSTRUCTION		
The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles so that all specified equipment, including filled water tank, a full complement of personnel and fire hose shall be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the International Association of Fire Chiefs and National Fire Protection Association. Certified Laboratories certificate shall be		

submitted by the manufacturer. Weight of apparatus shall meet all Canadian Federal and BC provincial axle load laws.		
6. DELIVERY REQUIREMENTS		
The apparatus shall be completely equipped as per these specifications upon arrival and on completion of the required tests shall be ready for immediate service in the Courtenay Fire Department. Any and all alterations required to comply with these specifications must be done at the vendor's expense. A qualified delivery representative shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in proper operation, care and maintenance of the equipment delivered. Inspection and approval will be done at the plant.		
7. ELIMINATION OF DIVIDED RESPONSIBILITY		
It is required that each proponent produce both the chassis and the complete apparatus. To eliminate divided responsibility and service, the chassis and body must be manufactured by the same company. Manufacturer shall state the number of years the company has been producing their own chassis and body. Manufacturer shall state compliance with this paragraph. **NO EXCEPTIONS**		
8. STATEMENT OF EXCEPTIONS TO NFPA 1901		
If, at the time of final factory assembly and testing completion and prior to delivery, the apparatus manufactured is not in compliance with NFPA 1901, a “Statement of Exceptions” must be provided as follows: • The specific standard affected. • A statement describing why the manufacturer is not in compliance. • A description of the remedy, and who the responsible party is to complete the remedy. The document must be signed by an officer of the company, and an authorized agent of the purchaser. **NO EXCEPTIONS**		
9. CANADIAN DESTINATION & OPERATION COMPLIANCE		
The apparatus shall be specifically configured for operation in the Country of Canada. The following items shall be provided with the apparatus, even if stated otherwise throughout this specification. Those items shall include: • Emergency Engine Air Intake Shutdown • Daytime running lights • Amber clearance lights mounted on the front of the chassis in mirror housings • Province specific threads on all suction and discharge fittings • Metric Dash Gauges		

• US Pump Panel Gauges (PSI/GPM)		
10. PROPOSAL DRAWING		
A general layout drawing depicting the apparatus layout and appearance shall be provided with the proposal. The drawing shall consist of left side, right side, frontal and rear elevation views. Apparatus equipped with a fire pump, shall have a general layout view of the pump operators panel scaled the same as the elevation views. The drawing shall be a depiction of the actual apparatus proposed and not of a generic similar product.		
11. WIRING SCHEMATIC		
A flash drive containing wiring diagrams of the apparatus shall be provided at the time of delivery.		
12. PRE-CONSTRUCTION CONFERENCE		
After award of the contract, and prior to construction of the apparatus, a pre-construction conference shall be held via an online presentation and review of the RFP document and vendor proposal.		
13. APPARATUS FINAL INSPECTION TRIP		
Once the apparatus is completed including testing, a final inspection trip shall be provided to the manufacturer's facility, prior to delivery of the completed apparatus. A cost provision shall be provided for three (3) Courtenay Fire Department representatives in the proposal price for all travel, food and separate lodging. The apparatus shall be 100 % compliant to the satisfaction of the Courtenay Fire Department prior to delivery.		
14. CUSTOM CHASSIS		
A custom Severe Duty Cab and Chassis system shall be provided. The chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained and the type of service required. The cab and chassis system, shall be considered the proponents “Top of the Line”. There shall be no divided responsibility in the production of the apparatus.		
15. WHEELBASE		
The approximate wheelbase shall be 236 in.		
16. DOUBLE FRAME RAILS/TANDEM AXLES		
The chassis frame shall be of a ladder type design utilizing industry accepted engineering best practices. The frame shall be specifically designed for fire apparatus use. Each frame rail shall be constructed of two .375” thick-formed channels. The outer channel shall be 10.188" x 3.50” x .375” and the inner channel (liner) shall be 9.31” x 3.13” x .375”.		

The section modulus shall be 31.8 in.3. The resistance to bending moment (RBM) over the entire rail will be at-least 3,498,000 in./lbs. The cross-members shall be constructed of minimum 3/8" formed channels and have formed gusseted ends at the frame rail attachment. Tandem suspensions will use a multi-piece bolt assembled “butterfly” cross- member configuration. This cross-member will span the entire rear of the vehicle. Each rail is media blasted to remove scale, oil, and contaminants. This blasting also ensures paint adhesion. Each rail will be primed with Cathacoat 302HB, a high performance, two component, reinforced inorganic zinc-rich primer with proven cathodic protection of steel structures, prior to assembly. .625 inch, grade 8 flange, Huck bolt fasteners shall be used on all permanently attached brackets to the frame to eliminate the need for bolt re-tightening. A lifetime warranty shall be provided, per manufacturer's written statement.		
17. FRONT TOW EYES, BELOW BUMPER		
There shall be two front tow eyes with 3” diameter holes attached directly to the chassis frame, accessible below the front bumper.		
18. TOW EYES, PAINTED FINISH		
The front tow eyes shall be painted to match the color of the chassis frame.		
19. REAR TOW EYES		
There shall be two tow eyes attached directly to the chassis frame rail and shall be chromate acid etched for superior corrosion resistance and painted to match the chassis.		
20. STEERING		
The steering system shall be a TRW wheel to wheel steering system that is tested and certified by TRW, consisting of a heavy duty TRW/Ross Model TAS-85 power steering gear, TRW PS36 steering pump, miter box, drag links, and a thermostatic controlled fan cooled system (set point 185 deg. F to 170 deg. F). The steering gear shall be bolted to the frame at the cross-member for steering linkage rigidity. Four (4) turns from lock to lock with an 18" diameter slip resistant rubber covered steering wheel. Steering column shall have six-position tilt and 2" telescopic adjustment. The		

cramp angle shall be 45 degrees with 315mm tires or 43 degrees with 425mm tires providing very tight turning ability.		
21. DRIVE LINE		
The driveline shall consist of Spicer 1810 series dual grease fitting universal joints with "half-round" end yokes. The drive shaft shall be built with a heavy-duty steel tube 4.095" outside diameter x .180 wall thickness. The shafts shall be dynamically balanced prior to installation into the chassis. A splined slip joint shall be provided in each shaft assembly. Universal joints shall be extended life. There shall be two (2) Zerk fittings in each universal joint assembly so the joint can be greased without turning the shaft.		
22. ENGINE		
The apparatus shall be powered by a Cummins Diesel X 12 500 HP @ 1800 R.P.M., 1695 ft. lb. torque @ 1000 R.P.M. Displacement: 11.8 liter displacement. Cylinders: 6 Bore 5.2” (132mm) Stroke 5.67” (144mm)		
23. AIR COMPRESSOR		
The air compressor shall be an 18.7 CFM engine driven Wabco.		
24. STARTER		
A 12-volt starter shall be provided, controlled by a switch on the left lower cab dash.		
25. EXHAUST SYSTEM		
The engine exhaust system shall include the following components: • Diesel Particulate Filter (DPF) • Diesel Oxidation Catalyst (DOC) • Diesel Exhaust Fluid (DEF) • Selective Catalytic Reduction Filter (SCR).The SCR catalyst utilizes the DEF fluid, which consists of urea and purified water, to convert NOx into nitrogen and water. This shall meet or exceed 2017 EPA emissions requirements. • The engine exhaust system shall be horizontal design constructed from heavy-duty truck components. The exhaust tubing shall be stainless steel to the DPF through to the SCR, aluminized steel from the SCR to the exhaust tip. A heavy duty stainless steel bellows tube shall be used to isolate the exhaust system from the engine. • The system shall be equipped with single canister consisting of a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF), and shall be mounted under the right side frame rail, meeting the specific engine manufacturer's specifications and current emission level requirements.		

• The outlet shall be directed to the forward side of the rear wheels, exiting the right side with a heavy duty heat diffuser. The heat diffuser shall prevent the exhaust temperature from exceeding 851 deg. F during a regeneration cycle. A heat-absorbing sleeve shall be provided on the exhaust pipe in the engine compartment area to reduce the heat, protect the alternator, and also to protect personnel while servicing the engine compartment.		
26. AFTER TREATMENT SYSTEM		
To meet EPA requirements of Particulate output, a DPF (Diesel Particulate Filter) is used. To meet EPA requirements of Nitrous Oxide output an SCR (Selective Catalytic Reduction) system utilizing DEF (Diesel Exhaust Fluid) is used.		
27. ON-BOARD DIAGNOSTIC (OBD) SYSTEM		
The engine shall be equipped with an on-board diagnostic (OBD) system which shall monitor emissions- related engine systems and components and alert the operator of any malfunctions. The OBD system is designed to further enhance the engine and operating system by providing early detection of emission- related faults. The engine control unit (ECU) will manage smart sensors located throughout the engine and after-treatment system. The system shall monitor component verification and sensor operation. There shall be warning lights located in the dash instrument panel to alert the operator of a malfunction. A data port shall be provided under the driver's side dash for the purpose of code reading and troubleshooting. All communication shall be provided through the J1939 data link.		
28. ENGINE WARRANTY		
The engine shall have a five (5) year or 100,000 mile warranty and approval by Cummins Diesel for Full Engine Coverage Plan (RVF) – which is their most complete engine coverage plan, which includes EGR components installation in the chassis. There shall be no deductible for the first two years. A one hundred dollar deductible shall apply for service beginning the third year. Proponent will also state any extended warranty options.		
29. AIR CLEANER/INTAKE		
The engine air intake and filter shall be designed in accordance with the engine manufacturer's recommendations. It shall be 99.9% effective in removing airborne contaminants when tested per the industry standard SAE J726 procedure and offer a dirt holding capacity of at least 3.0 gm/cfm of fine dust (tested per SAE J726) offering superior engine protection.		

The air filter shall be located at the front of the apparatus and shall be at least 66” above the ground, to allow fording deep water in an emergency situation. An ember separator shall be provided in the engine air intake meeting, the requirements of NFAP 1901. An Air Restriction warning light shall be provided and located on the cab dash.		
30. PRIMARY FUEL FILTER/WATER SEPARATOR		
A Cummins approved Fleetguard Fuel Pro FH230 fuel filter/water separator shall be remote mounted to the chassis frame rail		
31. SECONDARY FUEL FILTER		
A Cummins approved Fleetguard FF5776 fuel filter will be mounted on the driver’s side of the engine.		
32. TRANSMISSION		
The chassis shall be equipped with a Generation 5 Allison EVS4500 six (6) speed automatic transmission. It shall be programmed five (5) speed, sixth gear locked out, for fire apparatus vocation, in concert with the specified engine. The transmission is communicated on the J-1939 through the communication port. The fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the engine's governed speed. The dipstick is dipped in a rubber coating for ease in checking oil level when hot. The chassis to transmission wiring harness shall utilize Metri-Pack 280 connectors with triple lip silicone seals and clip-type positive seal connections to protect electrical connections from contamination without the use of coatings. Ratings: • Max Input (HP) 600 • Max Input (Torque) 1850 (lb ft) • Max Turbine (Torque) 2600 (lb ft) Mechanical Ratios: • 1st – 4.70:1 • 2nd – 2.21:1 • 3rd - 1.53:1 • 4th - 1.00:1 • 5th - 0.76:1 • Reverse - -5.55:1		

33. TRANSMISSION FLUID		
The transmission shall come filled with an Allison approved Synthetic Transmission Fluid that meets the Allison TES-295 specification.		
34. ENGINE BRAKE		
The engine shall be equipped with a Jacobs compression engine brake. An "On/Off" switch and a control for "Low/High" shall be provided on the instrument panel within easy reach of the driver. The engine brake shall interface with the Wabco ABS brake controller to prevent engine brake operations during adverse braking conditions. A pump shift interlock circuit shall be provided to prevent the engine brake from activating during pumping operations.		
35. TRANSMISSION COOLER		
The apparatus transmission shall be equipped with a Liquid-To-Liquid remote mounted cooler with aluminum internal components. The cooler shall be encased in an aluminum housing and mounted to the outside of the officer's side frame rail for accessibility and ease of service.		
36. TRANSMISSION SHIFTER		
An Allison "Touch Pad" shift selector shall be mounted to the right of the driver on the engine cover accessible to the driver. The shift position indicator shall be indirectly lit for nighttime operation.		
37. COOLING SYSTEM		
The cooling system shall be designed to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the engine and transmission manufacturer's requirements, and EPA regulations. The complete cooling system shall be mounted in a manner to isolate the system from vibration and stress. The individual cores shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress to the adjoining core(s). The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler, bolted to the top of the radiator to maximize cooling, recirculation shields, a shroud, a fan, and required tubing. All components shall consist of an individually sealed system.		

38. RADIATOR		
The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system. The radiator shall be equipped with a drain cock to drain the coolant for serviceability. The drain cock shall be located at the lowest point of the aluminum cooling system to maximize draining of the system.		
39. CHARGE AIR COOLER		
The charge air cooler shall be of a cross-flow design and constructed completely of aluminum with extruded tanks. The charge air cooler shall be bolted to the top of the radiator to allow a single depth core.		
40. COOLANT		
The cooling system shall be filled with a Long Life a 50/50 mix. The coolant makeup shall contain ethylene glycol and de- ionized water to prevent the coolant from freezing to a temperature of –34 degrees F.		
41. HOSES & CLAMPS		
All radiator hose clamps shall be spring loaded stainless steel constant torque hose clamps for all main hose connections to prevent leaks. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance. Silicone hoses shall be provided for all engine coolant lines.		
42. FAN		
The engine cooling system shall incorporate a heavy-duty composite 11- blade Z-series fan. It shall provide the highest cooling efficiently while producing the lowest amount of noise. This robust yet light-weight fan results in less wear and stress on motors and bearings. A shroud and recirculation shield system shall be used to ensure air that has passed through the radiator is not drawn through again. The fan tip to radiator core clearance shall be kept at a minimal distance to increase the efficiency of the fan and reduce fan blast noise.		
43. FAN CLUTCH		
A fan clutch shall be provided that shall allow the cooling fan to operate only when needed. The fan shall remain continuously activated when the truck is placed in pump gear.		
44. SURGE TANK		
The cooling system shall be equipped with an aluminum surge tank mounted to the officer's side of the cooling system core. The surge		

tank shall house a low coolant probe and sight glass to monitor the coolant level. Low coolant shall be alarmed with the check engine light. The surge tank shall be equipped with a dual seal cap that meets the engine manufacturer's pressure requirements, and system design requirements. The tank shall allow for expansion and to remove entrained air from the system. There shall also be an extended fill neck to prevent system overfill and encroachment of expansion air space. Baffling shall be installed in the tank to prevent agitated coolant from being drawn into the engine cooling system.		
45. FUEL TANK		
The chassis shall be equipped with a 65-gallon rear mounted, behind the rear axle, rectangular fuel tank that shall be constructed of steel. The fuel tank shall be certified to meet FMVSS 393.67 tests. It shall also maintain engine manufacturer's recommended expansion room of 5%. There shall be two (2) tank baffles. Dual pick-up and return ports shall be provided for diesel generators if required. The fuel lines shall be nylon braid reinforced fuel hose with brass fittings. The lines shall be carefully routed along the inside of the frame rails. All fuel lines are covered in high temperature rated split plastic loom. Single suction and return fuel lines shall be provided. The bottom of the fuel tank shall contain a 1/2" drain plug.		
46. FUEL FILL		
The fuel tank shall be equipped with a 2-1/4" filler neck assembly with a 3/4" vent located on the driver's side of the truck. A fuel fill cap attached with a lanyard shall be provided.		
47. FUEL COOLER		
Installed on the apparatus fuel system shall be an Air-To-Liquid aluminum fuel cooler. The fuel cooler shall be located in the lowest module of the cooling system.		
48. EXHAUST SHIELD		
There shall be a heat deflector over the exhaust where it passes under the right side compartment		
49. DIESEL EXHAUST FLUID TANK		
The exhaust system shall include a molded cross linked polyethylene tank. The tank shall have a capacity of five (5) usable gallons and shall be mounted on the left side of the chassis frame.		

The DEF tank fill neck shall accept only a 19mm dispensing nozzle versus the standard 22mm diesel fuel dispensing nozzle to prevent cross contamination. The DEF tank cap shall be blue in color to further prevent cross contamination. A placard shall accompany fill location noting DEF specifications.		
50. ALTERNATOR		
A 420 ampere Prestolite/Leece Neville alternator with serpentine belt shall be provided. The alternator shall generate 260 amperes at idle.		
51. LOW VOLTAGE ALARM		
A Floyd Bell TXB-V86-515-QF low voltage alarm, audible and visual, shall be provided.		
52. BATTERIES		
The battery system shall be a single system consisting of six (6) negative ground, 12 volt Interstate Group 31 MHD batteries, cranking performance of 950 CCA each with total of 3800 amps, 185 minute reserve capacity with 25 ampere draw at 80 degrees Fahrenheit. Each battery shall have 114 plates. The batteries shall include a one-year warranty which shall be accepted nationwide. The batteries shall be installed in a vented 304 stainless steel battery box with a removable aluminum cover to protect the batteries from road dirt and moisture. The battery cover shall be secured with four "T" handle rubber hold downs to provide easy access for maintenance and inspection. Stainless steel hardware will be used for installation. The batteries are to be placed on dri-deck and secured with a fiberglass hold down. The batteries shall be wired directly to starter motor and alternator. The battery cables shall be 3/0 gauge. Battery cable terminals shall be soldering dipped, color-coded and labeled on heat shrink tubing with a color-coded rubber boot protecting the terminals from corrosion. There shall be a 350-ampere fuse protecting the pump primer and a 250-ampere fuse protecting the electric cab tilt pump and other options as required.		
53. BATTERY JUMPER TERMINAL		
There shall be one set (two studs) of battery jumper terminals located by the battery box under the cab. The terminals shall have plastic color-coded covers. Each terminal shall be tagged to indicate positive/negative.		
54. 120V SHORLINE INLET & AUTOEJECT		

The apparatus shall be equipped with a 120V shoreline inlet to provide power to the battery charger from an external source. The inlet shall include a Kussmaul 091-55-194X-XXX Super 20 Auto Eject featuring a built in digital display on the cover. Also featuring a 12 volt solenoid which shall eject the shoreline cord away from vehicle path upon sensing engine start. After ejection, a weatherproof cover shall snap into position over inlet. A 20 amp connector shall be provided and shipped loose for connecting the external shoreline cord to the inlet.		
55. BATTERY CHARGER		
A Kussmaul Auto Charge LPC 40 model #091-200-12-IND low profile 40 amp battery charger shall be provided and installed in the cab. The unit shall include an auxiliary 15 amp output circuit with power source selector for operating accessory loads. The charger shall be wired to the 120V shoreline inlet.		
56. FRONT AXLE		
A Hendrickson STEERTEK NXT non-driving, front steer axle with a capacity of 23,000 pound shall be provided. The axle shall have a 3.74" drop and will have a fabricated boxed shaped cross section, a one piece knuckle, and serviceable king pin. Adjustable Ackerman settings shall be available, and determine based on wheelbase. The axle shall have 10 bolt hub piloted, and furnished with oil seals.		
57. SUSPENSION (FRONT)		
The front suspension shall be a variable rate taper-leaf design, 54" long and 4" wide. Long life, maintenance free, urethane bushed spring shackles shall be utilized. All spring and suspension mounting shall be attached directly to frame with high strength Huck bolts and self-locking round collars. Spring shackles and pins that require grease shall not be acceptable. **NO EXCEPTIONS**		
58. ENHANCED FRONT SUSPENSION SYSTEM		
The front suspension shall have the handling, stability, and ride quality enhanced by the use of a Ride Tech auxiliary spring system and Koni high performance shock absorbers. This system shall utilize three stage, urethane auxiliary springs, and high performance gas filled shock absorbers to control the deflection of the leaf springs, and dampen vibration normally transmitted to the chassis. This maintenance free system will be custom tuned to the apparatus gross weight rating for maximum performance, while maintaining a soft compliant ride.		

A (3) three year 36,000 mile warranty will be provided by the Manufacturer.		
59. FRONT SUSPENSION LOCKING CYLINDERS		
Two (2) hydraulic suspension-locking cylinders shall be provided. The cylinders shall be mounted to the chassis frame rails directly above the front axle. The cylinders shall be manually operated from the outrigger control station.		
60. FRONT SUSPENSION LOCKOUT PLATE		
The front suspension shall be provided with a lockout plate that limits the travel of the front suspension when the front suspension jack has been engaged.		
61. STEER ASSIST		
The steer assist provides driver assistance when turning the vehicle left or right while traveling.		
62. FRONT TIRES		
The front tires shall be Michelin 445/65R-22.5 20PR "L" tubeless radial XZY3 mixed service tread. The front tire stamped load capacity shall be 25,600 pounds per axle with a nominal speed rating of 65 miles per hour when properly inflated to 130 pounds per square inch. The Michelin Intermittent Service Rating maximum load capacity shall be 27,392 pounds per axle with a maximum speed of 65 miles per hour when properly inflated to 130 pounds per square inch. The Michelin Intermittent Service Rating maximum speed capacity shall be 25,600 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.		
63. REAR AXLE		
The rear axle shall be a Meritor™ RT-50-180 Tandem drive axle with a capacity of 52,000 lbs. The axles shall be hub piloted, 10 studs, furnished with oil seals.		
64. INTER-AXLE DIFFERENTIAL LOCK		
A locking inter-axle differential shall be provided between the two rear axles. An activation switch shall be provided on the driver's dash.		
65. TOP SPEED		
The top speed shall be approximately 60 MPH. (100 KmH)		

66. SUSPENSION (REAR)		
52,000 TANDEM AIR RIDE The rear suspension shall be a Raydan Manufacturing, Air Link™ model 952-52-199 air ride suspension. This suspension shall incorporate a quad air spring system. The air suspension bags shall have internal rubber stops giving the ability to operate without air if the need arises. Heavy-duty shock absorbers shall be provided, inboard mounted, to dampen load forces, reduce tire hops, and improve stopping. Torque rods shall be incorporated to restrict lateral movement of the differentials and to reduce bushing and tire wear. Dual height control valves shall be provided to maintain even, balanced loads. Suspension shall have a ground rating of 52,000 pounds.		
67. REAR TIRES		
The rear tires shall be Michelin 315/80R-22.5 20PR "L" tubeless radial XDN2 Grip all weather tread. The rear tire stamped load capacity shall be 33,080 pounds per axle with a nominal speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch. The Michelin Intermittent Service Rating maximum load capacity shall be 35,396 pounds per axle with a maximum speed of 75 miles per hour when properly inflated to 130 pounds per square inch. The Michelin Intermittent Service Rating maximum speed capacity shall match the nominal speed rating. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.		
68. TIRE PRESSURE MONITOR		
A Quick Pressure mechanical tire pressure sensor/indicator shall be provided for each wheel. The pressure sensor shall indicate if the tire is properly inflated. Each indicator shall have a green & red display visible inside a sight glass on the sensor. Full green indicates that the pressure is correct. Partial green/red indicates that the tire is under inflated by as little as 10%. Full red indicates that the tire is under		

inflated by 25% or more. The indicators shall replace the standard valve stem caps. A total of ten (10) indicators shall be provided.		
69. WHEELS		
The front and rear wheels shall be ALCOA® brand aluminum. DURA-BRIGHT® finish shall be provided on front and outside-rear wheels.		
70. HUB COVERS		
Polished stainless steel hub covers shall be provided for the front and rear axle.		
71. LUG NUT CAPS		
Chrome plated lug nut caps shall be provided for the front and rear wheels.		
72. FRONT MUD FLAPS		
Hard rubber mud flaps shall be provided for front tires.		
73. REAR MUD FLAPS		
Hard rubber mud flaps shall be provided for rear tires.		
74. BRAKES, FRONT/REAR		
The front brakes shall be Arvin Meritor DiscPlus EX225 Air Disc Brakes. Each disc brake assembly shall include one (1) 17" vented rotor, one (1) lightweight hub, one (1) twin-piston caliper, and two (2) quick-change pads.		
75. PARKING BRAKE		
A four-wheel parking brake system shall be provided.		
76. VISTA BRAKE LOCK SYSTEM		
A Vista Brake Lock system shall be provided and installed in the cab. The system shall consist of an illuminated key pad installed on the dash near the driver, an air cylinder disconnect between the parking brake valve and parking brake knob, and sensors to monitor park brake valve position, driver's door position, and driver's seat (occupied or unoccupied). The system shall require a 4 to 8 digit code to be entered into the keypad to release the parking brake. If the system detects that park brake knob/valve are not depressed and the door is opened and the seat unoccupied, it shall automatically engage the parking brake.		
77. AIR BRAKE SYSTEM		
The vehicle shall be equipped with air-operated brakes. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 standards.		

Each wheel shall have a separate brake chamber. A dual treadle valve shall split the braking power between the front and rear systems. All main brake lines shall be color-coded nylon type protected in high temperature rated split plastic loom. The brake hoses from frame to axle shall have spring guards on both ends to prevent wear and crimping as they move with the suspension. All fittings for brake system plumbing shall be brass. A Meritor Wabco System Saver 1200 air dryer shall be provided. The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. The system shall be designed so the vehicle can be moved within 60 seconds of startup. The quick build up system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time. The vehicle shall not be required to have a separate on-board electrical air compressor or shoreline hookup to meet this requirement. Six (6) supply tanks shall be provided. One air reservoir shall serve as a wet tank and a minimum of one tank shall be supplied for each the front and rear axles. A Schrader fill valve shall be mounted in the front of the driver's step well. A spring actuated air release emergency/parking brake shall be provided on the rear axle. One (1) parking brake control shall be provided and located on the engine hood next to the transmission shifter within easy reach of the driver. The parking brake shall automatically apply at 35 ±10 PSI reservoir pressure. A Meritor WABCO IR-2 Inversion Relay Valve, supplied by both the Primary and Secondary air systems, shall be used to activate the parking brake and to provide parking brake modulation in the event of a primary air system failure. Accessories plumbed from the air system shall go through a pressure protection valve and to a manifold so that if accessories fail they shall not interfere with the air brake system.		
78. AUTOMATIC MOISTURE EJECTORS		
Each air tank in the chassis braking system shall consist of a heated automatic moisture ejector to assist in keeping the air tanks and air lines free of debris and moisture. A manual pull cable shall be incorporated.		
79. AIR COMPRESSOR		

A Kussmaul 091-9B-1-AD 120V 100 PSI air compressor shall be provided and installed in the cab. The vehicle mounted air compressor shall ensure that the air brake system is properly pressurized for immediate response of the unit. A pressure switch shall regulate operation and shall automatically sense low air pressure in the brake system and restore the proper pressure. The unit shall have an auto drain which shall be installed on the outlet side of the air compressor and shall automatically purge water from the air discharge output. The water shall be ejected from the water separator bowl every time the compressor cycles off via a 120 volt solenoid. The compressor shall be wired to the 120V shoreline connection.		
80. AIR BRAKING ABS SYSTEM		
A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles and all electrical connections shall be environmentally sealed from water and weather and be vibration resistant. The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall sense approaching wheel lock and instantly modulate brake pressure up to 5 times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, that circuit shall revert to normal braking action. A warning light at the driver's instrument panel shall indicate malfunction to the operator. The system shall consist of a sensor clip, sensor, electronic control unit and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro- magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate wheel slip in milliseconds.		
81. COMPRESSION FITTINGS ON AIR SYSTEM		
All airline fittings installed on the chassis shall be compression style fittings.		

The following locations shall utilize push-on fittings: • Pressure protection valve (accessory block) • Double check valve (braking system, park brake) • One way check valve (brake valve tank) • Elbow Male Modified 1/4" tube x 1/4" MP (low air switch) • Elbow Male 1/4" tube x 3/8"MP (brake pedal solenoid) • Connector 1/4" x 3/8"MPT (brake pedal solenoid) • Switch stoplight (Wabco sealed switch/brake light and service brake switch) • Low pressure switch (PTC) (Wabco sealed switch/low air switch)		
82. MISCELLANEOUS CHASSIS EQUIPMENT		
Fluid capacity plate affixed below driver's seat. Chassis filter part number plate affixed below driver's seat. Maximum rated tire speed plaque near driver. Tire pressure label near each wheel location. Cab occupancy capacity label affixed next to transmission shifter. Do not wear helmet while riding plaque for each seating position. NFPA compliant seat belt and standing warning plates provided.		
83. ALUMINUM CAB		
The cab shall be a full tilt 6-person 10" rear raised roof cab designed specifically for the fire service and manufactured by the chassis builder. Rear of the cab shall be slanted forward at the top rear for mid-ship aerial use. The outside of the rear cab wall shall be aluminum diamond plate. Apparatus cabs that are not manufactured by the apparatus manufacturer shall not be acceptable**. NO EXCEPTIONS**		
84. CAB DESIGN		
The apparatus chassis shall be of an engine forward, fully enclosed tilt cab design. There shall be four (4) side entry doors. The cab shall be of a fully open design with no divider wall or window separating the front and rear cab sections. The cab shall be designed in a manner that allows for the optimum forward facing vision for crew. Cab designs that utilize roof mounted air conditioning units, are not desired. The cab shall be constructed of high strength 5052H32 aluminum plate welded to 6061-T6 extruded aluminum framing. The cab roof shall utilize 5” x 5” honeycomb re-enforced 6061 T6 aluminum extrusion, with fully radiused outer corner rails with integral drip channel and 6061 T6 ¾” x 2” x 3/16” aluminum box		

tubing type cross brace supports. Structures that do not include an integral drip channel will not be accepted. The box tubing type cross brace supports shall be installed in a curved fashion beginning from the midline of the apparatus cab and curving toward the exterior corner rails. This curvature will allow for increased strength in the event of a roll over while not allowing for rainwater buildup on the apparatus cab roof. The cab sides shall be constructed from 1 ½" x 3" x 3/16" 6061 T6 extruded door pillars and posts that provide a finished door opening, extruded and formed wheel well openings supports, formed aluminum wheel well liners and box tubing type support braces. The cab floor and rear cab wall shall utilize 1 ¾" x 4" x 3/16" 6061 T6 extruded box tubing type framing and support bracing. The framework shall be of a welded construction that fully unitizes the structural frame of the cab. The structural extrusion framework shall be overlaid with interlocked aluminum alloy sheet metal panels to form the exterior skin of the cab. The cab sides shall be constructed of 3/16" thick 5052H32 aluminum plate that slides into an integral channel of the extrusion framework. The plate is then skip welded into that channel to allow for tolerable flex while the apparatus travels down the roadway. Cab designs that utilize 1/8" thick aluminum for the cab sides shall not be acceptable. The structural extrusion framework shall support and distribute the forces and stresses imposed by the chassis and cab loads and shall not rely on the sheet metal skin for any structural integrity. The cab face extrusion framework shall be overlaid with 1/8" thick 5052H32 aluminum plate to allow for an aesthetically pleasing radiused cab face.		
85. CAB SUB-FRAME		
The cab shall be mounted to a 4" x 4" x 3/8" steel box tube sub-frame, and shall be isolated from the chassis, through the use of no less than six (6) elastomeric bushings. This substructure shall be completely independent of the apparatus cab. The sub frame shall be painted to match the primary chassis color.		

The sub-frame shall be mounted to the chassis through the use of lubricated Kaiser Bushings for the front pivot point, and two (2) hydraulically activated cab latches, to secure the rear. Cab mounting that does not include a sub-frame shall not be considered. **NO EXCEPTIONS**		
86. CAB DIMENSIONS		
The cab shall be designed to satisfy the following minimum width and length dimensions: • Cab Width (excluding mirrors) 98" • Cab Length (from C/L of front axle) • To the front of the cab (excluding bumpers) 68” • To the rear of the cab 62” • Total cab length (excluding bumpers) 130”		
87. ROOF DESIGN		
The cab shall be of a 10" one-half rear raised roof design with side drip rails and shall satisfy the following minimum height dimensions: • Cab Dimensions Interior Front 59" Rear 65" • Cab Dimensions Exterior Front 65" Rear 75"		
88. FENDER CROWNS		
Polished stainless steel front axle fenderettes with full depth radiused wheel well liners shall be provided.		
89. CAB INSULATION		
The exterior walls, doors, and ceiling of the cab shall be insulated from the heat and cold, and to further reduce noise levels inside the cab. The cab interior sound levels shall not exceed 90 decibels at 45 mph in all cab seat positions. **NO EXCEPTIONS**		
90. EXTERIOR GLASS		
The cab windshield shall be of a two piece curved design utilizing tinted, laminated, automotive approved safety glass. The window shall be held in place by an extruded rubber molding. The cab shall be finished painted prior to the window installation.		
91. SUN VISORS		
The sun visors shall be made of dark smoke colored transparent polycarbonate. There shall be a visor located at both the driver and officer positions, recessed in a molded form for a flush finish.		
92. CAB STRUCTURAL INTEGRITY		

The cab of the apparatus shall be designed and so attached to the vehicle as to eliminate, to the greatest possible extent, the risk of injury to the occupants in the event of an accident. The apparatus cab shall be tested to specific load and impact tests with regard to the protection of occupants of a commercial vehicle. A test shall be conducted to evaluate the frontal impact strength of the apparatus cab to conform to the test J2420 and the "United Nations Regulation 29, Annex 3, paragraph 4, (Test A). A second test shall be conducted to evaluate the roof strength of the apparatus cab to conform to the Society Of Automotive Engineers (SAE) SAE J2422/SAE J2420 and "United Nations Regulation 29, Annex 3, paragraph 5, (Test B) and SAE J2420. The evaluation shall consist of the requirements imposed by ECE Regulation 29, Paragraph 5. The test shall be conducted by a certified independent third party testing institution. A letter stating successful completion of the above test on the brand of cab being supplied shall be included in the proposal. There shall be **NO EXCEPTIONS** to this requirement.		
93. SEAT BELT TESTING		
The seat belt anchorage system shall be tested to meet FMVSS 207 Section 4.2a and FMVSS 210 section 4.2. Testing shall be conducted by an independent third party product evaluation company. A copy of the certification letter shall be supplied with the proposal documents.		
94. CAB LOCKDOWN LATCHES		
Cab lockdown latches shall be provided to prevent the cab from being tilted in the down position. Once the cab tilt switch is engaged the cab latches will release to allow the cab to be tilted.		
95. CAB TILT SYSTEM		
An electrically powered hydraulic cab tilt system shall be provided, and shall lift the cab to an angle of 45 degrees, exposing the engine and accessories for fluid checks and service work. The system shall be interlocked to only operate when the parking brake is set. The lift system shall be comprised of two (2) hydraulic lift cylinders, an electrically driven hydraulic pump, and a control switch. The hydraulic pump shall be located on the exterior of the frame rail on the driver's side of the chassis that can be easily accessible when the		

cab is tilted. A mechanical locking system consisting of an air operated actuator and a heavy radiused wall 3" x 3" aluminum extrusion will be provided to ensure the cab remains in the raised position in the event of a hydraulic failure. Additionally, each of the hydraulic lift cylinders shall incorporate a check valve, and velocity fuses that will activate should a sudden drop in pressure by detected. The cab tilt controls shall be interlocked to the parking brake to ensure the cab will not move, unless the parking brake is set. The cab tilt controls will consist of a momentary raise/lower switch and a two position cab safety lock switch. The hydraulic lift cylinders will be connected to a steel cab sub-frame, and not directly to the cab. **NO EXCEPTIONS**		
96. MANUAL CAB LIFT		
There shall be a manually operated hydraulic pump for tilting the cab in case the main pump should fail. Access to the pump shall be located under the left corner of the front bumper.		
97. CAB TILT REMOTE		
The cab tilt system shall be remotely controlled utilizing a ten-foot cable with a hand-held push button device, which shall plug into a receptacle in the bumper area of the cab. The receptacle shall have a spring- loaded weatherproof cover. The remote control shall allow the operator to safely stand away from the apparatus and view the surrounding cab area while it is being tilted.		
98. CAB DOORS		
The cab doorframes shall be constructed from 6061 T6 aluminum extrusions fitted with a 5052 H32 aluminum sheet metal skin and shall be equipped with dual weather seals. The outside cab door window opening shall be framed by a black anodized aluminum trim, to provide a clean appearance. The cab doors shall be equipped with heavy-duty door latching hardware, which complies with FMVSS 206. The door latch mechanism shall utilize control cable linkage for positive operation. A rubber coated nylon web doorstop shall be provided. The doors shall be lap type with a 10 gauge full-length stainless steel flange and 3/8" diameter hinge pin and shall be fully adjustable. All openings in the cab shall have grommets or equipped with rubber boots to seal the cab from extraneous noise and moisture.		

The cab doors shall be designed to satisfy the following minimum opening and step area dimensions: • Door Opening: Front 36.5" x 73" Rear 36.5" x 73" The lower portion of the doors shall have a 3” Red and White chevron going outboard lower to inboard higher.		
99. CAB STEPS		
The lower cab steps shall be no more than 22" from the ground. Grip strut material shall be installed on the stepping surface. An intermediate step shall be provided, midway between the lower cab step, and the cab floor. The intermediate step shall be slightly inset to provide for safer ingress and egress. Diamond plate material shall be installed on the stepping surface. All steps shall be covered with material that meets or exceeds the NFPA requirements for stepping surfaces.		
100. AUXILIARY CAB STEPS		
There shall be one additional step under each cab door to assist with entrance and exit of the cab. The steps shall be constructed of aluminum with a grip strut stepping surface.		
101. STEP LIGHTS		
A white TecNiq E41 LED light strip shall illuminate each interior cab step. These lights shall illuminate whenever the battery switch is and the cab door is open.		
102. POWER WINDOWS		
All four cab entry doors shall have power windows. Each door shall be individually operated and the driver’s position shall have master control over all windows. All four windows shall roll down completely.		
103. SIDE WINDOWS		
Fixed position side window shall be provided on each side of the cab between the forward cab area and the crew cab area. The widows shall be approximately 20.5" high x 16.50" wide to provide maximum visibility. The side windows shall be held in place by an extruded rubber molding with a chrome plated decorative locking bead.		
104. REAR CAB WINDOWS		
Two sliding windows approximately 16.25" wide x 14.25" high shall be provided in the back wall of the cab.		
105. WINDSHIELD WIPERS		

Two (2) black anodized finish two speed synchronized electric windshield wiper system. Dual motors with positive parking. System includes large dual arm wipers with built in washer system. One (1) master control works the wiper, washer and intermittent wipe features. Washer bottle is a remote fill with a 4 quart capacity. Washer fill is located just inside of officer cab door.		
106. WINDSHIELD WIPER DEACTIVATED		
The windshield wipers shall be deactivated when the parking brake is engaged.		
107. WINSHIELD WASHER RESERVIOR		
A four quart capacity windshield washer reservoir shall be provided. The fill access shall be located in the forward officer's step well area.		
108. MIRRORS		
Two (2) Lang Mekra 300 Series smooth chrome plated Aero style main and convex mirrors shall be installed on each side of the vehicle. The main mirror shall be 4-way remote adjustable with heat, 7" x 16" 2nd surface chromed flat glass. The convex shall be 6" x 8" 2nd surface chromed 400 mm radius glass. Each mirror housing assembly shall be constructed of lightweight textured chrome ABS with on truck glass and housing back cover replacement. In the event the mirror breaks the glass shall be replaceable in (3) minutes or less. The glass shall include a safety adhesive backing to keep broken glass in place. The mirror assembly shall be supported by a "C" loop bracket constructed of polished stainless steel tube utilizing two point mounting reducing vibration of mirror glass during normal vehicle operation. The lower section of the holder shall include a spring loaded single detent position 20 degrees forward with easy return to operating position without refocusing.		
109. GRILLE		
The front of the cab shall be equipped with a polished stainless steel grille with sufficient area to allow proper airflow into the cooling system and engine compartment. Plastic chrome plated grilles shall not be acceptable. The lower grill shall have "COURTENAY" laser cut into the grill and backlighted in red		
110. BUMPER		

There shall be a 12" high structural steel channel, severe duty wrap-around (45 degree) bumper provided at the front of the apparatus, extending back to the cab. It shall be paint in the primary cab colour. There shall be an 11.50” stainless steel band along the vertical surfaces. Laser cut perforated grilles shall be incorporated into the bumper and located at the outboard section of the bumper LH for the air horns and at the RH for the siren speakers. The bumper shall be mounted to a reinforcement plate constructed of 1/4" x 10" x 70" carbon steel. A gravel shield shall be provided, constructed of .188” aluminum diamond plate. The bumper extension shall be approximately 12".		
111. AIR HORNS		
Two (2) Grover 2040 Stuttertone rectangular, 21” long chrome plated, air horns shall be recess mounted, on the left-hand side behind the perforated grille of the bumper.		
112. FOOT SWITCH FOR AIR HORNS		
Two (2) Foot switches for the air horns shall be provided, one on the driver's and the other on the officer’s side.		
113. ELECTRONIC SIREN		
One (1) Whelen 295HFS2 electronic siren shall be installed at the cab instrument panel complete with noise canceling microphone. The remote control head shall be flush mounted in a location specified by the fire department. The electronic siren shall be wired through the steering wheel button. A selector switch shall be provided on the instrument panel to switch between functions.		
114. SIREN SPEAKER		
Two (2) Cast Products SA4201-5-A 100 watt weatherproof siren speakers shall be provided and wired to the electronic siren.		
115. SPEAKER MOUNTING		
The electronic siren speaker(s) shall be recess mounted, on the right-hand side behind the perforated grille of the bumper.		
116. FEDERAL Q2B SIREN		
There shall be a Federal Q2B-NN siren installed in the center of the cab grille. The siren shall be securely mounted and activated by means of a solenoid and shall include a brake.		
117. MOMENTARY SWITCH ON DASH, OFFICER'S SIDE, FOR MECH SIREN		
A momentary switch for the mechanical siren shall be provided on the officer's side dash.		
118.CAB EXTERIOR LIGHTING		

Exterior lighting and reflectors shall meet or exceed Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements		
119. HEADLIGHTS		
The front low and high beam headlights shall be heated FIRETECH model FT-4X6 LED, rectangular shaped, quad style installed in custom rectangular shaped stainless steel housings on the front of the cab. Each housing shall accommodate a forward-facing turn signal in the outboard location and a side-facing warning light. An additional pair of rectangular shaped stainless steel housings shall be installed on the front of the cab above the headlight housings. Each housing shall accommodate two (2) forward-facing warning lights and a side-facing turn signal.		
120. HEADLIGHT FINISH		
The interior components of the headlights shall have a chrome finish.		
121. ALTERNATING HEADLIGHTS		
The headlights shall have an alternating flash feature for emergency response use.		
122. FRONT TURN SIGNALS		
There shall be four (4) Whelen 400 Series Model 40A00AAR LED rectangular amber turn signal lights mounted one (1) each side in the front of the headlight housings and one (1) mounted on the side of each warning light housing.		
123. ICC/MARKER LIGHTS		
Five (5) Gorte 47183 ICC/marker lights shall be provided on top of the roof of the cab to meet D.O.T. requirements.		
124. MARKER LIGHTS		
Amber clearance lights shall be mounted on the back of the mirror housings, visible to oncoming traffic.		
125. EXTERIOR CAB HANDRAILS		
There shall be four (4) 24" long, handrails provided and installed, one at each cab entrance. The handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange.		

Sufficient space shall allow for a gloved hand to firmly grip the rail.		
126. HANDRAIL SCUFF PLATES		
Four (4) 4" wide mirrored stainless steel scuff plate shall be provided, one behind each of the exterior grab handles.		
127. INTERIOR CAB HANDRAILS		
There shall be two (2) rubber coated grab handles provided and mounted on the interior of the cab, one each side, on the windshield post for ingress assistance. The handrail on the driver's side shall be approximately 11" long and the handrail on the officer's side shall be approximately 18" long.		
128. CAB DOOR HANDRAILS		
There shall be two (2) rubber coated grab handles provided and mounted, one on the inside of each rear crew door, just below the windowsill. The handrails shall be approximately 11" long. There shall also be two (2) 1.25" diameter knurled stainless steel handrails shall be provided and mounted, one on the inside of each rear crew door, just above the windowsill. The handrails shall be approximately 22" long.		
129. CAB REAR WALL COVERING		
The rear outside wall of the cab shall be covered with 1/8" aluminum diamond plate.		
130. DIAMOND PLATE, CAB ROOF		
The rear exterior section roof of the cab shall have a diamond plate overlay. The overlay shall be constructed of .125" aluminum embossed diamond plate and measure 30" x 91".		
131. CAB INTERIOR		
The metal surfaces of the cab interior shall be coated and sealed with MultiSpec gray speckle, urethane modified, and mar resistant paint. The textured coating shall provide paramount durability and wear resistance against foreign objects and normal wear and tear. The front and rear headliners, as well as the rear cab wall, shall be finished in Gray-Black Durawear covered padded panels.		
132. INTERIOR DOOR PANELS		
The interior of the cab entry doors shall have a 304 brushed stainless steel scuff plate, contoured to the door, from the door window sill down.		
133. REFLECTIVE MATERIAL, CHEVRON STRIPING, INTERIOR CAB DOORS, ORAFOL REFLEXITE		
The apparatus shall have reflective Orafol Reflexite Chevron striping affixed to the inside of each cab door. The striping shall be plainly		

visible to oncoming traffic when the doors are in the open position. Colour Red/White		
134. CAB FLOOR COVERING		
The cab interior floor shall be covered with a 5/16" thick, black rubberized material to provide a rugged but cosmetically pleasing stepping surface throughout the cab. The floor covering shall provide superior durability and resistance against foreign objects as well as normal wear and tear.		
135. ENGINE ENCLOSURE		
An integral, formed aluminum and composite engine enclosure shall be provided. The engine enclosure shall be contoured and blended in an aesthetically pleasing manner with the interior dash and flooring of the cab. The enclosure shall be kept as low as possible, to maximize space and increase crew comfort. The enclosure shall be constructed from 5052 H2 aluminum plate and GRP composite materials, providing high strength, low weight, and superior heat and sound deadening qualities. Additionally, the underside of the engine enclosure shall be coated in with a ceramic spray on insulation and sound control. This coating is an environmentally-friendly coating that is applied seamlessly and rapidly while providing superior thermal insulation and protection against vibration and noise, and will prevent future corrosion from forming by sealing the substrate. **NO EXCEPTIONS**		
136. ENGINE ENCLOSURE COVERING		
The top of the engine enclosure shall be covered with Scorpion heavy duty, gray polyurethane blended coating. The textured coating shall provide paramount durability and wear resistance against foreign objects and normal wear and tear as well as sound deadening and insulation. The rubberized cab floor covering shall extend up the lower exterior sides of the engine enclosure to aid in sound deadening and heat resistance.		
137. CENTER CONSOLE		
There shall be a storage console installed on the engine enclosure between the driver and officer. The console shall be constructed from smooth aluminum and shall be coated with the same finish as the engine enclosure. The console shall measure approximately 23" long X 11.375" wide X 8.125" high. The console shall have a 13" long storage area in the center that shall be divided into five (5) separate areas with four (4) fixed vertical dividers. The dividers shall be spaced 2.125" apart for map book storage. A Velcro strap shall be installed front to rear to secure the map books. Each outboard area of the		

console shall have one (1) stainless steel cup holder and one (1) approximately 5.5” long X 4.75” wide X 3.5” high open storage area.		
138. ENGINE HOOD LIGHTS		
An LED work light shall be installed in the engine enclosure with an individual switch located on the base of the light.		
139. WORK SURFACE		
There shall be a flat work surface in front of the officer’s seat.		
140. GLOVE BOX		
A glove box shall be provided and located directly in front of the officer’s position		
141. UPPER CREW DOOR AREA		
Each upper cab crew door area shall remain open and painted to match the cab interior.		
142. CHASSIS WIRING, MULTIPLEX		
All chassis wiring shall have XL high temperature crosslink insulation. All wiring shall be color-coded, and the function and number stamped at 3" intervals on each wire. All wiring shall be covered with high temperature rated split loom for easy access to wires when trouble shooting. All electrical connectors and main connectors throughout the chassis shall be treated to prevent corrosion All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations. All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.		
143. MASTER ELECTRICAL PANEL		
The chassis main electrical panel shall be wired through the master disconnect solenoid and controlled with a three-position ignition rocker switch. Multiplex nodes shall be located at officer's right side lower interior firewall with removable cover and schematic provided with notebook holder on outside cover.		
144. CLASS 1 ES KEY™ SYSTEM AND ULTRAVIEW and UltraView™ DISPLAY SPECIFICATION		
Electrical System: The electrical system shall utilize Class1 Inc. **ES-Key™** technology, **Supernode II** and **other Es-Key modules** where applicable. The **UltraView™** display may also be utilized. The apparatus shall be equipped with a Class 1 ES-Key Management System for controlling electrical system devices. This management system shall be capable of performing load management functions,		

system switching, monitoring and reporting, and be fully programmable for a standardized electrical system utilizing the ES-Key Professional software program. The ES-Key system shall utilize a Controller Area Network (J1939) protocol to provide multiplexed control signals for "real time" operation. The system shall consist of a main control module (Universal System Manager or Supernode II) and the appropriate combination of Power Distribution Module(s) (PDM), Switch Input Module(s) (SIM), and other I/O modules as required for the application. Optional system enhancements may include the UltraView™ 700 display, and various Es-Key switch modules for increased graphic user interface. **Supernode II™** The apparatus shall be equipped with a Class1 ES-Key™ system with a Supernode II™ high density input output node. The Supernode II™ shall have (24) Polarity Selectable inputs, (24) outputs, a Universal System Manager, a Vehicle Data Recorder, Seat Belt Warning System, a data logger, programmable special utilities, and select J1939 engine and drive train message reception with ES-Key™ I/O association. It must be sealed to IP-67 and have integrated power connections. The Supernode™ shall have (18) positive and (6) negative outputs. Each positive output shall be capable of 13 amps continuous duty. The negative outputs shall be capable of 2 amps continuous duty. Supernode II™ outputs shall contain features such as digital circuit breaker, flash capability, PWM capability and open load detection. The Supernode II™ special utility functions shall include timers (delay on/off and one shot), counters, bi-stable switches, and select J1939 broadcast messages. The Supernode II™ shall have an integrated USB port to allow for direct connection to the ES-Key system without additional interface devices. The Supernode II™ shall have an integrated Load Manager. The Load Manager sequencer shall assure that loads are applied and removed gradually, thus eliminating the possibility of inducing failures in the vehicle's equipment. The load manager shall be a precision, solid state controller which sequentially switches "ON" multiple circuits at 1/2 second intervals.		

Individual switches shall enable the user (Driver) to select output "ON or "OFF" status, at any time. The sequencer shall be initiated by the "Emergency Master" switch. The sequencer priority shall be set at the apparatus pre-build conference. The aforementioned Load Manager shall monitor the vehicles battery voltage. Loads may be shed at any voltage at one tenth of volt increments. A low voltage warning may be set at any set point (usually 11.5 volts). The load manager can shed any output that is controlled by the system (there is no limit to the number of loads that may be managed by the network).The load shed priority shall be set by the circuit significance, followed closely by circuit draw. The Load Manager shall shed loads until the voltage level begins to rise. Voltage Monitor: A voltage monitor shall be built into the ES-Key electrical system. It shall activate a warning when the alternator output voltage falls below any desired voltage (usually 11.5 volts). **UltraView™ 700 Display** The apparatus shall be equipped with the UltraView™ 700 display (UV700). The UV700 is a 7 inch, full color LCD display, with (14) buttons and touch screen capability with (2) J1939 CAN Bus connections and (3) NTSC/PAL video inputs. It shall be bonded for direct sunlight viewing, sealed to IP67 and mounted in either the flush, pedestal or rear-mount position. **Other Es-Key modules** The apparatus may be equipped with other Es-Key module as deemed appropriate for the design. This may include: • Power Distribution Modules • High Density Power Distribution Modules • Output Modules • Input Modules • Smart Touch Switch Panels • 1-Touch Switch Panels **Component Installation** All ES-Key components shall be mounted as recommended in the component datasheets provided by Class1. **Training Video** A operational training video shall be supplied with this unit		
145. INSTRUMENT PANEL		

The main dash shroud, which covers the area directly in front of the driver from the doorpost to the engine hood, shall be constructed of vacuum formed ABS material with scorpion texture. The dash shall be a one- piece hinged panel that tilts outward for easy access to service the internal components. The gauge panel shall be constructed with a .125" aluminum panel, covered with a scratch resistant reverse printed and laminated poly carbonite. The gauges shall be AMETEK Vehicular Instrumentation Systems (VIS), Next Generation Instrumentation System (NGI) with built-in self-diagnostics and red warning lights to alert the driver of any problems. All gauges and controls shall be backlit for night vision and identified for function. All main gauges and warning lights shall be visible to the driver through the steering wheel.		
146. MASTER BATTERY & IGNITION SWITCH		
The vehicle shall be equipped with a keyless ignition, with a three (3)-position Master Battery rocker switch, "Off/ACC/On" and a two (2)-position Engine Start rocker switch, "Off/Start"		
147. DIESEL PARTICULATE FILTER CONTROLS		
There shall be two (2) controls for the diesel particulate filter. One control shall be for regeneration and one control shall be to inhibit engine regeneration. These shall be located below the steering wheel in the kick panel.		
148. INSTRUMENTATION & CONTROLS		
Instrumentation on dash panel in front of the driver: • Tachometer/hour meter with high exhaust system regeneration temperature, and instrument malfunction indicators • Speedometer/odometer with built in turn signal, high beam, and re-settable trip odometer • Voltmeter • Diesel fuel gauge • DEF (Diesel Exhaust Fluid) gauge • Engine oil pressure • Transmission temperature • Engine temperature • Primary air pressure • Secondary air pressure Indicators and warning lights in front of the driver: • Parking brake engaged • Low air with buzzer • Antilock brake warning		

• Check transmission • Transmission temperature • Upper power indicator • Seat belt • Engine temperature • Low oil indicator • Low voltage indicator • Air filter restriction light • Low coolant indicator • High idle indicator • Power on indicator • Check engine • Stop engine • Check engine MIL lamp • DPF indicator • High exhaust temperature • Wait to start Other indicator and warning lights (if applicable): • Differential locked • PTO (s) engaged • Auto-slip response • Retarder Engaged • Retarder Temperature • ESC indicator • Jacks out • Jacks Down Controls located on main dash panel in front of the driver: • Master power disconnect with ignition switch • Engine start switch • Headlight switch • Windshield wiper/washer switch • Differential lock switch (if applicable) • Dimmer switch for backlighting Controls included in steering column: • Horn button • Turn signal switch • Hi-beam Low-beam switch • 4-way flasher switch • Tilt-Telescopic steering wheel controls		
149. CENTER CONTROL CONSOLE		
There shall be an ergonomically designed center control console. The console shall be constructed of 1/8” smooth aluminum and shall be		

mounted on the engine hood between the driver and officer. The console shall have a durable coating to match the color of the engine hood covering and shall feature surfaces on each side that are contoured to face the driver and the officer for easy viewing and accessibility. The switches and other customer specified electrical items shall be mounted in removable 1/8" smooth aluminum panels with a black wrinkle finish. The console shall have an aluminum lift-up lid with quick release latch. The lid shall be held in the open position with a gas strut to allow for easy access and serviceability. Controls located in the console conveniently accessible to the driver: • Transmission shifter • Remote mirror control • Illuminated rocker switches to control high idle, Jacob's brake, siren/horn, siren brake, master emergency, and other customer specified components • 12V power point (if applicable) • Controls located in the console conveniently accessible to the driver and the officer (center): • Parking brake control with a guard to prevent accidental engagement • Pump shift control with OK TO PUMP and PUMP ENGAGED lights Controls located in the console conveniently accessible to the officer: • Illuminated rocker switches to control customer specified components that are easily reachable to the officer and do not allow for compromise of the driver's view, and eliminate the need for foot switches • Surface to recess siren head, radio head, or other desired items as space permits 12V power point (if applicable) Driving compartment warning labels shall include: • HEIGHT OF VEHICLE • OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION • DO NOT USE AUXILIARY BRAKING SYSTEMS ON WET OR SLIPPERY ROADS • EXIT WARNINGS Additional labels included: • COMPUTER CODE SWITCH		

• ABS CODE SWITCH • FLUID DATA TAG • CHASSIS DATA TAG		
150. OVERHEAD CONTROL CONSOLE		
An ergonomically designed overhead console shall be provided above the driver and officer, running the full width of the cab. The overhead console shall be constructed from 1/8" aluminum plate and shall be painted with a durable finish to match the inside of the cab. There shall be seven (7) removable 1/8" smooth aluminum plates with a black wrinkle finish to house switches and other electrical items. Directly above the driver there shall be two (2) panels with no cutouts, unless otherwise specified by the customer. There shall be a panel located to the right of the driver that shall be designated for defroster, heat, and air conditioning controls (if specified). The center overhead panel shall be designated for up to seven (7) door ajar indicators. Upon releasing the apparatus parking brake, one or more of these lights shall automatically illuminate (flash) when any of the following conditions occur that may cause damage if the apparatus is moved: cab or compartment door is open; ladder or equipment rack is not stowed; stabilizer system deployed; any other device has not been properly stowed. There shall be a panel to the left of the officer as well as two (2) directly above the officer. These panels shall have no cutouts, unless otherwise specified by the customer.		
151. COMMUNICATION SYSTEM		
• Communication Antenna: Vhf RH Forward Cab • Communication Antenna Cable: Routing to be determined at preconstruction meeting • Aux Communication Antenna 1: Cell L Forward Cab • Aux Communication Antenna 1 Cable: Routing to be determined at preconstruction meeting • Aux Communication Antenna 2: GPS Puck Cnt Forward Cab • Aux Communication Antenna 2 Cable: Routing to be determined at preconstruction meeting		

• Radio- Motorola XPR 5500e location to be determine at preconstruction meeting. Programming information will be provided • Mic holders for both the radio and PA system shall bell held in place by Magnetic Mic units location to be determine at preconstruction meeting • Sigtronics wireless headset system shall be install in the unit c/w 4 headsets that are intercom only (rear) and 2 headsets with intercom and radio interface (Driver, Officer) SE-9 headsets • Charging ports to be install at each seating position location to be determine at preconstruction meeting		
152. ENGINE WARNING SYSTEM		
An engine warning system shall be provided to monitor engine conditions such as low oil pressure, high engine temperature and low coolant level. Warning indication shall include a STOP ENGINE (red) light with audible buzzer activation and a CHECK ENGINE (amber) light. Note: (Some engine configurations may also include a fluid warning light.) There shall be a master information light bar with 24 lights located across the center of the dash panel that covers up to 24 functions. These are defined under Indicators and Warning Lights above.		
153. PUMP SHIFT MODULE		
An Innovative Control electric pump shift module with indicating lights shall be located within easy reach of the driver. A gear lockup shall be provided to hold the transmission in direct drive for pump operation.		
154. PROGRAMMABLE LOAD MANAGER		
Load manager shall have the ability to sequence loads on and off. The Super Node II has twenty-four (24) inputs and twenty-four (24) outputs. Eighteen (18) are positive polarity outputs and six (6) are ground polarity outputs. It shall also be able to establish a 8 priority levels to shedding loads when the vehicle is stationary, starting at 12.8 volts lowest priority load to be shed, then respectively at 12.7, 12.5, 12.3, 12.1, 11.9, 11.5 and never shed volts DC. An output is shed (turned OFF) when the system voltage drops below the designated priority level's shed voltage for thirty (30) seconds. If the voltage has dropped below multiple priority level shed voltages then each higher priority level will shed before the lower		

priority levels. An output is unshed (turned back ON) when the system voltage rises above the designated priority level's unshed voltage for ten (10) seconds. If the voltage has risen above multiple priority level unshed voltages then each lower priority level will unshed before the upper priority levels.		
155. MASTER SWITCH		
All outputs can be tied or not tied to the stage switch. In fire apparatus this switch is typically referred to as the master switch. The state of the stage switch is controlled by Utility Module output memory space 3. When this output is active the stage switch is active. Any output tied to the stage switch will be OFF if the stage switch is not active regardless of the output's multiplex equation. Set an output's to be tied to the stage switch by checking the stage switch box in its "Output Port Load Settings" under the "Settings" tab. The name of the stage switch can be changed from the standard "stage" to anything desired by modifying the text in the "Output Port Load Settings" area.		
156. AUTOMATIC HIGH IDLE ACTIVATION		
The Utility Module's high idle request (input memory space 2) is activated when the system voltage drops below the high idle threshold (12.8 volts standard or 25.6 volts if 24 volt load management is enabled) for 8 seconds or longer AND load management has been enabled (Utility Module output memory space 1 is active). The high idle request will remain active as long as the voltage remains below the voltage threshold and for 3 minutes after the system voltage rises above the voltage threshold. High idle can be canceled by activating the Utility Module's high idle cancel (output memory space 0).		
157. HIGH IDLE		
The engine shall have a "high idle" switch on the dash that shall maintain an engine RPM of 1,000. The switch shall be installed at the cab instrument panel for activation/deactivation. The "high idle" mode shall become operational only when the parking brake is on and the truck transmission is in neutral.		
158. DOOR AJAR LIGHT		
A Whelen TIR3 LED light shall be installed in the cab near the driver. The light shall illuminate when the parking brake is released and any cab or body door is open or any other item on the apparatus is not properly stowed that may cause damage.		
159. DOOR AJAR ALARM		

A door ajar alarm shall be installed in the cab to work in conjunction with the door ajar light.		
160. AUXILIARY POWER POINT		
One (1) 12-volt 20-ampere auxiliary lighter socket type plug-ins, shall be provided in the cab near the officer.		
161. USB POWER POINT		
One (1) 12-volt dual port USB power point shall be provided in the cab near the driver.		
162. AUXILIARY USB POWER POINT		
One (1) 12-volt USB power point shall be provided in the cab on the driver's side of the lower command console center panel.		
163. CAB ACCESSORY FUSE PANEL		
A fuse panel shall be located underneath the rear facing seat on the officer's side. The fuse panel shall consist of six (6) battery hot and six (6) ignition switch circuits. Each circuit shall be capable of 10-ampere 12- volt power and total output of 50-amps. The fuse panel shall be capable of powering accessories such as hand held spotlights, radio chargers, hand lantern chargers and other miscellaneous 12-volt electrical components.		
164. POWER & GROUND STUDS, OVERHEAD COMMAND CONSOLE		
There shall be a set three (3) threaded power studs provided in the cab's overhead Command Console for future installation of two-way radios. The studs shall be wired as follows: • One (1) 12-volt 60-amp, direct to the battery • One (1) 12-volt 30-amp controlled by the ignition switch • One (1) 12-volt 125-amp ground		
165. POWER & GROUND STUDS, LOWER COMMAND CONSOLE		
There shall be a set three of (3) threaded power studs provided in the cab's lower Command Console for future installation of two-way radios. The studs shall be wired as follows: • One (1) 12-volt 60-amp, direct to the battery • One (1) 12-volt 30-amp controlled by the ignition switch • One (1) 12-volt 125-amp ground		
166. SPARE FUSE BLOCK		
An additional fuse block shall be installed in the cab as part of the electrical system for future installation of rechargeable equipment and/or hand lights. The location shall be determined during the pre-construction conference.		
167. VEHICLE DATA RECORDER		

An Akron / Weldon vehicle data recorder as required by the 2009 edition of NFPA 1901 shall be installed. Vehicle data shall be sampled at the rate of 1 second per 48 hours, and 1 minute per 100 engine hours. Free software is available to allow the fire department to collect the data as needed.		
168. 110 VOLT POWERBAR		
One 110 volt power bar for accs.(radios) shall be installed between the rear-facing seats. This shall be tied into the shoreline power supply.		
169. LIGHTING CAB INTERIOR		
Interior lighting shall be provided inside the front of the cab for passenger safety. Two (2) Whelen 6" round ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens. One light shall be located over each the officer and driver's position. The lights shall also activate from the open door switch located in each cab doorjamb.		
170. LIGHTING CREW CAB INTERIOR		
Interior lighting shall be provided inside the crew cab for passenger safety. Two (2) Whelen 6" round ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens shall be provided. The lights shall also activate from the open door switch located in each cab doorjamb.		
171. MAP LIGHT		
A Sunnex 20" "goose neck" LED map light shall be provided on the officer's side of the cab dash.		
172. HEAVY DUTY HEATER/DEFROSTER/AIR CONDITIONER		
There shall be a minimum 65,000 cool BTU and 65,000 heat BTU single unit, heater/air conditioner mounted over the engine cover. The unit shall be mounted in center of the cab on the engine hood/enclosure. Unit shall have a shutoff valve at the right side of the frame, next to the engine. Airflow of the heater/air conditioner shall be a minimum 1200 CFM. To achieve maximum cooling, a TM-21 Compressor (10 cu. in.) will be used. The defroster/heater shall be a minimum of 35,000 BTU and shall be a separate unit mounted over the windshield. There shall be eight (8) louvers/diffusers to direct to windshield and door glass. Airflow of the defroster/heater shall be a minimum 350 CFM. The unit shall be painted Zolatone greystone to match the cab ceiling.		

The condenser shall be roof mounted and have 65,000 BTU rating. The unit shall include three fan motors. Airflow of the condenser shall be a minimum 2250 CFM. (This roof-mounted condenser shall work at full rated capacity at an idle with no engine heat problems.)		
173. HEATER/DEFROSTER/AIR CONDITIONING CONTROLS		
The heater/defroster/air conditioning shall be located in the overhead console in the center of the apparatus cab within reach of the driver and officer. The controls shall be illuminated for easy locating in dark conditions. The controls shall be located in such a way that the driver will not be forced to turn away from the road to make climate control adjustments. Control of all heater/defroster/air conditioning functions for the entire apparatus cab shall be achieved through these controls.		
174. FLOORBOARD HEATING DUCT		
There shall be ductwork to the floor of the cab, facing forward to provide heat for the front of cab floor area.		
175. DEFROSTER DIFFUSER		
A molded diffuser made of durable ABS plastic ductwork system shall be provided. It shall be form fitted and shall attach to the cab's overhead defroster unit to provide temperature controlled air to the windshields. Air flow of up to 280 cfm is balanced and directed across the entire windshield for optimum defrosting capability in all types of weather.		
176. TOOL MOUNTING PLATE		
There shall be a 3/16" smooth aluminum plate installed on top of the heat/ air conditioning unit for use in mounting of equipment. The plate shall measure approximately 25" wide x 19.5" long and shall be spaced up 1". The mounting plate shall feature beveled edges on the front and rear for a finished appearance. The plate shall be coated with the same finish as the heat/air conditioning unit and shall be secured with screws for easy replacement.		
177. METAL VENT COVERS		
Metal deflectors shall be provided for the hood mounted heat/A/C unit.		
178. AUXILLARY DEFROST FAN DRIVER'S SIDE		
There shall be a Red Dot model RD-5-5786-OP 12-volt fan mounted under the upper command console, inboard of console position 2, directed at the driver's side windshield. The fan shall be activated by a 3- position toggle switch located at the base of the fan. The switch positions shall be High, Low and Off.		
179. AUXILLARY DEFROST FAN OFFICER'S SIDE		
There shall be a Red Dot model RD-5-5786-OP 12-volt fan mounted under the upper command console, inboard of console		

position 5, directed at the officer's side windshield. The fan shall be activated by a 3- position toggle switch located at the base of the fan. The switch positions shall be High, Low and Off.		
180. DRIVER'S SEAT		
A H.O. Bostrom Sierra high back ABTS seat with air suspension shall be provided for the driver. The seat shall be equipped with a red 3-point shoulder harness with lap belt. The seat shall have fore/aft adjustment and shall be upholstered with heavy duty Low Seam Durawear Plus material.		
181. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
182. OFFICER'S SEAT		
A H.O. Bostrom Tanker 550 ABTS SCBA fixed base seat shall be installed behind the Officer. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with a lap belt and dual retractors built into the seat assembly with RiteHite™ Seat belt customized fit Adjustment. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material. UNDER SEAT STORAGE COMPARTMENT There shall be a storage area under the officer's seat, accessible from the front through a hinged door with locking Southco C5 compression lever latch. The latch shall include two (2) CH751 flat keys. The door shall be shall be painted with a durable finish to match the inside of the cab and shall be vertically hinged near the engine enclosure. The storage area shall be approximately 19.5" wide x 14.375" high x 21.75" deep. The lower rear portion of the compartment shall be tapered to accommodate the wheel well and wiring chase. The opening shall be approximately 15.5" wide x 10.5" high.		
183. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding		

position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
184. CREW SEAT – DRIVER'S SIDE, REAR FACING		
One (1) H.O. Bostrom Tanker 450 ABTS SCBA fixed base seat shall be installed behind the driver. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.		
185. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
186. CREW SEAT – OFFICER'S SIDE, REAR FACING		
One (1) H.O. Bostrom Tanker 450 ABTS SCBA fixed base seat shall be installed behind the officer. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.		
187. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
188. CREW SEAT – DRIVER'S SIDE, FORWARD FACING, INBOARD		
One (1) H.O. Bostrom Tanker 400CT ABTS SCBA flip-up base seat shall be installed in the driver's side forward-facing inboard position. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.		
189. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from		

anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
190. CREW SEAT – OFFICER'S SIDE, FORWARD FACING, INBOARD		
One (1) H.O. Bostrom Tanker 400CT ABTS SCBA flip-up base seat shall be installed in the officer's side forward-facing inboard position. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.		
191. HELMET STORAGE		
The helmet for the above seat shall be stored in an On Scene Solutions Talon helmet bracket. The bracket shall be constructed from anodized aluminum with stainless steel hardware. The bracket shall secure the helmet by capturing the brim of the helmet with three adjustable tabs. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated. Location to be verified at preconstruction meeting		
192. CUSTOM SEAT LOGOS		
The seats shall include a custom logo in the headrest. The design shall be supplied by the fire department.		
193. SCBA BRACKETS		
Each SCBA seat in the cab shall feature an H.O. Bostrom SecureAll self-contained breathing apparatus (SCBA) locking system. The seat back shall include a bracket which shall be capable of storing most U.S. and international SCBA brands and sizes while in transit or for storage. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters; adjustment points shall utilize similar hardware and adjustments shall be made with one tool. The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock		

is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions. The locking system shall include a release handle integrated into the seat cushion for quick and easy release and to eliminate the need for straps or pull cords which might interfere with other SCBA equipment.		
194. SEAT BELT WARNING SYSTEM		
An Akron / Weldon seat belt warning system shall be provided, and shall monitor each seating position. Each seat shall be supplied with a sensor that, in conjunction with the display module located on the dash, shall determine when the seat belt was fastened and if the seat is occupied. An icon shall represent that the seat is properly occupied. An audible and visual alarm shall be activated if the seat is occupied and/or the belt is not fastened in the proper sequence.		
195. CREW SEAT COMPARTMENT		
A compartment shall be provided under the forward facing crew seats on the back wall of the cab. The compartment shall be full through, with an access door on each side, accessible from the side of the crew cab doors. Compartment dimensions are 47"L x 14.75"H x 18.75"W.		
196. COMPARTMENT DOOR LOCKS		
The crew seat compartment doors shall be equipped with locking Southco C5 compression lever latches. Two (2) CH751 flat keys shall be provided.		
197. CAMERA SYSTEM		
A Brigade powered model SE-770-100, Buckeye 360° Video camera system kit shall include a 7" monitor, (4) four cameras, an Electronic Control Unit (ECU), required harnesses and a manual camera switch. The system kit shall provide split video feed with bird's-eye view and individual camera views. It shall be capable of integrating with an existing vehicle system for an automatic camera view, which seamlessly switches from front/left/right/rear views based on turn signal and reverse activation. It shall also feature a switch module that allows the operator to override the default camera view. The system shall feature NTSC video inputs for (4) four cameras, and also have NTSC, CVBS (SD) 2-channel view output. It shall have a 185 degree horizontal camera view angles, and have a resolution of 800 x 480 at 30 FPS (frames per second). The system shall operate from 9 to 36 VDC, and shall consume no more than 15 watts of power. It shall operate from -22° F to 158° F. The ECU (Electronic Control Unit) shall have dimensions of 6.6" L x 5"		

H X 1.4” D. The camera shall have dimensions of 1.4” L X 2.4” H X 1.8” D. A 2 year warranty shall also be provided with the system.		
198. ADDITIONAL MONITOR		
An additional Brigade 7" waterproof monitor, shall be installed near driver's outrigger controls, and tied back into the 360 degrees system located in the cab.		
199. FIRE PUMP HALE QMAX-200		
Fire pump shall be midship mounted. The fire pump shall be of the double suction single stage centrifugal type, carefully designed in accordance with good modern practice. The pump shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI. The pump body shall be horizontally split, on a single plane, casing type with removable lower casing for easy removal of the entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in the chassis. All moving parts in contact with water shall be of high quality bronze or stainless steel. Easily replaceable bronze labyrinth wear rings shall be provided. Discharge passage shall be designed to accomplish uniform pressure readings as the actual pump pressure. The rated capacity of the fire pump shall be 2250 gallons per minute in accordance with NFPA# 1901. The pump shaft shall be rigidly supported by three bearings for a minimum deflection. One high lead bronze sleeve bearing to be located immediately adjacent to the impeller (on side opposite the drive unit). The sleeve bearing shall be lubricated by a force fed, automatic lubrication system, pressure balanced to exclude foreign material. The remaining bearings shall be heavy duty type, deep groove ball bearings in the gear box and they shall be splash lubricated.		
200. PUMP TRANSFER CASE – G SERIES		
The drive unit shall be designed of ample capacity for lubricating reserve and to maintain the proper operating temperature. Pump drive unit shall be of sufficient size to withstand up to 16,000 lbs. ft. torque of the engine in both road and pump operating conditions. The gearbox drive shafts shall be heat treated chrome nickel steel input and output shafts shall be at least 2-		

3/4" in diameter, on both the input and output shafts. They shall withstand the full torque of the engine in both road and pump operating conditions. The engagement of the pump transmission shall be of such design so as to permit transfer of power from road to pump operation only after vehicle is completely stopped. The pump shift shall be air actuated from the cab and have both a green "Pump Engaged" light, and a green "O.K.-To-Pump" light. A third green light shall be provided on the pump operator's panel for "Throttle Ready". The pump drive unit shall be cast and completely manufactured and tested at the pump manufacturer's factory.		
201. PUMP SEAL		
One (1) only required on the suction (inboard) side of the pump. The mechanical seal must be two (2) inches in diameter and shall be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal. Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency. **NO EXCEPTIONS** The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel to be super-finished under for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.		
202. PUMP ANODE		
A Hale pump anode kit assembly # 529-0050-00-0 shall be provided and installed in the pump body. A minimum of two (2) anodes shall be installed one (1) in the suction side and one (1) in the discharge side of the pump.		
203. PUMP TEST & CERTIFICATION		
The pump, when dry, shall be capable of taking suction and discharging water in compliance with NFPA #1901 chapter 14. The pump shall be tested by Under Writer's laboratories and shall deliver the percentages of rated capacities at pressures indicated below: • 100% of rated capacity @ 150 PSI net pump pressure. • 70% of rated capacity @ 200 PSI net pump pressure.		

• 50% of rated capacity @ 250 PSI net pump pressure.		
204. AUXILIARY COOLER		
An auxiliary cooler shall be furnished to provide additional cooling to the engine under extreme pumping conditions. Water from the pump is to be piped to the coils of the heat exchanger allowing the engine fluid to be cooled as required. This unit will be controlled via a ¼ turn valve		
205. PUMP CONNECTIONS		
All suction and discharge lines (except pump manifolds) 1" and larger shall be heavy-duty stainless steel pipe. Where vibration or chassis flexing may damage or loosen piping or where a coupling is necessary for servicing, a flexible connection shall be furnished. All lines shall be drained by a master drain valve or a separate drain provided at the connection. All individual drain lines for discharges shall be extended with a 90 degree fitting in order to drain below the chassis frame. All water carrying gauge lines shall utilize nylon tubing		
206. TANK TO PUMP		
The booster tank shall be connected to the intake side of the pump with a check valve. The 3" tank to pump line shall run from a bottom sump into the 3" valve. To prevent damage due to chassis flexing or vibration, a short 3" flexible rubber hose coupling shall be used to connect the tank to the intake valve.		
207. VALVES		
All valves on the firefighting package shall be Akron unless otherwise stated. **NO EXCEPTIONS**		
208. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
209. VALVE ACTUATOR		
The valve shall be controlled by an Innovative Controls push/pull handle located at the operator's panel.		
210. TANK FILL		
A 1.5" tank fill shall be provided, using a quarter turn full flow ball valve controlled from the pump operator's panel.		
211. VALVE		

The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
212. VALVE ACTUATOR		
The valve shall be controlled by an Innovative Controls push/pull handle located at the operator's panel.		
213. PRESSURE GOVERNOR, MONITORING AND MASTER PRESSURE DISPLAY		
Fire Research InControl series TGA401 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring. The following continuous displays shall be provided: • Pump discharge; shown with four Daylight bright LED digits more than 1/2"high • Pump Intake; shown with four daylight bright LED digits more than 1/2" high • Pressure / RPM setting; shown on a dot matrix message display • Pressure and RPM operating mode LEDs • Throttle ready LED • Engine RPM; shown with four daylight bright LED digits more than 1/2" high • Check engine and stop engine warning LEDs • Oil pressure; shown on a dual color (green/red) LED bar graph display • Engine coolant temperature; shown on a dual color (green/red) LED bar graph display		

• Transmission Temperature: shown on a dual color (green/red) LED bar graph display • Battery voltage; shown on a dual color (green/red) LED bar graph display The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation. The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions: • High Battery Voltage • Low Battery Voltage(Engine Off) • Low Battery Voltage (Engine Running) • High Transmission Temperature • Low Engine Oil Pressure • High Engine Coolant Temperature • Out of Water (visual alarm only) • No Engine Response (visual alarm only) The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements. Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi. The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM		

mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle. The pressure governor, monitoring and master pressure display shall be programmed to interface with a Cummins engine.		
214. 6” PUMP INLETS SHORT		
A 6" diameter suction port with 6" NHT male threads shall be provided, on the both sides of vehicle. The inlet shall extend through the side pump panels and come complete with removable strainers 4” Storz couplings c/w 30 degree elbow and cap on both sides.		
215. HALE BUTTERFLY MAINSUCTION INTAKE VALVES – LEFT & RIGHT		
The left and right side main pump inlets shall be equipped with a full flow butterfly type Hale valve designed to mount on the fire pump between the suction tube extension and the suction tube behind the pump control panel		
A pressure relief valve shall be provide with a factory set of 125 psi and field adjustable from 75-250 psi. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed.		
The outlet of the pressure relief valve shall have a 2.5” NPT thread to allow directing the discharge flow away from the pump operator’s position. A permanent ID label shall be installed at the discharge pipe that reads “DO NOT CAP”.		
The valve will be provide with a panel placard indicating control operation. The placard shall have status lights to indicate whether the valve is open, closed or traveling from one position to the other.		
The valve shall be provided with a gear actuator that will cycle the valve from open to closed position in no less than three seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment.		
The 12 volt DC motor on the electric operated valve shall be provided with and automatic resetting, thermally compensated over current protection circuit breaker to protect the 12 volt DC motor and the apparatus electrical system. A manual over ride handle for emergency usage shall be provided adjacent to the intake valve(s) and the control switches shall be on the pump panel.		
216. 2.5" LEFT SIDE INLET		
A 2.5" gated inlet valve shall be provided on the left side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer. The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.		

217. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
218. VALVE ACTUATOR		
The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.		
219. INLET ADAPTER		
One (1) 2.5" NST male x 2.5" special thread chrome female swivel adapter with 2.5" special thread plug and chain shall be provided for the above inlet.		
220. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
221. 2.5" RIGHT SIDE INLET		
A 2.5" gated inlet valve shall be provided on the right side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer. The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.		
222. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
223. VALVE ACTUATOR		
The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.		
224. INLET ADAPTER		

One (1) 2.5” NST male x 2.5” special thread chrome female swivel adapter with 2.5” special thread plug and chain shall be provided for the above inlet.		
225. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
226. DISCHARGE #1 - LEFT		
The discharge in position #1 on the left side of the apparatus shall include the following features. • A 2.5" discharge shall be provided on the left side of the apparatus.		
227. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
228. VALVE ACTUATOR		
The valve shall be controlled by a rack and sector with an Innovative Controls push pull handle located at the operator’s panel.		
229. 2.5" PRESSURE GAUGE		
An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.		
230. DISCHARGE ADAPTER		
The discharge valve shall be equipped with a chrome plated 30° elbow. One (1) 2.5” NST female x 2.5” special thread male chrome plated adapter with 2.5” special thread chrome plated cap and chain shall be provided for the above discharge.		
231. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
232. DISCHARGE #2 - LEFT		
The discharge in position #2 on the left side of the apparatus shall include the following features. A 2.5" discharge shall be provided on the left side of the apparatus.		

233. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self- locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
234. VALVE ACTUATOR		
The valve shall be controlled by a rack and sector with an Innovative Controls push pull handle located at the operator's panel.		
235. 2.5" PRESSURE GAUGE		
An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.		
236. DISCHARGE ADAPTER		
The discharge valve shall be equipped with a chrome plated 30° elbow. One (1) 2.5" NST female x 2.5" special thread male chrome plated adapter with 2.5" special thread chrome plated cap and chain shall be provided for the above discharge.		
237. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
238. DISCHARGE #3 – RIGHT		
The discharge in position #3 on the right side of the apparatus shall include the following features. A 3" discharge shall be provided on the right side of the apparatus.		
239. VALVE, SLOW CLOSE		
The valve shall be an Akron slow close type Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10-year warranty covered by Akron Brass.		
240. VALVE ACTUATOR		

The valve shall be controlled by an Akron model 9323 electric controller located at the operator's panel. Valve position will be displayed on the LCD screen incorporated into the control head.		
241. 2.5" PRESSURE GAUGE		
An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.		
242. DISCHARGE ADAPTER		
The discharge valve shall be equipped with a chrome plated 30° elbow. One (1) 2.5" NST female x 2.5" special thread male chrome plated adapter with 2.5" special thread chrome plated cap and chain shall be provided for the above discharge.		
243. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
244. DISCHARGE #4 - RIGHT		
The discharge in position #4 on the right side of the apparatus shall include the following features. A 2.5" discharge shall be provided on the right side of the apparatus.		
245. VALVE		
The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
246. VALVE ACTUATOR		
The valve shall be controlled by an Innovative Controls push/pull handle located at the operator's panel.		
247. 2.5" PRESSURE GAUGE		
An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.		
248. DISCHARGE ADAPTER		
The discharge valve shall be equipped with a chrome plated 30° elbow. One (1) 2.5" NST female x 2.5" special thread male chrome		

plated adapter with 2.5” special thread chrome plated cap and chain shall be provided for the above discharge.		
249. THREAD TERMINATION		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
250. CROSSLAYS		
Three (3) crosslay hose beds shall be supplied as follows: • One crosslay with 2.5" piping and 2.5" swivel with the capacity of 200' of 2.5" hose. • Two crosslays with 2" piping and 1.5" swivel with the capacity of 200' of 1.75" hose each. • All crosslays shall be equipped with 2" valves. The valves shall be the "drop-out" style and controlled from the pump panel with electric actuators.		
251. VALVES		
The valves shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self- locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10- year warranty covered by Akron Brass.		
252. VALVE ACTUATORS		
The valves shall be controlled by an Akron model 9323 electric controller located at the operator’s panel. Valve position will be displayed on the LCD screen incorporated into the control head.		
253. 2.5" PRESSURE GAUGES		
An Innovative Controls liquid filled individual line pressure gauges shall be provided. The gauges shall be 2.5" in diameter with white faces and black lettering. The gauges shall have a pressure range of 0-400 psi.		
254. THREAD TERMINATIONS		
The above shall terminate to the thread requirements of the fire department. The purchaser shall specify the actual thread dimensions required during the pre-construction conference.		
255. DRAIN VALVES		
Each intake and discharge shall have its own ¼ turn drain valve located at the panel		
256. CROSSLAY COVER		

A vinyl crosslay cover shall be provided to enclose the top and Sides of the crosslays, capable of being secured at the top and sides.		
257. HOSE ROLLERS		
The crosslays shall be outfitted with stainless steel hose rollers. The rollers shall be on the right, left and bottom of the crosslay hose bed.		
258. MASTER PUMP DRAIN		
A multiport master drain valve shall be provided and plumbed to multiple locations on the main pump body. The valve assembly shall be clearly marked as the Master Drain.		
259. DRAIN VALVES LIFT UP STYLE		
Vertical lift up style, quarter turn style drain valves shall be provided for each suction inlet, or discharge outlet as specified. Each drain shall be clearly marked and color coded to match the corresponding suction of discharge.		
260. WATERWAY VALVE AND ACTUATOR		
The waterway valve shall be an Akron 4" electric valve. The valve shall be controlled by an Akron Navigator 9325 electric actuator located at the operator's panel. The actuator shall be connected to both a flow sensor and a pressure sensor. The actuator shall display pressure, flow, and valve position on a full color LDC display.		
261. WATERWAY DRAIN VALVE		
An Akron 1.5" waterway drain valve shall be provided and controlled with a push/pull handle.		
262. INTAKE AND DISCHARGE CAPS		
All intake and discharge lines with the exception of the 6" inlets and the crosslays will terminate with chrome ends and caps		
263. FOAM TANK		
There shall be a 30-gallon foam tank. The tank shall be part of the main booster tank. There shall be a 3" PVC fill tower and cap and a tank vent. There shall be a 1-1/2" flanged outlet and drain valve at the lowest point in the tank.		
264. CLASS A FOAM TANK GAUGE		
Fire Research TankVision Pro model WLA360-B00 tank remote indicator kit shall be installed. The kit shall include an electronic indicator module and a 10' remote cable. The indicator shall show the volume of foam in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.		

The remote indicator shall receive input information over a datalink from a Fire Research TankVision primary indicator model WLA260-A00, WLA360-A00 or WLA460-A00. It shall mirror the primary indicator. A 10' cable shall be provided to connect the datalink. The remote indicator shall have the same program as the primary so that the two indicators are interchangeable. Location of foam tank remote indicator shall be determined at the preconstruction meeting:		
265. FoamPro 3012 DETAILED SPECIFICATIONS		
The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, and discharge side foam proportioning system. The system shall be capable of handling current Class A and Class B foam concentrate. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flow meter(s), while also monitoring foam concentrate pump output. This compares values to ensure that the operator's preset is proportional to the amount of foam concentrate injected into the discharge side of the fire pump. All wetted components are to be made of corrosion resistant materials. To eliminate water flow restrictions, paddlewheel-type flow meter shall be installed in the manifold supplying discharges specified to be "foam capable." Flow meter shall provide maximum accuracy up to 2000 gpm and operate up to 2400 gpm. The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system: • Provide push-button control of foam proportioning rates from 0.1% to 10.0%, in 0.1% increments. • Show current flow-per-minute of water. • Show total volume of water discharged during and after foam operations are completed.		

• Show total amount of foam concentrate consumed. • Simulate flow rates for manual operation. • Perform setup and diagnostic functions for the computer control microprocessor. • Flash a “low concentrate” warning when the foam concentrate tank(s) runs low. • Flash a “non concentrate” warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty. A hydraulic motor driven positive displacement foam concentrate pump, rated at 12 gpm (45.4 L/min) with maximum operating pressure of 400 psi (27.6 BAR), shall be installed in a suitable accessible location. Pump shall include three plungers to maintain an even consistent flow across the full performance range. Pump vacuum characteristics allow off-board pick-up of foam. An electronically-operated valve shall receive signals from the computer control display to control the flow of hydraulic oil to the hydraulic motor coupled to the concentrate pump. The concentrate pump turns at a variable speed to ensure that the correct proportion of concentrate selected by the pump operator is injected into the fire pump discharge stream. Full flow check valve shall be provided to prevent foam contamination of fire pump and water tank or water contamination of foam tank. A hydraulic oil supply shall be provided that is capable of providing 2500 psi (172.4 BAR) of hydraulic oil at a minimum flow of 12 gpm (45.4 L/min). A separate hydraulic pump must be provided. The hydraulic system must comply with all applicable SAE and DOT standards. The hydraulic system shall contain an oil cooler and an appropriately sized hydraulic reservoir to maintain the temperature of the hydraulic oil at or below 180 degrees. An oil to air cooler mounted in front of the apparatus engine radiator will provide adequate cooling. Components of the complete proportioning system shall include: • Operator control/microprocessor and display. • Paddlewheel flow meter(s). • Triplex concentrate pump and motor driver. • Hydraulic motor. • Variable displacement hydraulic pump. • Wiring harnesses. • Low-level tank switch.		

• MultiFlo electronic module (if more than one flow meter is used) • Foam tank • Foam injection check valve. • Main waterway check valve. An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Dealer. The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards. Third party testing shall also certify compliance with RFI/EMI emissions per MIL-STD 461E. The following locations shall be foam capable: • All three crosslays • Tower waterway		
266. TRUCK MOUNTED FOAM TANK REFILL		
The system operates by attaching a suction hose to a pre-plumbed panel connection using a cam-lock fitting. The pick-up wand is then placed in the concentrate container. The operator simply pushes a button to engage the 12 or 24-volt pumping system, which automatically fills and stops when the tank is full. An indicator light notifies the operator that the operation is complete. Even though the system recognizes a full cell, the manual override feature will engage the concentrate pump momentarily, allowing the operator to fully empty the container. System is equipped with fresh water-flush capabilities and includes: • High-capacity concentrate pump • Continuous-duty 12 or 24-volt motor • Electronic microprocessor control • Flush valve • Indicator lights • Panel plates • Stainless fittings and cap • 1” concentrate pick-up wand • Check valves • 6’ of one inch hard suction hose with wand		
267. PUMP AND GAUGE PANELS		
Pump panels on both sides shall be easily removable. The gauge and control panels shall be two separate panels for ease of maintenance. There shall be one (1) removable access door as large		

as possible on the right side pump panel. This door shall have 1/4 turn latching mechanisms for easy removal. The pump controls and gauges shall be located at the left side of the apparatus and properly marked. The control panel shall be laid out in a user-friendly manner. All valve controls shall have the corresponding discharge gauge located immediately adjacent to control handle to allow operator to view the discharge pressure without searching the panel.		
268. PANEL FINISH		
The panels shall be constructed of brushed stainless steel for maximum protection against abrasion caused during normal use.		
269. ESCUTCHEON PLATES		
The pump panel shall be equipped with color-coded removable escutcheon plates around the suction and discharge valves.		
270. COLOR CODING		
Each discharge valve control, outlet, and corresponding line gauge shall be color-coded. The color-coding shall be (as applicable): • #1 Discharge – Orange • #2 Discharge – White • #3 Discharge – Green • #4 Discharge - Brown • #1 1 1/2”Pre-Connect – yellow Labelled Foam • #2 1 ½”Pre-Connect – Red Labelled Foam • #3 2 ½”Pre-Connect – Navy blue Labelled Foam • Left and Right 6” intakes - Burgundy • Aerial waterway – Silver Labelled Foam • Left and Right 2 ½” Inlets – Burgundy • Tank to Pump – Black • Tank Fill - Black • Master drain – Black All drain values shall correspond with colors		
271. PUMP MODULE FRAMEWORK		
The pump module framework shall be painted as specified by the customer at the pre-construction meeting. The paint finish shall be applied before the installation of any wiring, gauge lines, valve linkages, or operator’s panel. The paint shall be the same material used for the finished body and cab.		
272. PUMP FINISH		
The fire pump shall be painted as specified by the customer at the pre-construction meeting. The paint finish shall be applied before the installation of any wiring, gauge lines, valve linkages, or operator’s		

panel. The paint shall be the same material used for the finished body and cab.		
273. PLUMBING FINISH		
The plumbing shall be painted as specified by the customer at the pre-construction meeting. All fittings, pipe ends and valve ends shall be properly taped off prior to applying paint. The paint finish shall be applied before the installation of any wiring, gauge lines, valve linkages, or operator's panel. The paint shall be the same material used for the finished body and cab.		
274. PUMP PANEL LIGHTING, LED		
The driver's side pump panel controls and gauges shall be illuminated by a full width white TecNiq E41 LED light strip, controlled at the pump panel.		
275. PUMP PANEL LIGHTING LED		
A light shall be provided for the opposite side pump panel. The officer's side pump panel shall be illuminated by a full width white TecNiq E41 LED light strip, controlled at the pump panel.		
276. PUMP PANEL ILLUMINATION		
The driver's side pump panel illumination light shall be activated when the pump is engaged.		
277. PUMP ENGAGED LIGHT		
A green light shall be provided on the pump operator's panel that shall illuminate when pump is engaged.		
278. PUMP PANEL GAUGES AND CONTROLS		
The following gauges and controls shall be provided at the pump panel: •Two (2) certified laboratory test gauge outlets. •Pump primer control. •Master drain control and additional drains as needed. •Tank-fill and pump cooler valve controls. •Tank to pump valve control. •Pump capacity rating plate. •All discharge controls. •Two (2) master pump gauges. •Two master intake controls •Gauges on all 1-1/2" and larger discharge lines.		
279. PRIMING SYSTEM		
The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multi- stage, venturi based AirPrime System. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. A single panel mounted control will activate the priming pump and open the priming valve to the pump. The priming system shall have a five year warranty.		

280. (1) PRIMER BUTTON - MAIN SUCTION		
A single panel mounted control will activate the priming pump and open the priming valve to the pump.		
281. COMPRESSION FITTINGS ON AIR SYSTEM		
Compression style fittings shall be provided on air lines within the pump module.		
282. THERMAL RELIEF VALVE		
There shall be a Hale TRV-L Thermal Relief Valve supplied. The valve shall automatically dump a controlled amount of water to atmosphere when the pump water exceeds 120 degrees Fahrenheit. The valve shall re- set automatically. A light shall be provided at the pump panel, which will illuminate when the pump reaches 120 degrees Fahrenheit to warn the operator that the pump is automatically dumping.		
283. AIR HORN BUTTON		
A push button switch shall be provided on pump operator's panel to activate the air horns.		
284. 4" MASTER GAUGES		
Innovative Controls liquid filled pump pressure and vacuum gauges shall be provided. The gauges shall be 4" in diameter with white faces and black lettering. The gauges shall have a pressure range of 30"-0-400 psi.		
285. WATER TANK GAUGE		
Fire Research TankVision® model Pro 400 water tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof and manufactured of Polycarbonate/Nylon material. The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty. The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the water tank near the bottom; no probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.		

The gauge shall be located on the pump operator's panel.		
286. WATER TANK		
The tank shall be constructed of PT3™ polypropylene material by United Plastic Fabricating (UPF). This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1" as required. Internal baffles are generally 3/8" in thickness. The tank shall be of a specific configuration and shall be designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank shall be fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which		

allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware. There shall be one (1) sump constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor. There shall be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 G.P.M. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture. The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1". The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.		

The tank shall be completely removable without disturbing or dismantling the apparatus structure. The tank shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. The tank shall be delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. A center of gravity and weight calculation for both empty and full conditions shall be required with each tank. The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from UPF. In applications where the tank will be subject to severe conditions, the tank may have a warranty unique to the application that is clearly defined for each such application.		
287. WATER TANK SIZE		
The water tank shall have a capacity of 300 U.S. gallons.		
288. DRAIN IN TANK SUMP		
A 1.5" gate valve shall be provided in the tank sump, it shall be controlled at the pump panel.		
289. APPARATUS BODY		
All side metal, compartments and compartment floors shall be of bolted stainless steel. The body shall be assembled with heavy-duty stainless steel channel sills with bracing for extreme rigidity and mounted on a steel sub frame. The compartment body, pump housing and the engine compartment shall be separate modules (segmented body design) that are not to be fastened together in any manner in order to provide "flex joints" to alleviate stress and cracking of body compartments and running boards. Compartments shall extend from the front jacks to the tailgate of the apparatus and shall be recessed to the frame of the apparatus where possible. Compartments shall have sweep-out flooring (no obstructions on the floor bottom). Each compartment shall be properly vented with louvers.		

290. COMPARTMENTATION LEFT SIDE		
There shall be a compartment below the turntable as follows: • L1- Approximately 20-1/4" wide x 38-5/8" high x 20-1/4" deep There shall be two compartments above the rear wheels: • L2- Approximately 41-5/8" wide x 27-1/2" high x 12" deep. This compartment shall have a pan type lift up door equipped with "D" ring latch and gas door stay. • L3 - Approximately 58" wide x 27-1/2" high x 12" deep. This compartment shall have a pan type lift up door equipped with "D" ring latch and gas door stay. There shall be three compartments behind the rear wheels: • L4- Approximately 45-3/4" wide x 56-1/2" high x 26-1/2" deep. • L5 - Approximately 22" wide x 48-1/2" high x 26-1/2" deep. • L6 - Approximately 34-3/4" wide x 40-1/8" high x 26-1/2" deep.		
291. COMPARTMENTATION RIGHT SIDE		
There shall be a compartment below the turntable as follows: • R1- Approximately 40-1/4" wide x 38-5/8" high x 27-1/2". The lower portion shall be 10" deep. There shall be a 14" high x 17-1/2" deep x 40-1/4" wide notch in the lower rear portion of the compartment to accommodate the apparatus exhaust system. There shall be two compartments above the rear wheels: • R2 - Approximately 41-5/8" wide x 27-1/2" high x 26-1/2" deep. This compartment shall have a pan type lift up door equipped with "D" ring latch and gas door stay. • R3 - Approximately 58" wide x 27-1/2" high x 26-1/2" deep. This compartment shall have a pan type lift up door equipped with "D" ring latch and gas door stay. There shall be three compartments behind the rear wheels: • R4 - Approximately 45-3/4" wide x 56-1/2" high x 26-1/2" deep. • R5 - Approximately 45-3/4" wide x 56-1/2" high x 26-1/2" deep. • R6 - Approximately 34-3/4" wide x 40-1/8" high x 26-1/2" deep.		
292. AERIAL BODY SUBFRAME		
The chassis shall be fitted with a sub-frame system consisting of a series of stainless steel plate gusseted legs, extending down and out from the chassis frame rails on each side. This system will provide additional structural support to the running boards and side compartments. A heavy-duty rear platform shall be constructed of mild steel to support the rear compartments. The entire assembly will be attached to the chassis frame by a series of heavy-duty U-		

bolts. Self-supporting bodies will not be acceptable. **NO EXCEPTIONS.**		
293. COMPARTMENT INTERIOR - L1		
The L1 compartment on the left side of the apparatus shall include the following features: Turtle Tile interlock matting material shall be provided in the compartment.		
294. COMPARTMENT INTERIOR - L2		
The L2 compartment on the left side of the apparatus shall include the following features: • Turtle Tile interlock matting material shall be provided in the compartment. • One 120V receptacle hook into the shoreline power.		
295. COMPARTMENT INTERIOR - L3		
The L3 compartment on the left side of the apparatus shall include the following features: • Turtle Tile interlock matting material shall be provided in the compartment. • A 3/16" aluminum plate shall be provided in the compartment for mounting tools.		
296. COMPARTMENT INTERIOR - L4		
The L4 compartment on the left side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • There shall be a Slide-Master pullout drawer provided and installed. The drawer shall have a distributed load capacity of 600 lbs. and be capable of extending 100% of its depth. The tray shall be fabricated of .188" aluminum plate and have a formed lip that measures 2". • Turtle Tile interlock matting material shall be provided in the compartment.		
297. COMPARTMENT INTERIOR - L5		
The L5 compartment on the left side of the apparatus shall include the following features: • Turtle Tile interlock matting material shall be provided in the compartment.		
298. COMPARTMENT INTERIOR - L6		
The L6 compartment on the left side of the apparatus shall include the following features:		

• There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • There shall be a Slide-Master pullout drawer provided and installed. The drawer shall have a distributed load capacity of 600 lbs. and be capable of extending 100% of its depth. • The tray shall be fabricated of .188” aluminum plate and have a formed lip that measures 2". • Turtle Tile interlock matting material shall be provided in the compartment.		
299. COMPARTMENT INTERIOR - R1		
The R1 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate • Turtle Tile interlock matting material shall be provided in the compartment.		
300. COMPARTMENT INTERIOR - R2		
The R2 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • Turtle Tile interlock matting material shall be provided in the compartment. • One 120V receptacle hook into the shoreline power.		
301. COMPARTMENT INTERIOR - R3		
The R3 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • Turtle Tile interlock matting material shall be provided in the compartment.		
302. COMPARTMENT INTERIOR - R4		
The R4 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • There shall be a vertical divider/partition provided in a compartment as specified. The divider shall be constructed of		

.188" thick smooth aluminum plate. The top and bottom of the divider shall have a formed flange bolted to the interior of the compartment. • There shall be an adjustable vertical slide-out tool board with a 250 lb. capacity supplied and mounted on unistrut tracks. Extra compartment lights shall be provided and located as needed to properly illuminate the compartment. • Turtle Tile interlock matting material shall be provided in the compartment.		
303. COMPARTMENT INTERIOR - R5		
The R5 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • There shall be a Slide-Master pullout drawer provided and installed. The drawer shall have a distributed load capacity of 600 lbs. and be capable of extending 100% of its depth. The tray shall be fabricated of .188" aluminum plate and have a formed lip that measures 2". • Turtle Tile interlock matting material shall be provided in the compartment.		
304. COMPARTMENT INTERIOR - R6		
The R6 compartment on the right side of the apparatus shall include the following features: • There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate. • There shall be a Slide-Master pullout drawer provided and installed. The drawer shall have a distributed load capacity of 600 lbs. and be capable of extending 100% of its depth. The tray shall be fabricated of .188" aluminum plate and have a formed lip that measures 2". • Turtle Tile interlock matting material shall be provided in the compartment.		
305. COMPARTMENT INTERIOR - A1		
The A1 compartment on the rear of the apparatus shall include the following features: • There shall be a slide-out tray provided and installed in the rear compartment. The tray shall have a distributed load capacity of 500 lbs. utilizing UHMW slides and shall be capable of extending 75% of its depth. The tray shall be fabricated of .188" aluminum plate and measure		

approximately 85" deep x 24" wide with 8.75" sides and a 2.75" front lip. • Turtle Tile interlock matting material shall be provided in the compartment.		
306. COMPARTMENT LIGHTING		
Each compartment shall be equipped with two (2) white AMDOR LED light strips which shall provide a consistent pattern to illuminate to entire compartment.		
307. UNISTRUT		
Each compartment shall come equipped with 1.625" x .875" x .125" aluminum Unistrut channel. The Unistrut shall be securely fastened to the interior walls of the compartment.		
308. ROLL-UP COMPARTMENT DOORS		
Compartment doors R-1,R-4,R-5-R-6, L-4,L-5,L-6, shall be equipped with AMDOR™ brand roll-up doors, complete with the following features: •1" aluminum double wall slats with continuous ball & socket hinge joint designed to prevent water ingression and weather tight recessed dual durometer seals •double wall reinforced bottom panel with stainless steel lift bar latching system •bottom panel flange with cut-outs for ease of access with gloved hands •reusable slat shoes with positive snap-lock securement •smooth interior door curtain to prevent equipment hang-ups •one-piece aluminum door track / side frame •top gutter with non-marring seal •non-marring recessed side seals with UV stabilizers to prevent warping • dual leg bottom seal, with all wear component material to be Type 6 Nylon		
309. PAINTED ROLL-UP DOORS		
The doors shall be wet painted before assembly by the door manufacturer. The paint shall be the same as the apparatus to achieve an exact match of paint color and have the look and durability same as on the rest of the truck.		
310. HOSE BED COVER		
There shall be a red nylon/vinyl hose bed cover for the main hose bed. The cover shall be capable of being securely fastened at the front, sides and rear.		
311. HOSE BED		

The rear hose bed shall be completely wide open to allow for quick and easy loading and unloading of hose thus preventing hose and hose couplings from being caught or tangled. Rear opening of the rear hose bed shall be a minimum of 19" wide x 30" high x 150" deep and shall be no more than 44" from the ground. Any rear hose bed opening(s) requiring hose chutes shall not be acceptable. A side stacker hose bed is not acceptable. Hose bed flooring shall be removable slatted aluminum. The hose bed shall be illuminated via LED strip lighting, both sides the full length of the bed.		
312. BODY ELECTRIC SYSTEM MULTIPLEX		
All body electrical wiring in the chassis will be XLP cross link-insulated type. Wiring is to be color-coded and include function codes every three (3) inches. Wiring harnesses will be routed in protective, heat resistant loom, securely and neatly installed. All harnesses and power distribution modules will be electrically tested prior to installation to ensure the highest system reliability. The cab/chassis and the chassis/body connection points will be mounted in accessible locations. Complete chassis wiring schematics will be supplied with the apparatus. The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding 10% voltage drop across the circuit. The wiring shall be uniquely identified by color code or circuit function code, labeled at a minimum of every three (3) inches. The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable). All harnesses shall be covered with moisture resistant loom with a minimum rating of 300 Degrees Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable has a minimum rating of 289 degree Fahrenheit. All harnesses are securely installed in areas protected against heat, liquid contaminants and damage. The harness connections and terminations use a method that provides a positive mechanical and electrical connection and are in accordance to the device		

manufacturer's instructions. No connections within the harness utilize wire nut, insulation displacement, or insulation piercing. All circuits conform to SAE1292. All circuits are provided with low voltage over current protective devices. These devices are readily accessible and protected against heat in excess of component rating, mechanical damage, and water spray. Star washers are not used for ground connections.		
313. STEP LIGHTS		
The pump module running board area shall be illuminated by Whelen 2G 4" diameter LED lights mounted one each side on the front of the body in chrome flanges. LED strip lighting or individually mounted lights shall be provided at the rear of the body and at the turntable step to illuminate all stepping surfaces.		
314. BODY HANDRAILS		
Handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails, shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange. Sufficient space shall allow for a gloved hand to firmly grip the rail. The rails shall be located in the following areas: (Note: These are in addition to those previously mentioned in the cab section): • There shall be one (1) handrail at the side of the pedestal. • There shall be one (1) handrail located at the entrance to the aerial platform • There shall be two (2) handrails at the rear access ladder to the platform.		
315. STEPS		
There shall be up to three (3) Innovative Control fold-down steps with integrated step lights mounted on each side of the front face of body to provide access to the top of the pump module and compartments. The quantity and location of steps and handrails shall meet the Current NFPA 1901 pamphlet in effect at the time the apparatus is ordered.		
316. RUB RAILS		
The body shall be equipped with anodized aluminum channel style rub rails at the sides. Rub rails shall be spaced away from the body by 1/2" polymer spacers. The rub rails shall be polished to a bright finish.		

317. ALUMINUM TREADPLATE		
All load bearing aluminum tread plate running boards shall be .155 thick bright annealed with a serrated embossed finish. Running boards and rear step edges shall be flanged down for added strength. Running boards shall also be flanged up to form kick plates. All non-load bearing aluminum shall be .125" thick bright annealed finish. In areas where aluminum tread plate shall function as a load-bearing surface, there shall be a heavy steel sub-structure. This structure shall consist of 3" channel and 1-1/2" angle welded support. This shall assure that there shall be no flexing or cracking of running boards. The aluminum shall be insulated from the steel by closed cell foam body barrier material. Tread plate locations: • Skirting around front bumper. • The step at the cab entrance. • The jump seat steps. • The running boards. • The rear step. • The top of the compartments • The top of the turntable and the floor of the platform		
318. WHEEL LINERS		
Fiberglass fully radiused wheel well liners with adequate support to maintain their rigidity through adverse weather conditions shall be provided.		
319. SCBA CYLINDER COMPARTMENTS		
There shall be seven (7) spare breathing air cylinder compartments recessed in the rear fender wells, three (3) left and four (4) right. The compartments shall have brushed stainless doors with equipped with a weather resistant flush fitting thumb latch. The interior of the door shall incorporate a rubber seal to keep the compartment free of road debris and moisture. The interior compartment shall be constructed of a high- density polyethylene plastic.		
320. GROUND LADDERS		
The apparatus shall be equipped with 115’ of heavy duty, box type "I" beam rail, ground ladders. The ladders shall meet the requirements of NFPA 1931 to ensure proper design and that sufficient strength is available for the service intended. The ground ladders shall be constructed of aluminum with non-welded, field replaceable rung to rail connections to simplify field repairs. Removable plated steel butt spurs shall be utilized for added strength. A full 1/2", non-rotting, poly rope shall be provided for easy ladder operation. DUO SAFETY LADDERS • One (1) 10 ft. folding ladder, (mounted in fly section) • One (1) 14 ft. combination ladder		

• Two (2) 16 ft. roof ladders • One (1) 24 ft. 2-section extension ladder • One (1) 35 ft. 2-section extension ladder The ladders shall have lifetime Warranty against manufacturing defects.		
321. HOSEBED LADDER ENCLOSURE		
The ground ladders shall be stored within a weather resistant enclosed area on the officer's side of the hose bed area. The ladders shall be mounted on non-metallic slides so each ladder can be removed individually. All ladders shall be stored on beam if possible. A vertically hinged smooth aluminum doors shall enclose the hose bed and ladders on the rear.		
322. LICENSE PLATE BRACKETS		
A Cast Products LP0013 cast aluminum license plate bracket with LED light shall be provided at the rear of the apparatus. An isolated stainless steel piano hinge license plate holder shall be installed under the front bumper at the center point.		
323. BACK-UP ALARM		
An Ecco model SA917 automatic self-adjusting electronic back-up alarm producing 87-112 db shall be installed at the rear between the frame rails. It shall operate whenever the transmission's reverse gear is selected.		
324. STOP/TAIL/TURN/REVERSE LIGHTS		
The rear stop/tail/turn/reverse lights shall be Whelen 600 series lights installed in chrome plated PLAST3V triple housings one (1) each side on the rear of the apparatus body. The stop/tail lights shall be LED model 60BTT located in the top position of the housing. The amber arrow turn signals shall be LED model 60A00TAR located below the stop/tail lights. The reverse lights shall be LED model 60C00WCR (maximum intensity) located below the turn signals in the bottom position of the housing.		
325. LED ICC/MARKER LIGHTS		
LED type ICC/marker lights shall be provided to meet D.O.T. requirements.		
326. FLEXIBLE MARKER LIGHTS		
A Britax L427.200.L12V LED flexible marker light shall be mounted on the rear lower corners of the body, one each side.		
327. GROUND LIGHTING		
The apparatus shall be equipped with lighting capable of illumination to meet NFPA requirements. Lighting shall be provided at areas under the driver and crew riding area exits and shall be automatically activated when the exit doors are opened. The ground lights shall be		

Truck-lite® LED model #44042C. Lighting required in other areas such as work areas, steps and walkways shall be activated when the parking brake is applied, provided the ICC lights are on.		
328. ADDITIONAL WARNING LIGHT FLANGES		
Zone A (front) shall have a stainless steel warning light housing each side with (2) Whelen M6 Super LED red lights mounted in M6FC600 flange on the front of each housing. The inboard pair of lights is in addition to the minimum NFPA warning system and shall be wired through a load-shedding device.		
329. OPTICAL WARNING SYSTEM		
The optical warning system shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way and the other mode shall signal that the apparatus is stopped and is blocking the right-of-way. A momentary rocker switch shall be provided near the driver and labeled Master Emergency to energize all of the optical warning devices provided. A secondary momentary rocker switch shall be provided near the officer. All lights shall operate at not less than the minimum flash rate per minute as specified by NFPA.		
330. REAR WORK LIGHTS		
Two (2) Rigid Industries D2 Diffusion LED flood lights shall be provided. One (1) shall be mounted on each side on the upper rear of the apparatus body. The lights shall be activated by a switch inside the cab near the driver.		
331. UPPER LEVEL WARNING DEVICES		
The upper level shall be divided into zones A (front), B (officer's side), C (rear) and D (driver's side). Zone A (front) shall have one (1) Whelen Freedom IV 72" Model F4N7QLED light bar, with fourteen (14) LED modules. The light bar shall have two (2) end red LED modules, two (2) corner red LED modules, eight (8) forward-facing red LED modules and two (2) forward-facing white LED modules. The light bar shall have all clear outer lenses. The light bar shall be installed on the cab roof as far forward as possible with two (2) MK8H 5" cast aluminum risers. Zone B (officer's side) shall be covered by the module from the light bar and the rear beacon. Zone C (rear) shall have two (2) Whelen Model MCFLED2* Micro Freedom LED beacons installed one (1) each side on the upper rear of		

the apparatus. Each beacon shall feature two (2) rear-facing corner LED modules. Zone C (rear) shall have one (1) Whelen M6 Series model M6* Super LED warning light installed on the rear face of the aerial platform. Zone D (driver's side) shall be covered by the module from the light bar and the rear beacon.		
332. LOWER LEVEL WARNING DEVICES		
The lower level shall be divided into zones A (front), B (officer's side), C (rear) and D (driver's side). Zone A (front) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights. The lights shall be installed two (2) each side on the front of the cab in the warning light housings Zone B (officer's side) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights. The lights shall be installed one (1) near the front corner of the apparatus, one (1) under the turntable area, one (1) near the rear axle, and one (1) near the rear corner of the apparatus. Zone C (rear) shall have two (2) Whelen 600 series model 60*02F*R Super LED warning lights installed one (1) each side on the lower rear of the apparatus. Zone D (driver's side) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights. The lights shall be installed one (1) near the front corner of the apparatus, one (1) under the turntable area, one (1) near the rear axle, and one (1) near the rear corner of the apparatus.		
333. TRAFFIC ADVISOR		
One (1) Whelen TAL85 22" 2-piece LED traffic advisor shall be installed at the rear of the apparatus. The advisor shall have eight (8) amber LED light heads. The TACTL5 control head shall be mounted in a location specified by the fire department.		
334. SURFACE MOUNTED LED SCENE LIGHTS		
Two (2) Fire Research Spectra SPA260-Q20 surface mounted LED scene light shall be provided. The lamp head shall operate at 12 volts DC, draw 14 amps, and generate 20,000 lumens of light. The light shall be mounted (1) each side of the cab above the fixed center windows. Two (2) Fire Research Spectra SPA950-Q65 surface mounted LED scene light shall be installed (1) each side of the rear body with left and right		

switches above the driver. The lamp heads shall operate at 12 volts DC, draw 6 amps, and generate 5,000 lumens of light.		
335. BROW MOUNTED LED SCENE LIGHT		
One (1) FireTech 72" 3-piece FT-B-72-ML-3PKIT-* brow mounted LED scene lights shall be provided. The lamp head shall operate at 12 volts DC, draw 23.8 amps, and generate over 30,000 lumens of light. The light shall be mounted at the front brow of the cab and shall be controlled from a switch in the cab. All custom mounting brackets shall be supplied by OEM.		
336. GENERATOR		
The apparatus shall be equipped with a complete electrical power generation system. A Harrison hydraulic 10.0 KW generator model MAS – 16R/5A shall be provided and installed. The generator and wiring shall conform to present National Electric Codes as outlined in the National Fire Protection Association Standards. The output of the generator shall be controlled by an internal hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output. The generator shall be powered by a transmission power take off unit, through a hydraulic pump and motor. The generator shall be operable anytime that the apparatus engine is running and meeting the minimum range of 900 RPM's. • Height 14" • Width 24" • Depth 18" • Max kW 10.0 • Amps@120V 80 • Amps@240V 40 • Torque Required 82.9 • Maximum Pressure 2800 psi		
337. BREAKER BOX		
A circuit breaker box shall be provided with sixteen (16) spaces for breakers which shall be provided as needed. All wiring shall be installed in liquid tight conduit.		
338. BREAKER PANEL		
The breaker panel shall be located in the L2 Compartment and shall meet all requirements set forth by the National Electrical Code and NFPA guidelines.		
339. 120-VOLT OUTLETS		
Two (2) 120-volt outlets with weatherproof covers shall be installed (1) each of the body on the rear jack panels. All 120 volt wiring shall be installed in liquid tight conduit.		
340. CORD REEL		

There shall be a Hannay Model ECR1616-17-18/4 electric rewind, four (4)-conductor cable reel furnished and mounted in a compartment. The reel shall come complete with 150 feet of 10/4 Seoprene Water-resistant (SOW) yellow jacketed cable. A Hannay Type "C" roller assembly and HS-3 cable stop ball shall be provided.		
341. FOUR WAY RECEPTACLE		
An Akron (GFE) four-way receptacle box with light shall be provided and hard wired to the end of the cable. The box shall be securely mounted in the immediate area of the cord reel. The mounting shall be a fabricated aluminum bracket equipped with a Velcro strap to secure the box.		
342. SURFACE MOUNTED LED SCENE LIGHTS		
One (1) Fire Research Spectra SPA260-J20 surface mounted LED scene light shall be provided. The lamp head shall operate at 240 volts AC, draw 1 amp, and generate 20,000 lumens of light. The light shall be mounted on the front face of the aerial platform and shall be controlled from a switch inside the platform. One (1) Fire Research Spectra SPA260-J20 surface mounted LED scene light shall be provided. The lamp head shall operate at 240 volts AC, draw 1 amp, and generate 20,000 lumens of light. The light shall be mounted under the aerial platform and shall be controlled from a switch inside the platform.		
343. TELESCOPIC LED SCENE LIGHT		
Two (2) Fire Research Spectra SPA546-J20-C-ON telescopic LED scene lights shall be provided. The lamp heads shall operate at 240 volts AC, draw 1 amp, and generate 20,000 lumens of light. The lights shall be installed on the side of the turntable and shall be controlled from a switch located on each lamp head. Two (2) Fire Research Spectra SPA547-J20-ON telescopic LED scene lights shall be provided. The lamp heads shall operate at 240 volts AC, draw 1 amp, and generate 20,000 lumens of light. The lights shall be installed on the rear of the aerial platform and shall be controlled from a switch located on each lamp head.		
344. MID-MOUNT AERIAL		
The apparatus shall be a mid-mount configuration **NO EXCEPTIONS**		
345. AERIAL LOWER MAIN FRAME ASSEMBLY		
The mainframe assembly shall be mounted mid-ship on the chassis, forward of the pump and over the transmission. This shall leave the rear hose bed open for use of large diameter and regular fire hose. An open tube or angle substructure for the mainframe assembly shall not be acceptable.		

The main frame assembly base plate, located at the top of the assembly which supports and holds the turntable rotation bearing, will be a minimum 1" steel measuring 54" x 43". There shall be a minimum of two steel tension and compression bars mounted underneath, fore and aft, of the main frame assembly which shall tie the aerial and chassis together. The bars shall function to withstand vertical torsional loads. The forward tension and compression bar shall be attached from the rear area of the front spring suspension hanger to the underside area of the mainframe assembly. The rear tension and compression bar shall be attached from the forward area of the rear spring suspension hanger to the underside area of the mainframe assembly.		
346. TURNTABLE BEARING		
The turntable bearing shall be constructed of steel. There shall be a minimum of 36 drilled and tapped holes in the turntable bearing. The diameter of the turntable bearing shall be a minimum of 47". The turntable bearing shall be able to rotate 360 degrees in either direction on a one inch thick steel plate. The turntable bearing shall be bolted to the top of the main frame assembly using a minimum of 36 Grade 8 bolts.		
347. UPPER TURNTABLE		
The turntable shall be a minimum of one-inch thick plate and ninety-six (96) inches in diameter. The side plates to which the main base section of the aerial ladder is connected shall have a minimum height of four feet and shall include I-beam gussets of approximately fifty inches in length that tolerate the side thrust and tremendous forces to which the unit would be subjected. The turntable shall be bolted to the turntable bearing using a minimum of 36 Grade 8 bolts. The turntable shall be equipped with two removable aluminum sections for access into the pump. The turntable side plates shall be positioned at a 45-degree angle (opposite the angle of the raise/lower cylinders) to act as a partial counter balance weight on the opposite side of the truck from the ladder extension. The turntable shall be equipped with a rotating mechanism consisting of two hydraulically powered, planetary gear boxes that shall handle torque loads imposed by water hammer and hose breakage. The rotating mechanism shall give the turntable and boom built in coast		

as an added safety precaution to avoid lateral boom side-to-side deflection (reactionary whipping effect) caused by the boom being stopped suddenly. A parking brake system shall be provided that is capable of holding the turntable in a stationary position regardless of the angle or extension of the aerial, while carrying the manufacturer's rated load capacity with the waterway in operation and discharging water at the tip of the aerial fly section. An override shall be provided to release the parking brake when operating with the emergency auxiliary power unit. The power operated turntable shall provide continuous rotating of the aerial structure clockwise or counter clockwise, thus enabling the structure to be positioned in any segment through 360 degrees. The rotating mechanism shall also provide sufficient power to rotate the aerial sections in any direction at any angle, fully extended, while carrying the manufacturer's rated load capacity with the waterway in operation and discharging water at the tip of the aerial fly section. Provisions shall be made for emergency operation of the rotation system should loss of engine power occur. This shall be done through an auxiliary power unit that is capable of providing hydraulic power to safely rotate the aerial. There shall be one heavy-duty steel pivot shaft that shall attach the base section of the boom (at the top and very back) to the top portion of the turntable side plates. The minimum steel shaft measurement shall be 34" long, 4" diameter with 1" wall thickness. Turntables using two separate attachments to hold and position the ladder in place shall not be acceptable. The complete rotation system shall have built in relief to prevent damage from rotating the boom into buildings or from overloaded water streams. Suitable indicators, clearly visible at all times, shall be provided to facilitate correct alignment of the turntable with the bed of the boom. An automatic light shall be used to show correct alignment for bedding of the ladder from the turntable control station and the platform station.		
348. LEFT LOWER TURNTABLE ACCESS LADDER		
There shall be fixed steps located on the left side of the apparatus to access the turntable pedestal. The ladder shall be constructed of 1.25" heavy-wall aluminum tubing, and .25" diamond plate with a non-skid footing surface. Each step shall be 7" deep x 19.5" wide.		

349. LOWER FOLDING STEP		
There shall be an additional folding step located under the fixed steps on the left side of the apparatus to access the turntable pedestal. The step shall be 7" deep x 19.5" wide made of .25" thick diamond plate with a non-skid footing surface.		
350. LEFT UPPER TURNTABLE ACCESS LADDER		
A ladder shall be provided on the upper left side turntable to allow easy access to the climbing ladder. The ladder shall be constructed from heavy wall, knurled aluminum tubing 1.25" in diameter. A large treadplate step with a Gripstrut insert shall be located at the top to act as a landing. The entire assembly shall be securely bolted to the upper turntable side plate.		
351. RIGHT UPPER TURNTABLE ACCESS FOLDING STEPS		
A ladder shall be provided on the upper left side turntable to allow easy access to the climbing ladder. The ladder shall be constructed from heavy wall, knurled aluminum tubing 1.25" in diameter. A large tread plate step with a Gripstrut insert shall be located at the top to act as a landing. The entire assembly shall be securely bolted to the upper turntable side plate.		
352. INTERLOCK		
An interlock shall be provided that prevents operation of the aerial device until the chassis spring brakes have been set and the transmission has been placed in neutral or the transmission is in the drive position with the driveline to the rear axle disengaged. An interlock shall be provided that allows operation of the engine speed control only after the chassis spring brakes have been set and the transmission is in neutral. An interlock system shall be provided to prevent the lifting of the aerial device from the travel position until all the stabilizers are in a configuration to meet the stability requirements. The interlock system shall also prevent the moving of the stabilizers unless the aerial device is in the travel position.		
353. ROTATION LIMITING SYSTEM		
An aerial rotation limiting system shall be provided to notify and prevent the operator from rotating the aerial into a restricted position due to a "short-set" outrigger configuration. The system shall enable the operator to place the aerial in a 180-degree rotation to the opposite side of the apparatus than that of the "short-set" outriggers only.		

The aerial shall automatically slow down when it approaches the limit of rotation travel. The system shall be capable of rotating the aerial two degrees past the centerline of the apparatus on the "short-set" side to enable bedding of the aerial within the travel support structure without system cutout. Audible warning alarms and LED indicators shall be provided to warn the operator they have reached the rotation limit and can also be used to assist with set-up and troubleshooting of the system.		
354. SMART BOOM WARNING SYSTEM		
This system shall warn both audibly and visually of impending contact with either the cab or the body of the truck. When in an area of impending contact, the system shall shift the aerial controls into a reduced speed "creep mode" but shall not limit travel of the aerial. Both rotation interlock and the smart boom warning system shall display information on a visual LED information center mounted at the turntable control pedestal and in the platform.		
355. ROTATION LIMITING ALARM		
A Floyd Bell US-09-515-S audible warning alarm and LED indicators shall be provided to warn the operator they have reached the rotation limit and can also be used to assist with set-up and troubleshooting of the system.		
356. HYDRAULIC SYSTEM		
A flange mounted 30 GPM hydraulic pump shall be driven by a power take off unit that is connected to the chassis transmission to provide the power required for operating the aerial. The hydraulic system shall have a minimum hydraulic reservoir for 65 gallons of special hydraulic fluid. The hydraulic reservoir shall be located at the left side of the lower mainframe assembly. The hydraulic fluid must be discharged through a fine mesh stainless steel strainer. Within the system, pilot operated check valves shall be incorporated so that all valves hold in their respective function(s). A ten (10) micron return filter of 40 gpm capacity, with replaceable cartridge, shall be provided. The hydraulic system shall also incorporate automatic by-passes to compensate in the event the boom is forced into a building or the operator accidentally moving the control valve in the opposite direction while at full speed.		

The hydraulic system shall provide coast in the lift cylinders to prevent the outrigger jack system from coming off the ground. This shall be accomplished through programmable platform controls that limit the acceleration and deceleration of the boom. Intercooling of the hydraulic oil shall be accomplished through a built in heat exchanger to cool oil at all times. All hydraulic lines shall be of the double braided type, with synthetic cover, rated at 12,000-psi burst pressure or above. A PTO hour meter shall be provided to record the time when the aerial hydraulic system is engaged.		
357. AUXILIARY HYDRAULIC POWER		
A 12-volt auxiliary pump shall be provided to supply emergency power to the hydraulic system. This system shall be operated off the truck batteries and provide limited but adequate power to operate the boom and outrigger jacks under emergency conditions.		
358. CONTROL PEDESTAL		
There shall be an aerial control pedestal located on the left side of the turntable. The control station shall encompass three electric over hydraulic proportional lever type controllers for raising/lowering, extending/retracting, and rotating the aerial device. The control valves shall be a proportional type to allow feathering characteristics during any operation. The turntable pedestal controls shall have manual overrides within the console useable through an access door. The lower pedestal controls shall cancel the platform controls under all conditions. The pedestal shall have removable panels for access to the hydraulic lines, valves and electrical wiring. There shall also be a hinged cover at the top of the control station for additional access. A safety guardrail shall be provided at the turntable pedestal control station to prevent the operator from falling. The lower pedestal controls shall completely override the platform controls under all conditions and shall be grouped in a convenient manner and properly illuminated for nighttime operation. Each pedestal hydraulic control shall be equipped with electro-magnetic solenoids, which shall operate the hydraulic valves corresponding to the electrical controls mounted in the platform for aerial boom operation. The lower pedestal control station shall be situated so the operator can easily observe the platform while operating the controls.		

The following additional items shall be mounted at the top of the turntable pedestal control station: • Automatic panel light to illuminate controls for nighttime operation • On/Off control switch for boom lights (one light mounted on each side of the boom) • Three-way switching with the Platform for optional ladder lighting • Three-way switching with the Platform or on/off control switch for other optional lighting • Three-way switching with the Platform for the rear bucket scene light • On/Off control foot switch for high speed control of the hydraulic system • Three-way switching with the Platform for "creep mode" for aerial control functions and indicator LED • Illuminated emergency push button to deactivate the platform controls with the turntable electric controls remaining operable. • Low breathing air system pressure warning LED indicator • Pedestal control power LED indicator • Platform control power Led indicator • Intercom communication system • Tag displaying functions for each pedestal boom operation • Tag displaying rated load capacity for the platform • LED indicators for cab and body damage (crush zones), jacks status, rungs aligned, tower aligned, rotation interlock, light tower (if truck is equipped with a light tower) • Audible alarm for cab or body damage (crush zones), rotation interlock stop (when short-jacked) and low breathing air Interlock override button		
359. INCLINOMETER		
An illuminated inclinometer shall be provided and mounted in plain view of the pedestal operator location		
360. BOOM ASSEMBLY		
An elevated platform of the telescopic design consisting of a minimum of five sections shall be provided. The five sections produce a compact retracted length, allowing the platform to be positioned in tight or confined spaces at lower degrees of elevation. All sections shall be of the lightweight open lattice, non-		

crossing enclosed box design of truss type construction to obtain optimal stability at full horizontal reach. The telescoping sections shall be constructed from heat-treated 6061-T6 aluminum alloy material fastened by Aircraft type Huck bolts. There shall be no welding on the boom so as not to lower the yield strength of the material and cause torsional fracture, grain distortions and unequal conductivity. There shall be a minimum of 500 Aircraft type Huck bolts per section of boom. The base section of the boom shall have a section modulus of 468 $in.^3$ and a resisting bending moment of 16,000,000 in. lb. The base section shall also consist of two heavy-duty steel side plates; one mounted each side of the boom. The steel side plates shall be Huck bolted into place and shall function to tie the boom, turntable, and lift cylinders together. There shall be trailing beams attached to the side plates that shall function to position and anchor lift cylinders into place and to distribute shock loads imposed by water hammer or hose breakage. The boom shall be left in a natural aluminum finish. Painting the boom shall not be acceptable. The boom shall have the capability to shed ice buildup during freezing conditions.		
361. AERIAL BOOM SAFETY FACTOR		
The manufacture will state the safety factor Aerial boom, platform, all components and how it is achieved.		
362. AERIAL SPOT LIGHTS		
Two (2) FireTech LED spot lights shall be provided. One (1) shall be mounted on each side of the aerial base section to illuminate the aerial device for night time operation. The lights shall be activated by a switch at the pedestal.		
363. AERIAL PLATFORM DEVICE		
An aerial platform device with a minimum 100-foot vertical reach shall be provided. The height dimension shall be calculated with the boom at 80 degrees. The horizontal reach of the device shall not be less than 89 feet. The overall height of the apparatus with the aerial device in the bedded positions shall be no more than 11 feet, 6 inches and the overall length of vehicle shall be not more than 45 feet, 9-3/4 inches.		
364. CLIMBING LADDER		

A NFPA compliant climbing ladder with stowable high handrails shall be provided for an escape way and accessibility to and from the platform. Each section of the ladder shall be attached to a specific boom section allowing the ladder to extend automatically at the same rate as the boom. The climbing area shall be free of cables, waterway and extension cylinders. The ladder climbing area shall be an escape way free of all obstacles.		
365. LOAD CAPACITIES		
The following load capacities shall be established with the stabilizers at full horizontal extension and placed in the down position. Capacities shall be based upon full extension and 360 degree rotation. **35 MPH WIND CONDITION (DRY)** The aerial platform shall have a rated capacity of 1000 pounds at any elevation or extension. This condition shall be with “NO WATER” flowing or in the waterway. **35 MPH WIND CONDITION (WET)** The aerial platform shall have a rated capacity of 500 pounds at any elevation or extension. This condition shall be “WITH WATER” flowing or in the waterway.		
366. LADDER LIGHTING SYSTEM		
The climbing ladder shall be illuminated by FireTech FT-WL-2000-S-B 12V LED lights. The lights shall be spaced along the length of the boom to provide even lighting. The lights shall be activated by one (1) switch at the turntable pedestal and one (1) switch inside the platform.		
367. LIFTING CYLINDERS		
The raising and lowering mechanism shall consist of two hydraulic cylinders approximately 7" in diameter. The cylinders shall be attached to the boom assembly in a manner that requires only 50% of the lifting force. The cylinders shall be capable of lifting the full rated load of 1000 lb. with the boom at full horizontal extension with less than 1500 psi. hydraulic pressure. The power operated raising and lowering cylinders shall provide movement of the ladder and platforms rapidly and smoothly without undue sway or vibration. A positive locking device shall be provided so the desired angle of elevation can be maintained indefinitely without dependence upon engine power.		

As a safeguard feature, the lifting system shall be structurally and hydraulically designed and mounted to prevent rapid descent (lowering) of the aerial unit in the event of detachment, failure or hydraulic hose break. In the event of failure of any raising mechanism during operation, the gravity descent of the ladder shall be kept at a speed, which shall prevent damage to the equipment or danger to personnel. Provisions shall be made to prevent damage at full raise and lowering. There shall be a pilot controlled check valve on each cylinder.		
368. EXTENSION AND RETRACTION		
The boom and platform shall be extended by dual hydraulic rams mounted midway between the upper and lower main rails of the base section. The cylinders shall be mounted at the ends of the base section and supported through the middle to accommodate the load stress(s) of the boom. The hydraulic cylinders shall extend the second section so that both cylinders hydraulically equalize and provide the additional safety feature of a double extension system. The extension/retraction cylinder shaft size shall be a minimum of 3" in diameter. Each cylinder rod shall have a tubular design to save weight. The third, fourth, and fifth sections shall be connected to the second section of the boom by dual aircraft cables. This design feature shall eliminate the extra weight of hydraulic cylinders on the outer sections when extended to the side of the apparatus. The design shall be such that the operating hydraulic pressures of the main system shall be 2,000 psi or less. Once again, as a safeguard feature, the system shall be structurally and hydraulically designed and mounted to prevent rapid descent (retraction) of the aerial unit should a detachment, failure or hydraulic hose break. All sections of the boom shall extend and retract (slide) on special polymer slide blocks. Each slide block shall be bolted into place and shall be removable for inspection and maintenance. There shall be minimum of 44 slide blocks throughout the five sections of the boom for proper alignment and stability.		
369. WATER SYSTEM TO THE PLATFORM		
Water shall be supplied through a machine honed and fitted telescopic waterway constructed of high tensile aluminum. The waterway sections shall be provided with special pack gland type seals for minimum maintenance and the seals shall be located on the inside of		

the telescoping waterway. Waterway seals located on the outside of the waterway shall not be acceptable due to the decreased life expectancy caused by foreign particles and bad weather conditions damaging seals. The waterway shall be completely enclosed by the boom sections with supports for the end of each waterway section. This shall leave the bottom side of each boom section completely free extension/retraction cylinders, waterway supply line and waterway supports, hydraulic lines and nozzle(s) from possible damage due to the boom accidentally hitting against roof cornice or other types of constructions. The water supply line shall come directly off the main pump discharge manifold and shall be piped through smooth high pressure piping without the use of 90 degree chicksan joints, to reduce friction loss. A full flow ball valve to eliminate any possibility of water hammer on the waterway shall control the water flow. The water shall be passed through a special 4" passage-rotating swivel designed to also provide hydraulic passages and electrical circuits to the turntable. A 1.5” waterway drain valve shall be provided, and controlled from the pump operator’s panel. Waterway piping immediately above the hydraulic swivel shall have one 90 degree elbow connected to a straight pipe attached to a reinforced smooth bore hose. There shall be no chicksan swivels or multiple bends or twists of the waterway pipe immediately above the hydraulic swivel, which would increase friction loss. The waterway diameter at the base section of the boom shall have a minimum inside diameter of 3-1/4" and shall finish in the fifth section of the boom with a minimum inside diameter of 5-1/4". This shall be done in order to decrease the friction loss as much as possible while increasing the water flow. The waterway and platform nozzles shall have the capability of flowing 2,000 gallons per minute. **NO EXCEPTION** Two (2) automatic relief valves, at the top and the bottom of the waterway, shall be provided in to eliminate any damage to the waterway by pressure shock or retracting the boom with the drain valve closed.		
370. OUTRIGGER GROUND JACKS		
The outrigger control station shall be located in the L1 compartment. An indicator panel to aid setup of the ground jacks is located next to the L1 compartment. The single outrigger control station shall		

control all outrigger operations allowing for a one-person operation and quick set-up. Individual manual control valves shall be supplied for each mode of outrigger operation. There shall be a plaque located next to each control displaying the function. A two position hydraulic transfer valve (diverter valve) shall be installed to direct hydraulic power to either the outrigger operations or the boom operations to prevent operation of both circuits at the same time. Fluid capacity plate for all lubricants and filter part numbers shall be provided. There shall be four other controls located at the outrigger control station: • Aerial interlock override push button control to allow the boom to be raised from the nested position if an outrigger is "short-set" • Auxiliary hydraulic motor push button control • High speed push button control for the hydraulic system • Upper power/hydraulic transfer switch that turns control power on/off to the pedestal and platform. The switch also permits hydraulic fluid flow to the pedestal control valves. The mid-ship mounted outrigger jack rams shall have a minimum bore and stroke of 5"x 23". Outriggers that employ exposed hydraulic lines shall not be acceptable. The extendable outrigger stabilizers, when fully extended, shall have a spread of 20 feet. The stabilizer sections shall have a minimum overlap of 43" for safety and stability. The stabilizers shall be operated independently or simultaneously and may be positioned to accommodate obstructions such as curbs, pavement depressions, parked vehicles, or any other hindrance. The extendable portion of the outrigger stabilizers and the support in the mainframe shall be constructed of reinforced structural tubing, Type A500 Grade B or equivalent. Poly wear pads shall be installed between inner and outer tubes. The extendable portion of the outrigger shall ride on UHMW (ultra-high molecular weight) slide blocks.		

There shall be two rear jacks located directly behind the rear tandem axle area, one each side of the vehicle, designed to extend straight down to take the weight off the rear suspension system. This shall enable the vehicle to be set up in tight or confining spaces with cars, additional fire apparatus, or other obstructions nearby. Any beam or contributing structural member, through which the jacks supports the weight of the boom (aerial sections), or any position of the apparatus plus the live loads peculiar to firefighting operations, shall be of ample strength to carry these loads without evidence of stress, bending, twisting or other failure(s). Pilot operated check valves shall be incorporated on each jack cylinder and manual pin locks shall be provided for each main outrigger jack, for additional safety. There shall be an audible alarm and warning light that are automatically activated when the outriggers are being deployed.		
371. AERIAL JACKS ALARM		
An Ecco DT500 alarm shall be audible when the aerial jacks have been deployed either in the short jack mode or in fully deployed operations.		
372. OUTRIGGER DISPLAY PANEL COVER		
The outrigger position display panel cover shall be made of stainless steel and be hinged at the bottom to allow access to the position indicators and the outrigger for service. The panel shall be sealed to not allow water in the locked position. It shall be secured in place with two (2) latches in the upper corners.		
373. OFFICER'S SIDE OUTRIGGER COMPARTMENT		
A compartment shall be located between the officer's side outrigger and the pump panel. The opening shall have four rollers to allow easy deployment of the cord from the reel and be covered with a stainless steel single hinged door with push button locks.		
374. OUTRIGGER PADS		
There shall be two (2) jack pads attached to the main outriggers, and shall also be removable. They shall be made of black high-density polyethylene material.		
375. OPERATIONAL TEST		
After starting the engine, setting the jacks and transmitting power to the platform, a complete cycle of the platform operation shall be carried out as follows: With one person operating the machine from the platform control station, raise the platform from horizontal, rotate through a 90 degree turn and extend to full specified height. This shall be completed in less than 150 seconds, smoothly and without vibration. The platform shall then be retracted and lowered to its starting position after which a thorough inspection shall be		

made of all moving parts with special attention given to the platform leveling system. This test shall be repeated employing the controls at the lower pedestal control station. The effectiveness of the lower control override shall be demonstrated.		
376. AERIAL DEVICE CERTIFICATION		
The ladder shall be tested and certified by Underwriter's Laboratories.		
377. PLATFORM AND EQUIPMENT		
The platform shall be constructed of heat reflecting reinforced aluminum to protect occupants against flash fires and freezing weather. The platform shall have a minimum floor area of 19.5 sq. ft. and shall be provided with closed sides, 42" high all around. The platform shall be completely enclosed along the floorboard to protect occupants. There shall be four doors in the platform, two in the front and two in the rear, each of which shall be provided with a suitable safety latch. All doors shall latch and open inward to avoid accidentally falling from the platform. A total of four (4) anchor points shall be provided within the platform for the attachment of safety harnesses. A slip-resistant front access step shall be provided, full width of the platform, approximately 8-1/2" wide. The front corners shall be chamfered for accessibility to parapets and roofs. Drain openings shall be provided to prevent water accumulation in the platform. The platform-supporting member shall be a welded steel fabrication in the form of a yoke. The yoke supporting tube shall be bolted to the fly section of the boom. The platform shall be attached to the yoke supporting tube through two swivel points, one each side, above center. The position of the supporting yoke tube shall enable the platform to reach over roof cornices and other obstructions and position the platform directly on top of the roof without damaging the platform undercarriage, waterway supply line, hydraulic lines or boom sections. A platform leveling system shall be provided and so designed that the platform together with its rated load shall be supported and maintained level in relation to the turntable regardless of the position of the boom or sections. This shall include dual hydraulic cylinders on each side of the platform (four cylinders total) and a self-contained		

hydraulic leveling system (fully enclosed) in the end of the boom so that no hydraulic lines, reel or base controls have to travel through the telescoping sections, helping to eliminate service problems or failure of the leveling system due to ruptured lines or leaking reels. The platform pivots shall be mounted above center (characteristic of a ferris-wheel suspension) to prevent dumping the platform should a malfunction of the leveling system occur. As a safety feature, should a malfunction occur, there shall be an emergency manual override control to level the platform.		
378. PLATFORM BOOM OR SECTION BED LOCK		
An interlock system shall be provided which shall prevent action and movement of the retracted elevating platform boom or sections in their bed until the ground jacks are placed in position to stabilize the vehicle.		
379. LOAD LIMITATIONS		
Load instruction plates shall be located at the turntable pedestal control station and the platform control station indicating the safe load of the platform. The platform shall carry the rated load capacity indicated in the following manner: raise, extend, rotate, retract and lower without exceeding the hydraulic pressures prescribed by the manufacturer. Extensions, retraction, and elevation functions can be operated simultaneously. **THE PLATFORM SHALL BE CAPABLE OF CARRYING ITS RATED LOAD SAFELY IN ANY POSITION OF OPERATION ACCORDING TO NFPA #1901.**		
380. COMPARTMENT DOOR SKINS		
Exterior compartment door L-1, L-2,L-3,R-2,R-3 and the hose bed and ground ladders compartment doors shall be covered with smooth aluminum painted panel shall c/w stainless steel hinge and be attached with isolated stainless bolts. The doors with have stainless steel D-ring latches. Door A-1 shall be covered with diamond plate material.		
381. PLATFORM ACCESS LADDER		
There shall be an aluminum tread plate access ladder furnished near the rear of the body, on the left side, to access the platform. The ladder shall be furnished with a drop down aluminum step to allow easy access when the vehicle is set-up on the outriggers. Each step will be illuminated for night operation.		
382. PLATFORM CONTROLS FOR BOOM OPERATION		
The platform control station shall be on the forward wall of the platform, centered for ease in operator viewing while operating the platform. The three controls shall control the functions of raising and lowering, extension and retraction and rotation of the aerial. The		

placement of the controls shall conform to NFPA. The controls shall be of the electronic type. This system shall provide diagnostic functions to aid in trouble shooting as well as programmable features to control speed, acceleration and deceleration. The controls shall be lighted for nighttime operation. All electrical connections to the control panel shall be made through waterproof connections and be easily removed or replaced for service. The following additional items shall be located at the platform control station: • On/off control switch for light to illuminate controls for nighttime operation. • Foot operated switch for high-speed control of the hydraulic system. • A button to activate “creep mode” of the aerial operation. • Slave intercom station allowing "hands free" operation of the intercom. • A “rungs aligned for climbing” for all high-handrail aerial ladder platforms. • On/Off control for Platform Control Power • Three-way switching with the Pedestal for optional ladder lighting • Three-way switching with the Pedestal or on/off control switch for other optional lighting • Three-way switching with the Pedestal for the rear bucket scene light • On/Off control foot switch for high speed control of the hydraulic system • Three-way switching with the Platform for “creep mode” for aerial control functions and indicator LED • Low breathing air system pressure warning LED indicator • LED indicators for cab and body damage (crush zones),), jacks status, rungs aligned, tower aligned, rotation interlock, light tower (if truck is equipped with a light tower) • Audible alarm for cab or body damage (crush zones), rotation interlock stop (when short-jacked) and low breathing air		
383. INCLINOMETER		
An illuminated inclinometer shall be provided and mounted in plain view of the aerial platform operator.		
384. PLATFORM CONTROL COVER		

A diamond plate cover shall be provided over the control panel in the aerial platform. The cover shall be secured with a hinge at the top and latched at the bottom.		
385. LIGHT GUIDE RODS		
An amber light guide rod shall be provided, one each side of yoke.		
386. 120 VOLT CIRCUIT TO PLATFORM		
One (1) 15 amp electrical circuit utilizing 12 gauge 3 conductor electric cable shall be provided to the tip of the ladder. The circuit shall be wired from an enclosed terminal strip below the turntable through the collector ring assembly. One (1) (NEMA-L5-20) female, three-prong, twist lock receptacle, with environmental cover, shall be located below the aerial platform controls.		
387. WATER CURTAIN		
A water spray system shall be provided beneath the platform and controlled by a hand operated valve inside the platform. The spray system shall provide 75 GPM of water in a 25 ft. diameter water curtain below the platform. As a safety factor, one or both turret nozzles may be directed straight down for large volumes of water directly below.		
388. AUXILIARY YOKE OUTLETS		
Directly behind each turret a 2-1/2" BAT outlet, reduced to an 1-1/2" NPSH thread with cap and chain, shall be provided as auxiliary outlets with gate valves near the platform. A hose carrier for 50 ft. 1-1/2" hose shall be provided in the platform.		
389. DRIVERS SIDE PLATFORM MONITOR		
The driver's side platform monitor shall be an Akron Stream Master2 style 3480. The monitor shall be constructed of lightweight Pyrolite® and have a flow capacity of 2000 GPM. The monitor shall be directly attached to the platform supporting yoke with a 4" manually operated butterfly valve to control the flow of water. The monitor shall have a 4" flange with a 2.5" outlet and at full flow of the aerial waterway it will flow 2000 GPM. The monitor shall be controlled by two (2) model #6041 toggle station. One (1) shall be installed at the pedestal and one (1) shall be installed inside the aerial platform. A model #3600 hand held wireless controller shall be installed in a location specified by the fire department.		
390. DRIVERS SIDE MONITOR NOZZLE		
The driver's side monitor shall be equipped with an Akron style 5178 electric remote control nozzle with a flow rating of 500-2000 GPM.		
391. OFFICER'S SIDE PLATFORM MONITOR		

The officer's side platform monitor shall be an Akron Stream Master2 style 3481 manual hand wheel controlled. The monitor shall be constructed of lightweight Pyrolite® and have a flow capacity of 1250 GPM. The monitor shall be attached directly to the platform supporting yoke with a 4" manually controlled butterfly valve to control the flow of water.		
392. RIGHT SIDE MONITOR NOZZLE		
An Akron #3488 polished aluminum stream shaper shall be provided. An Akron #2499 set of stacked tips shall also be provided. Tip sizes shall be 1-3/8", 1-1/2", 1-3/4", and 2". The base thread size shall be 2-1/2" NST.		
393. INTERCOM		
A Fire Research ACT Intercom model ICA900-112 two-way system shall be installed between the aerial operator's position and the aerial platform. The intercom kit shall include two control modules, one that is hands free and one that has a push-to-talk button, two speakers, and cables. The interconnection between control modules shall require two wires. The control modules shall have an LED volume display and push- button volume control. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed. The intercom shall be designed for exterior use. The control module shall be no more than 2 7/8" high by 5 1/8" wide by 1 7/8". The speaker shall be no more than 5 1/8" high by 5 1/8" wide by 1 1/2" deep. The power requirements for each control module with a speaker shall not exceed 1/2 amp at 12 VDC.		
394. BREATHING AIR SYSTEM		
A breathing air system to the platform shall be provided. One 6000-psi DOT cylinder, with pressure regulator, relief valve, and low air warning alarm, shall be provided. The system shall terminate in the platform with a three place manifold, ready to accept the customer supplied air fittings. All valves, pressure regulators and gauges shall be protected from accidental damage. There shall be a second 6000 psi DOT air bottle mounted on the turntable floor. It shall be plumbed together with the primary bottle so that either bottle may be used.		
395. BREATHING MASK STORAGE		
Storage shall be provided for breathing masks in the platform.		
396. AIR BOTTLE REFILL		
There shall be a screw-type shutoff valve and a CGA air fitting supplied on the air system plumbing to which a refill hose can be connected.		

The fitting shall be installed with a stainless steel tee. There shall be a protective dust cap installed on the air line fittings. The air storage bottle shall be refillable without disconnecting the air-line plumbing.		
397. BREATHING AIR TANK LOCATION		
The platform air supply cylinder shall be mounted on the officer's side of the aerial turntable.		
398. BREATHING AIR ALARM		
A Floyd Bell TUHC-V88R-930-Q low air alarm, audible and visual, shall be provided.		
399. PARAPET LADDER		
There shall be a two-section ladder assembly pivoting off of the front step of the platform that permits access over parapet walls and onto roof surfaces. The ladder shall be self-storing and easily deployed and retracted using a gas spring assisted lever.		
400. STOKES ARMS		
There shall be two arms mounted under the front step of the platform that swing out and lock in the deployed position to provide support for a full size stokes basket and victim. The arms and platform shall have six anchor points to securely tie down a basket and victim. Weight capacity shall be stated.		
401. LIFTING EYE		
A single lifting eye shall be attached to the fly section of the boom for the purpose of hoisting a stokes basket. When a stokes basket is suspended from the eye, the basket shall be able to be reached by an attendant in the platform. Capacity of the eye shall be 800 lb. and any weight suspended from it shall be subtracted from the rated capacity of the platform.		
402. CORROSION REDUCTION POLICY		
The manufacturer shall have in place a formal corrosion reduction program and assembly procedures designed for reducing and eliminating the possibility of corrosion. It is understood that fire apparatus will operate in harsh environments. At the time of the proposal the apparatus manufacturer shall show proof of a corrosion policy. Failure to submit this information could be grounds for rejection. If a formal policy is not in place explain in your proposal how your firm will take the necessary steps for corrosion reduction. There will be no exception to this requirement. In addition to a formal program, the manufacture shall show proof of testing corrosion reduction processes to ASTMB117. A copy of recent test shall be included in the proposal. **Frame Rails**		

The chassis frame rails shall be coated with a high performance, two component, reinforced inorganic zinc rich primer with a proven cathodic protection makeup preferably Cathacoat 302HB. The surface shall be clean and free of all salts, chalk and oils prior to application. Were the primer has been broken during the frame assembly process the area shall be touch up to reestablish the seal. Prior to finish paint a second primer Devran 201 shall be applied. Once the assembly of the frame is complete and the second primer is applied the entire assembly shall be covered with high quality top coat paint preferably Imron 5000 or equal. The manufacturer shall submit with the proposal a copy of the product brochure and or description of the primer to be used. **Electro Plating** Steel and Iron brackets such as the pump module bracket shall be Zinc plated to protect against corrosion. Plating shall be in accordance with ASTM B663. The apparatus manufacturer shall list all components with plating. **Fasteners** In any area that a stainless steel screw or bolt head is to come in contact with aluminum or steel, painted or non-painted, the fastener shall have the underside if the head pre-coated with nylon. The nylon coating shall act as a barrier between the fastener head and the metal or painted surface. Screw or bolt taped into the metal shall be pre-coated with a Threadlocker type material pre-applied on the threads. When bolting together stainless steel the manufacturer shall use a pan-head bolt with nylon coating under the head, a stainless washer with a rubber backing, and a Stover flange nut to secure the bolt. When mounting aluminum components such as a step to the apparatus body. The manufacturer shall use stainless washers with rubber backing. All mounted components shall a barrier material between the two surfaces. All rivet type fasteners shall be of the same material being secured. Whenever possible, pre-drill and tap all holes for mounting components such as lights, steps and hand rails prior to the paint		

process to reduce the corrosion opportunity. If a hole must be drilled into a previously painted surface, re-establish the paint barrier around the hole and use a flange-type nutsert with a gasket under the flange.

Where possible, minimize the number of stainless trim screws in aluminum. Structural tape and or adhesive shall be used were possible for mounting trim to the body or cab.

If a pre-treated screw or bolt is not available, hand apply Dynatex Boltlocker or Threadlocker on the threads of the screw, bolt or nutsert. This will help seal threads from moisture and help prevent the fasteners from loosening.

If lubricant is used when tapping the hole, clean out the lubricant and the shavings before applying blue
Threadlocker into the hole.

Barrier Tape
Barrier tape shall be used on the backsides of all lights, trim pieces, or other components when bolting them to the apparatus; also when attaching stainless steel over an aluminum surface or when attaching aluminum tread plate to the stainless steel. All instances of dis-similar metals contacting each other require the addition of barrier tape between the metals where contact is made.

Before applying the tape, be sure the metal surface is clean from oil or dirt by cleaning the surface with a 50/50 mix of alcohol and water pr similar solvent.

Gaskets
Gaskets shall be used under all snaps, loops and fasteners for such items as for hose bed covers. Reestablish paint seal around the mounting hole edges after drilling. Mounting with Threadlocker coating shall be used

Flat washers with rubber backing shall be used behind all lights that have stainless screws.

Rollup Doors
1 3/4" X 1/16” barrier tape shall be used on the frame opening to act as barrier between the aluminum door rail and the painted door opening surface.

Use a paint stick around the holes after drilling and tapping. In mounting the rails, use screws with the nylon under the head and Threadlocker on the threads for mounting the doorframes. Install barrier tape to the painted surface where the trim is located on top of the door opening. **Hinged Doors** Barrier tape shall be applied to the painted surface of the body and on the painted hinge side of the door. On the hinge side, mount tape out toward the edge to space over the barrel of the hinge, being sure to not touch the door. Make sure the hinge fits into the extrusion frame with no corner weld beads interfering with the door fit. Do not put the hinge in a bind or cause the stainless steel hinge to touch the aluminum. Install the doors using a truss head bolt with the nylon coating under the head and Threadlocker on the threads. **Painted Steel** The manufacturer shall wipe any oil residue dry, remove any rust and remove weld slag or smoke. Clean the surface with solvent before painting. Prime with one even coat of black Color primer, and then spray a topcoat over the primer for the finish coat. After bolts are tightened to the proper torque, touch up the bolt area and ends of the bolts with primer or cold galvanizing coating. **Mounting Emergency Lights and Options** All emergency lights, accessory mountings, Kussmaul covers, and 110 outlet boxes mounted to the body should be mounted with pre-coated Threadlocker and nylon under the head screws or bolts to minimize corrosion between dissimilar metals. **Electrical Grounding** Grounding straps shall be installed consisting of a minimum 2-gauge strap bolted to the chassis frame. A ground cable from the cab to the right side frame rail. From the alternator to the right side frame rail. From the pump module frame to the right side truck frame. Aerials: from the hydraulic and pump module framework. From the pump mount to the truck frame rail.		

From the body module to the right side truck frame.

Proper grounding will help eliminate ground loop problems throughout the truck, reducing the possibility for electrolysis and corrosion to occur. Provide clean connection points on all ground connections, (remove paint where applicable), and spray or brush on electrical sealer as necessary.

When installing foam system pump wiring the power must come from a dedicated breaker to a power solenoid, and then to the power terminal provided by FoamLogix or FoamPro. Pay particular attention to the grounding detail for wire size and good grounding practice, including removing the paint at the point of ground attachment to the chassis. Keep the length of ground wire as short as practically possible.

Salt Spray Testing

Salt spray test shall be used to confirm the relative resistance to corrosion of coated and uncoated metallic specimens, when exposed to a salt spray climate at an elevated temperature. Test specimens shall be placed in an enclosed chamber and exposed to a continuous indirect spray of neutral (pH 6.5 to 7.2) salt water solution, which falls-out on to the specimens at a rate of 1.0 to 2.0 ml/80cm²/hour, in a chamber temperature of +35C. This climate shall be maintained under constant steady state conditions.

Method

Salt fog testing shall be performed by placing samples in a test cabinet that has been designed in accordance with Paragraph 4 (Apparatus) of ASTM B117 and operated in accordance with Paragraph 10 (Conditions) of ASTM B117.

A 5% salt solution, prepared by dissolving sodium chloride into water that meets the requirements of ASTM D1193 Specification for Reagent Water, Type IV is supplied to the chamber. At the time the samples are placed into test, the cabinet should be pre-conditioned to the operating temperature of 35ºC and fogging a 5% salt solution at the specified rate. The fog collection rate is determined by placing a minimum of two 80 sq. cm. funnels inserted into measuring cylinders graduated in ml. inside the chamber. One collection device shall be located nearest the nozzle and one in the farthest corner.

Orientation

Unless otherwise agreed upon, the samples are placed at a 15-30 degree angle from vertical or tested in the "installed" position. This orientation allows the condensation to run down the specimens and minimizes condensation pooling. Overcrowding of samples within the cabinet should be avoided. An important aspect of the test is the utilization of a free-falling mist, which uniformly settles on the test samples. Samples should be placed in the chamber so that condensation does not drip from one to another. **Test Durations** Test durations shall be 500 hours except for sample rotation and daily monitoring of collection rates, the cabinet should remain closed for the duration of the test.		
403. PAINTING		
The apparatus shall undergo extensive pre-paint preparation. All cab and body trim parts are to be removed prior to painting. All appliance-mounting holes are to be drilled and de-burred prior to painting. This allows mounting holes to be primed and painted. Before prime and finish coats are applied, the complete apparatus shall be properly prepared and treated to permit the best possible adhesion of the primer and finish coats. All materials used in the paint process shall be of the highest quality available. Modern methods shall be employed to assure the finest finish surface possible. All priming, surfacing and painting shall be done in a modern down draft or cross flow paint facility. Experienced personnel trained by the paint manufacturer shall perform all paint application in order to provide the highest quality and most enduring paint finish available. Both aluminum and steel surfaces to be painted shall be primed with a two (2)-component primer which is compatible with the finish coat. The apparatus shall be finish painted with a polyurethane base/clear system. "**NO EXCEPTION**" Utilizing the stainless steel body fabrication, the interior of all compartments, inside hose bed and surrounding areas adjacent to compartments doors shall remain a #4 brushed stainless steel finish. This practice shall eliminate the possibility of paint chipping, and electrolysis of aluminum, which can cause corrosive action between dissimilar metals. The chassis, compartment doors, front and rear jack doors, and rear fender panels shall be painted the color indicated.		

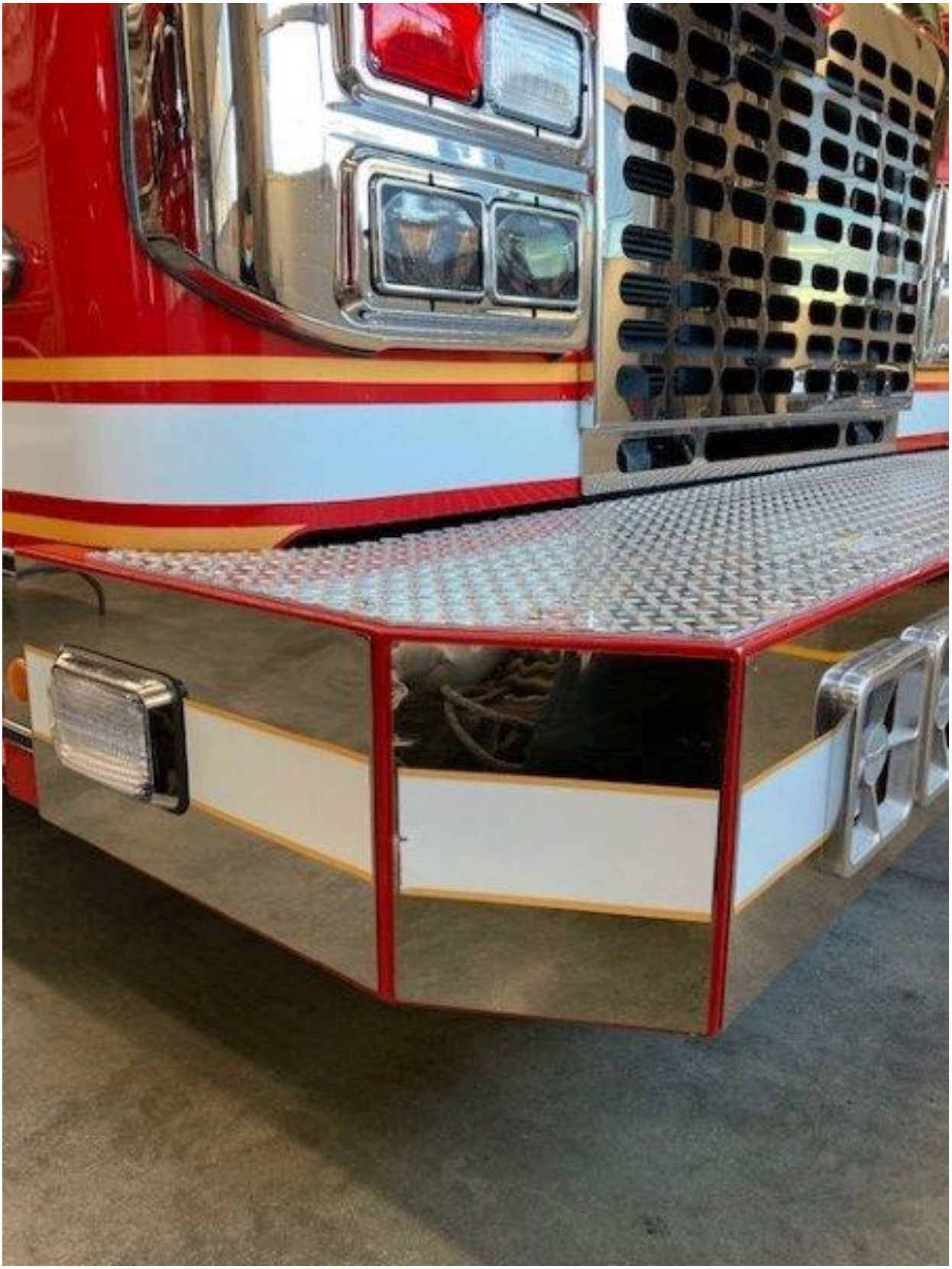
A barrier gasket/washer of "High Density Closed Cell Urethane Foam" shall be used behind all lights, handrails, door hardware and any miscellaneous items such as stainless steel snaps, hooks, washers and acorn nuts. The gaskets/washers shall be coated with pressure sensitive acrylic adhesive. All screws used to penetrate painted surfaces shall be pre-treated/coated under the head with nylon and the threads shall have pre-coat #80. This procedure shall be strictly adhered to for corrosion prevention and damage to the finish painted surfaces. The following paint process shall be utilized: **Surface Preparation:** • Wash surface thoroughly with mild detergent. • Clean and de-grease with Prep-Sol 3812S. • Sand and feather edge using 400 grit or finer on a dual action sander. • Remove sanding dust with a cleaner compatible with polyurethane base coat/clear coat final finish. **Substrate treatment:** • Use a Metal Conditioner followed with a Conversion Coating product **Priming:** • Use a priming 615S pretreatment. • Use a self-etching primer applied to achieve a 1.5 mil dft minimum. • Use Prime N Seal sealer compatible with polyurethane base coat. **Colour Coat:** • Apply polyurethane base coat 1-2 mil dft minimum. **Clear Coat:** • Apply polyurethane clear coat 2 mil dft minimum.		
404. SINGLE TONE PAINT		
A single paint color shall be provided for the apparatus. Colour to be determine by the Fire Department		
405. PAINTED FRAME AND LOWER AERIAL COMPONENTS		
The frame rails, rear drop, fuel beam, outriggers, sway bars, and lower aerial components shall be painted glossy black.		
406.TURNTABLE PAINT		
The turntable, side plates and lift cylinders shall be painted the same color as the apparatus.		
407. ADDITIONAL PAINT PACKAGE		
The ladder sheave beams, extension cylinder and yoke shall be painted the same color as the apparatus.		
408. AIR CONDITIONING CONDENSER		

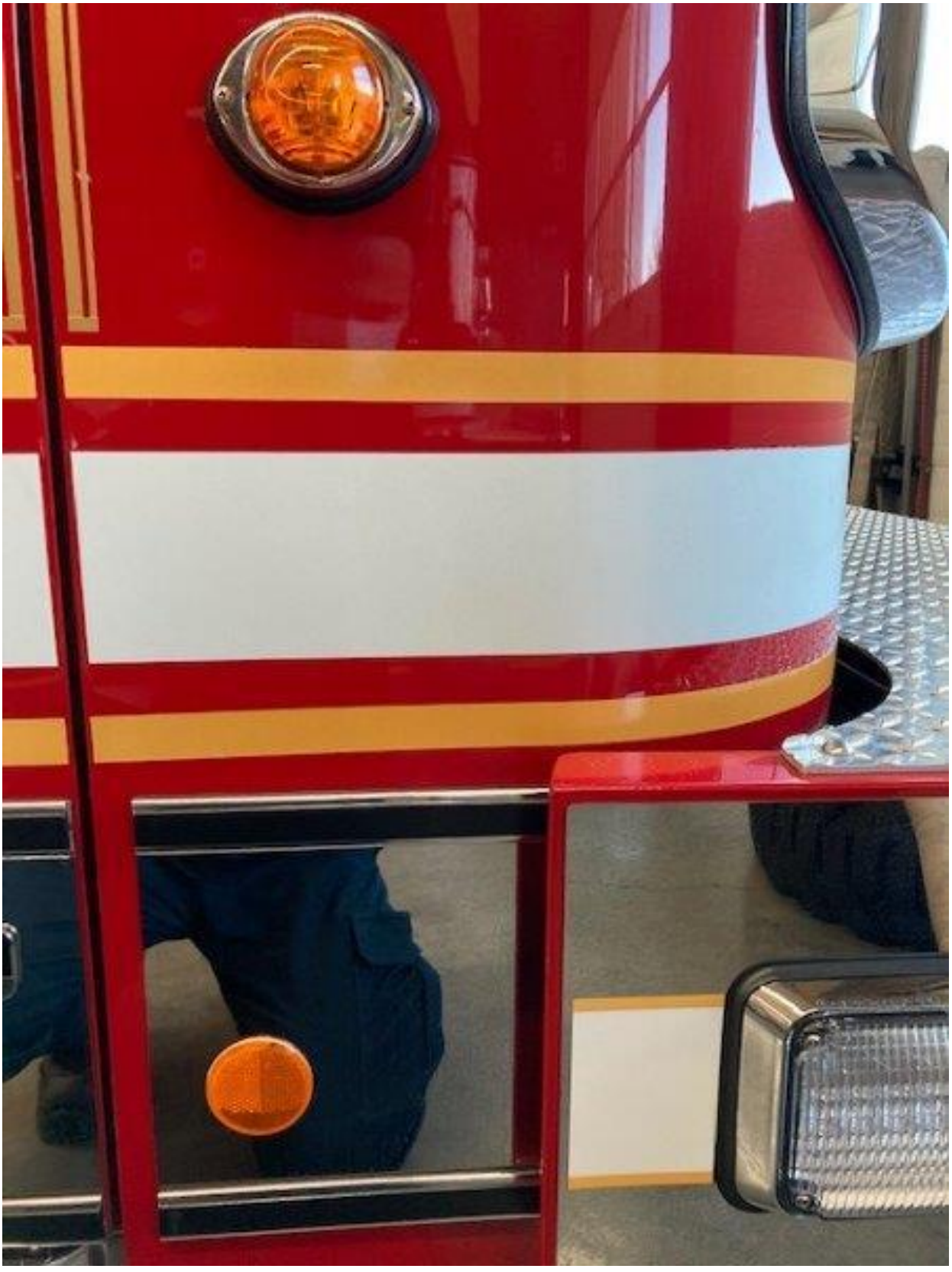
The air conditioning condenser shall be painted to match the cab roof.		
409. CAB LETTERING – SINGLE COLOR WITH SHADING		
3M Reflective Scotchlite gold lettering with left hand shading and right hand outline shall be provided on the cab doors as directed by the Fire Department. Driver and Officer doors with 2 ¾" letters; 3 ¼" total with shading shall read "COURTENAY FIRE DEPARTMENT". Left and Right rear cab doors with 3" letters; 3 ½" total with shading shall read "TOWER 12". Example Photos Supplied		
410. DEPARTMENT CRESTS		
Driver and Officer doors shall have 3M Reflective Scotchlite 10 ¾" Diameter *Department Crest centered without shading*		
411. REFLECTIVE STRIPING 8" Strip		
A 4" White 3M Reflective Scotchlite stripe shall be provided across the front of the cab and along each side of the apparatus. A 1" space above and below the white stripe with an additional 1" 3M Reflective Gold Sotchlite stripe. Total width of striping will be 8" -Example Photos Supplied		
412. "Z" STRIPE		
The 3M Reflective Scotchlite stripe shall be a mitered "Z" type starting just past the rear axles. -Example Striping design & photos provided by Courtenay Fire Department		
413. CHEVRON STRIPING, REAR BODY OUTBOARD, ORAFOL REFLEXITE		
The apparatus shall have 6" Red and White reflective Orafol Reflexite Chevron style striping affixed to the outboard rear body panels. The striping will be set in a manner to have the effect of an inverted "V" shape. The stripe will travel low to high from the outside to the inside.		
414. CHEVRON STRIPING, REAR PLATFORM OUTBOARD, ORAFOL REFLEXITE		
In addition to the outboard rear body panels, the rear platform outboard panels shall also be covered with 6" Red and White Reflective Orafol Reflexite Chevron style striping. -6" 3M Reflective Scotchlite Apparatus designation "TOWER 12" shall be applied to platform panel -6" 3M Reflective Scotchlite "KEEP BACK 150 METRES" shall be applied below the "TOWER 12"		
415. BOOM SIGN		
A boom sign, approximately 133" x 26", shall be provided on each side of the boom. The background of the boom sign shall be painted primary truck color. *BOOM SIGN SIZE WILL REQUIRE FINAL MEASUREMENT CHANGE DUE TO FINAL DESIGN*		

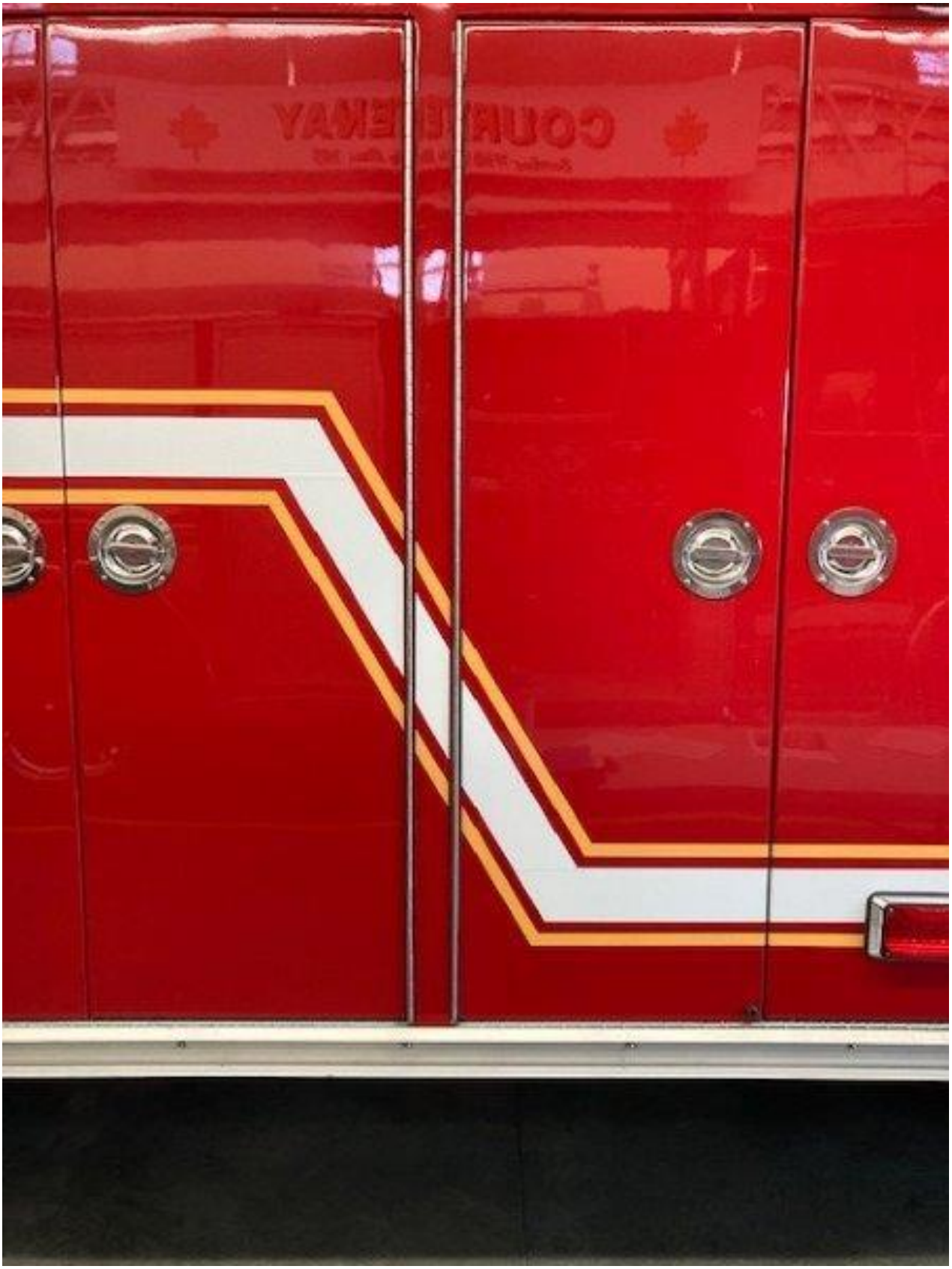
416. BOOM SIGN LETTERING		
-9" 22KT Gold laminated gold leaf letters, with left hand shading and right hand outline to equal 10" letters in Calibri font shall on each boom sign shall read "COURTENAY" Quote below COURTENAY -3" 22KT Gold laminated gold leaf letters; 3 ½" total with left hand shading freestyle script font shall read "*Serving with Pride since 1915*" -One large Canadian flag shall be on right side of the boom sign. *Approximately 12"* ***BOOM SIGN DESIGN SUBJECT TO CHANGE***		
417. ABOVE GRILL LETTERING		
-3" 22KT Gold laminated gold leaf letters; 3 ½" total with left hand shading freestyle script font shall read "*Serving with Pride since 1915*" Sizing may be determined by available space		
418. BROW LETTERING		
-6" 22KT Gold laminated gold leaf letters; 6 ½" total with left hand shading freestyle script font shall read "*Tower 12*" Sizing may be determined by available space		
419. PHONE 911		
Both left and right rear cabinet roll up doors shall have 3M Reflective Scotchlite gold "911 with phone symbol" 4 ½" numbers; 5" total with left hand shading. -Example photos supplied		
420. STANDARD CAB & BODY PIN STRIPING		
The cab and cab doors along with the painted compartment doors on the body shall have 3M gold trim pin striping and corner accents. -Example Photos Supplied *All decals shall be reviewed and proof read for approval at pre-construction*		
421. MISCELLANEOUS EQUIPMENT FURNISHED		
1 pt. touch-up paint A bag of stainless steel nuts and bolts, as used in the construction of the apparatus.		
422. WHEEL CHOCKS		
Two (2) Ziamatic #SAC-44 folding wheel chocks with SQCH-44H holders shall be provided. The wheel chocks shall be located in an area close to the rear axles easily accessible from the side of the apparatus.		
423. PIKE POLE STORAGE		
Three (3) storage tubes shall be recessed each side of the rear compartment for pike pole storage. A spring- loaded clip shall be installed near each tube to secure the head of a standard pike pole.		

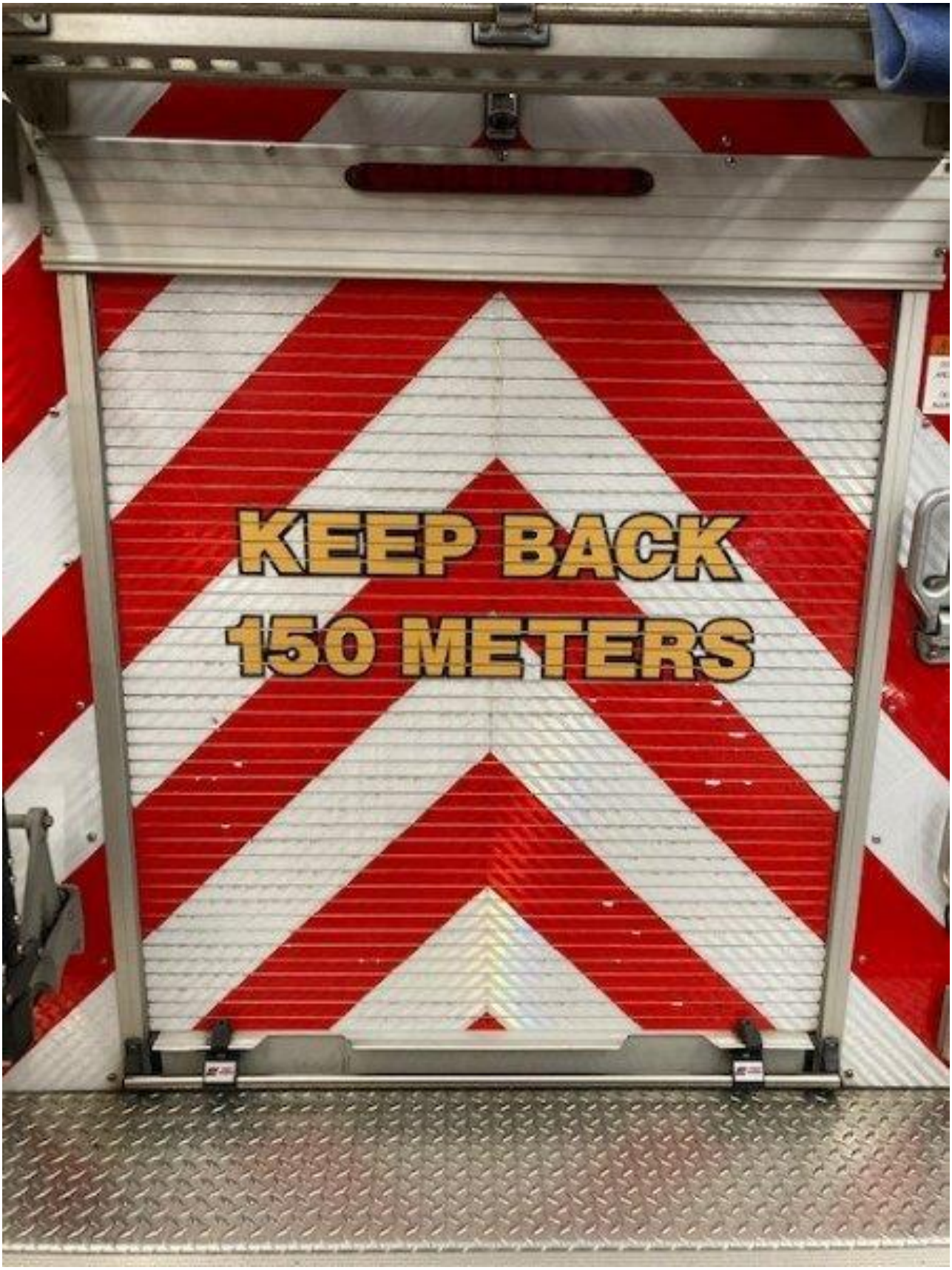
424. OPERATION AND SERVICE MANUALS		
Complete "Operation and Service" manuals shall be supplied with the completed apparatus, one (1) printed copy and one (1) USB flash drive. Service manual instructions shall include service, maintenance and troubleshooting for major and minor components of the truck. The apparatus manufacturer shall supply part numbers for major components (i.e. Engine, Axles, Transmission, Pump, etc.). A table of contents, hydraulic, air brake and overall apparatus wiring schematics shall be included. A video demonstration USB flash drive on the operation of the truck shall be supplied with the manuals.		
425. DELIVERY		
The custom built fire apparatus shall be shipped from the manufacturing facility to the Courtenay Fire Department 650 Cumberland Road, Courtenay, B.C. On delivery a factory trained delivery engineer who shall thoroughly demonstrate the complete apparatus operation and maintenance to the Courtenay Fire Department designated personnel. Detailed training material shall be submitted.		
426. WARRANTIES		
The following warranties shall be supplied: The apparatus shall be warranted to be free from mechanical defects in workmanship for a period of two (2) years or 30,000 miles, whichever comes first. The apparatus shall be covered for parts and labor costs associated with repairs for a period two (2) years or 30,000 miles, whichever comes first. Other warranties include: • Life-time warranty on the frame • Ten (10) year warranty on paint • Ten (10) body structural warranty • Ten (10) year cab structural warranty • Two (2) year aerial mechanical warranty • Thirty (30) year aerial structural warranty • Manufacturers Warranties for all major components • Detailed warranty documents shall be included for complete coverage on each of these warranties.		
427. MANUFACTURING & LOCATIONS		
The apparatus will be manufactured in facilities wholly owned and operated by the company. A complete stock of service parts, and service shall be provided on a 24 hours around the clock basis. The company shall maintain parts and service for a minimum period of twenty (20) years on each apparatus model manufactured.		

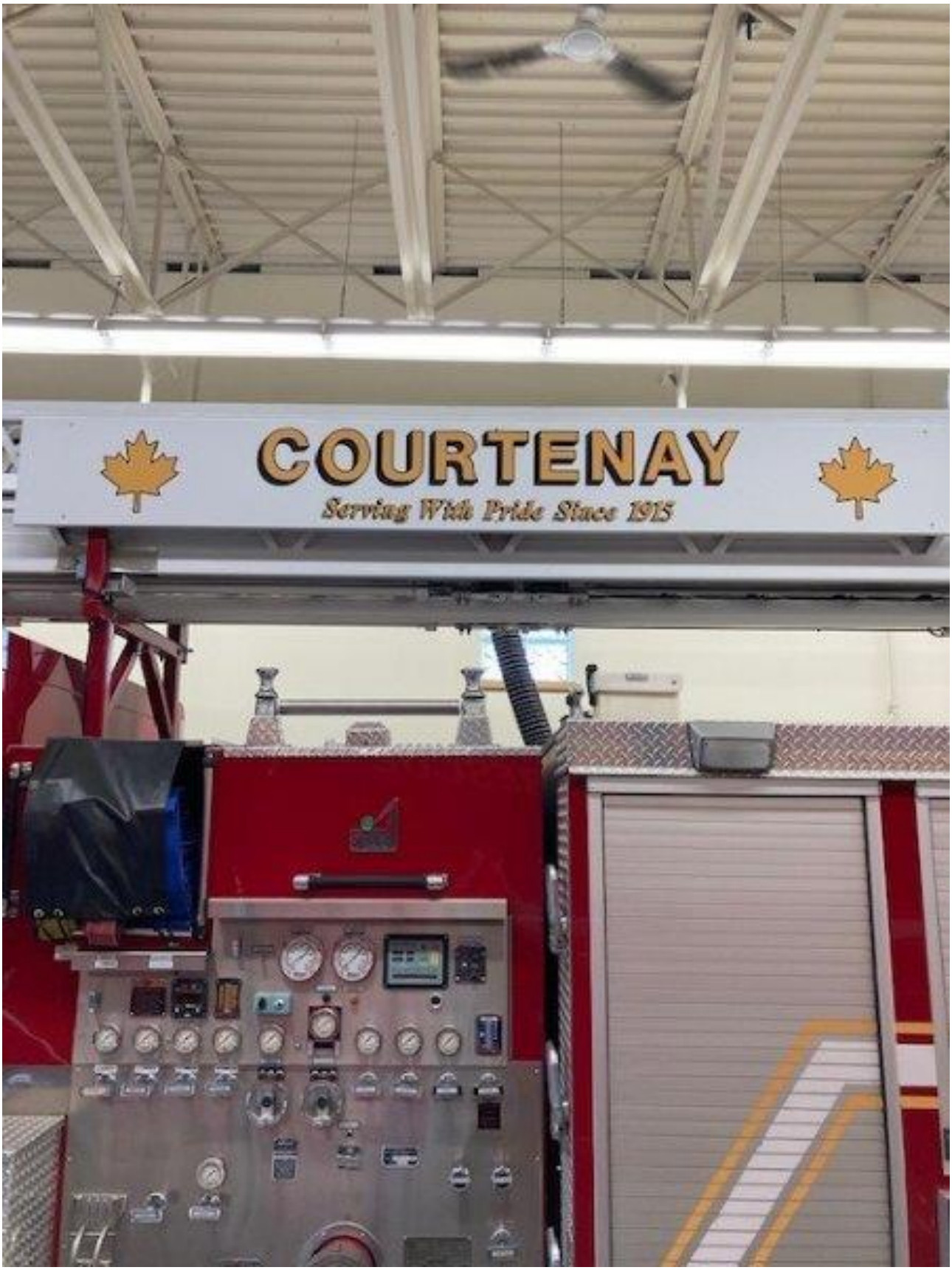
428. PHOTOS

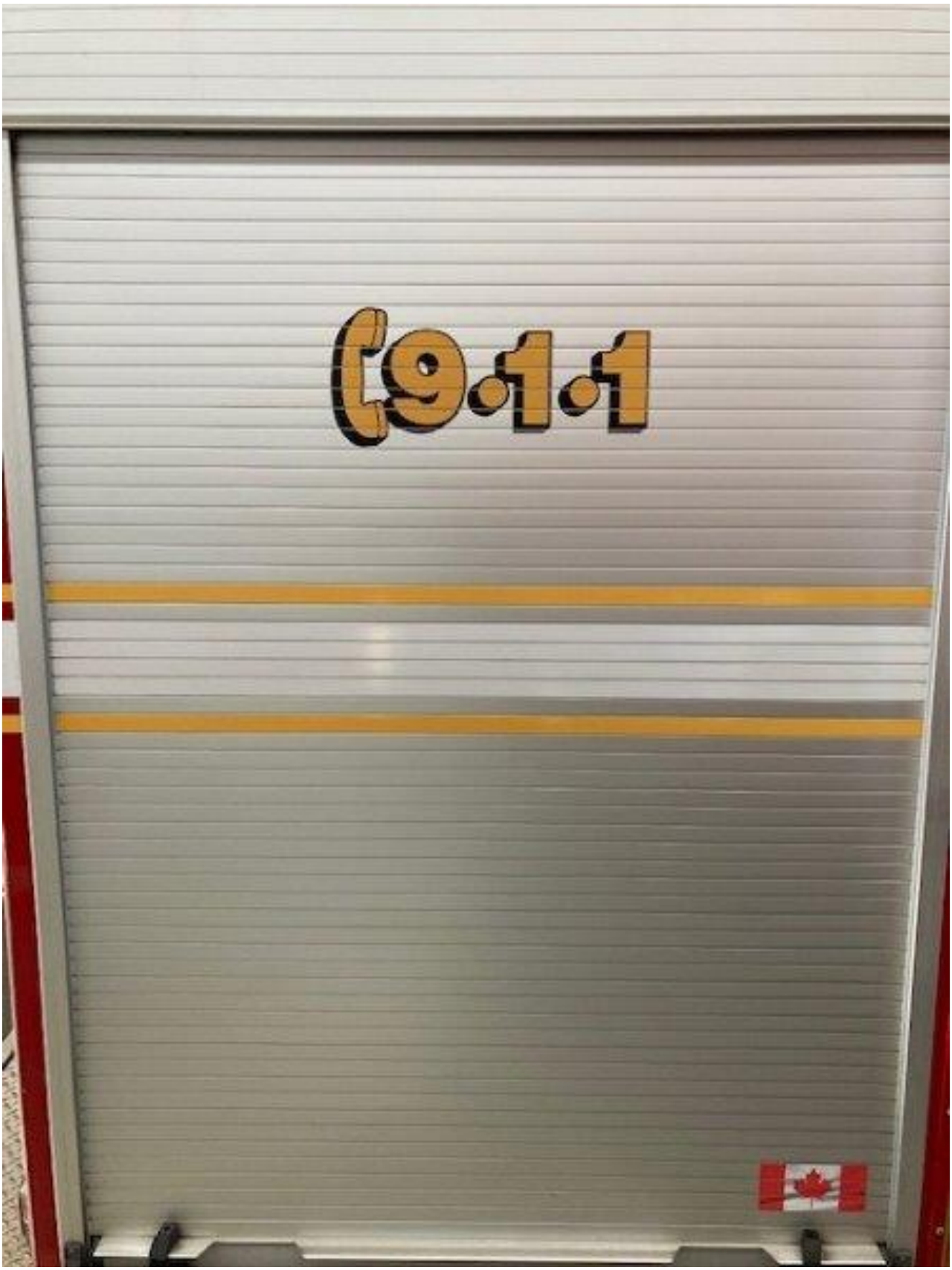


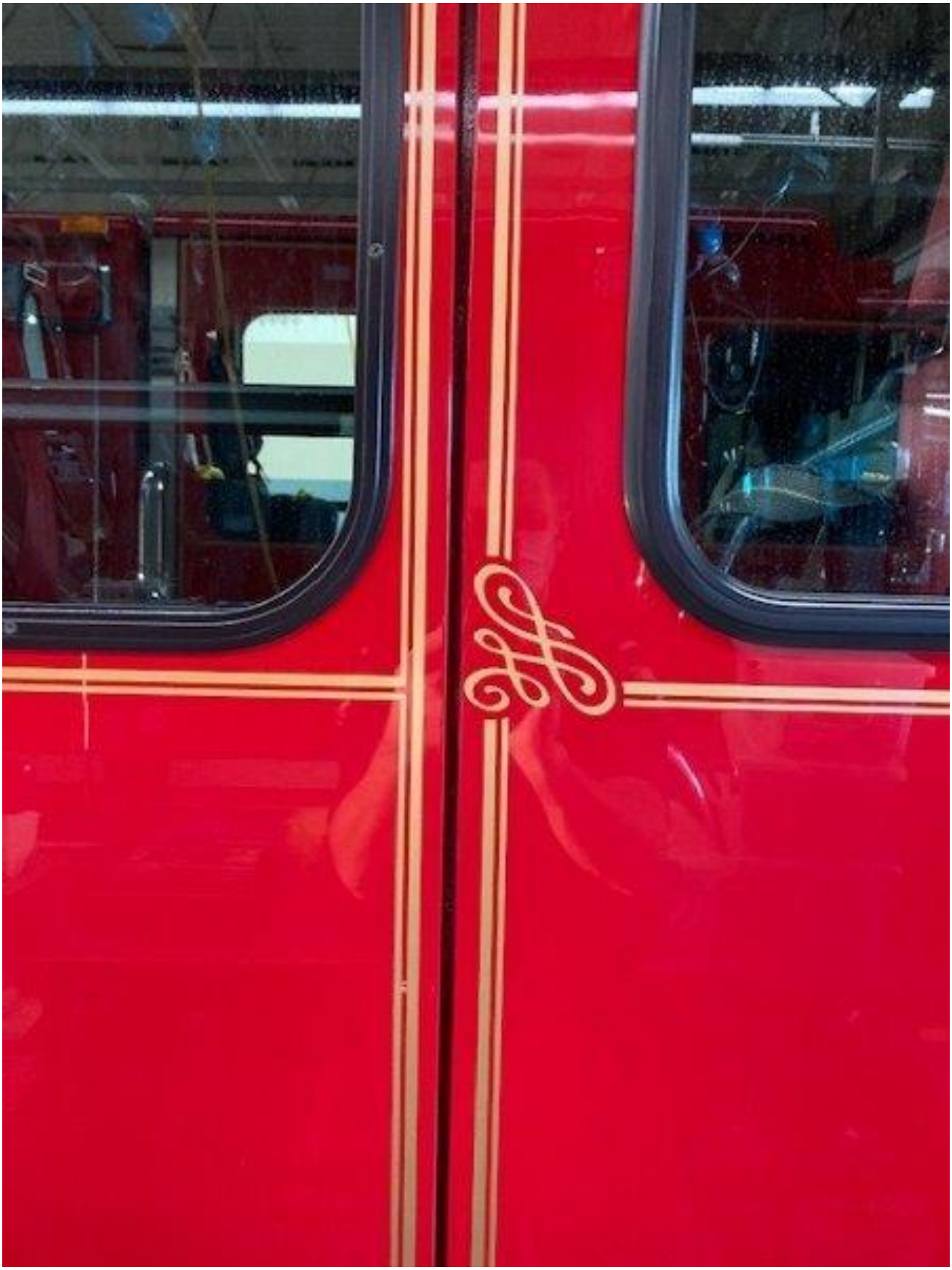


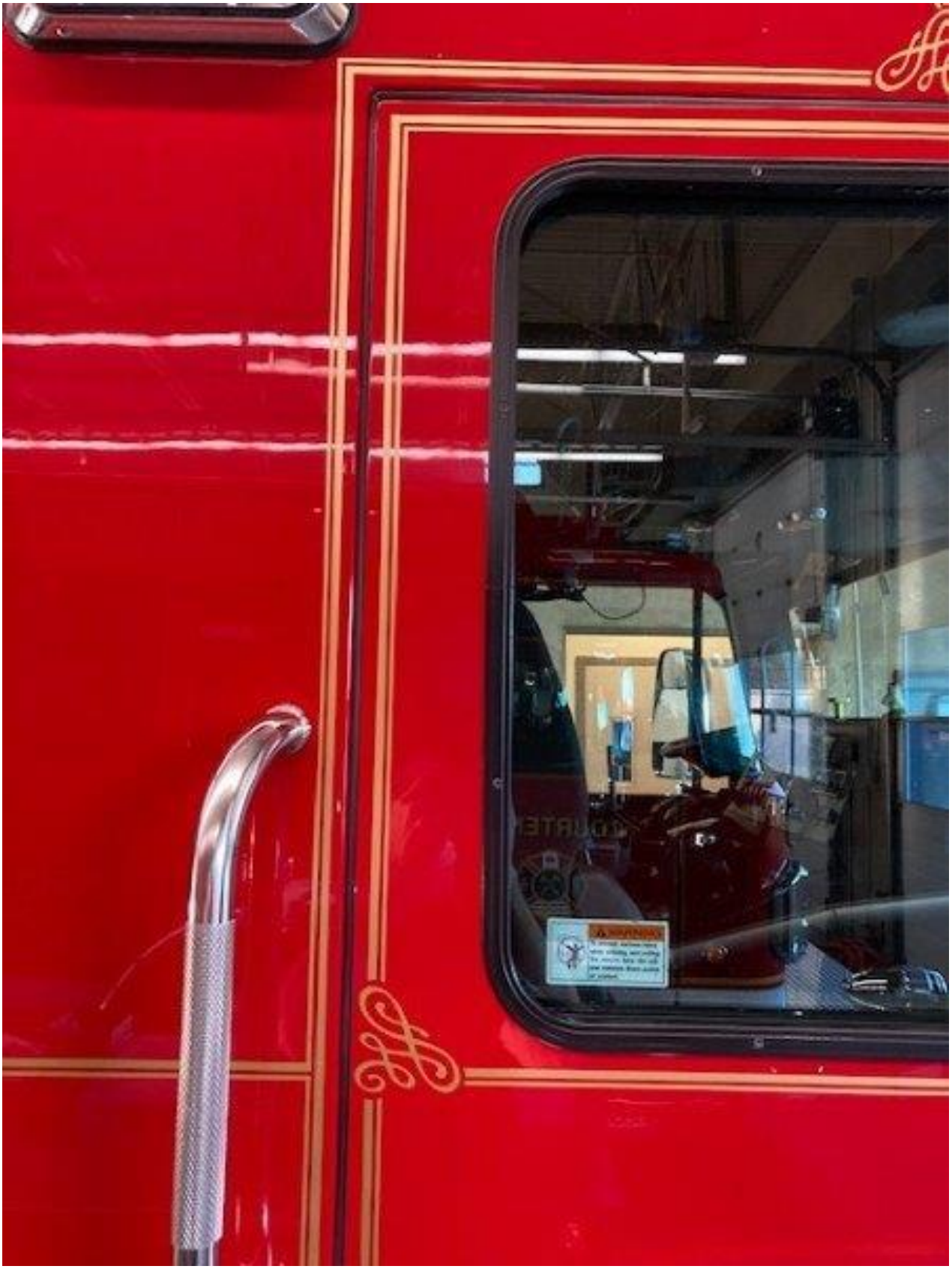


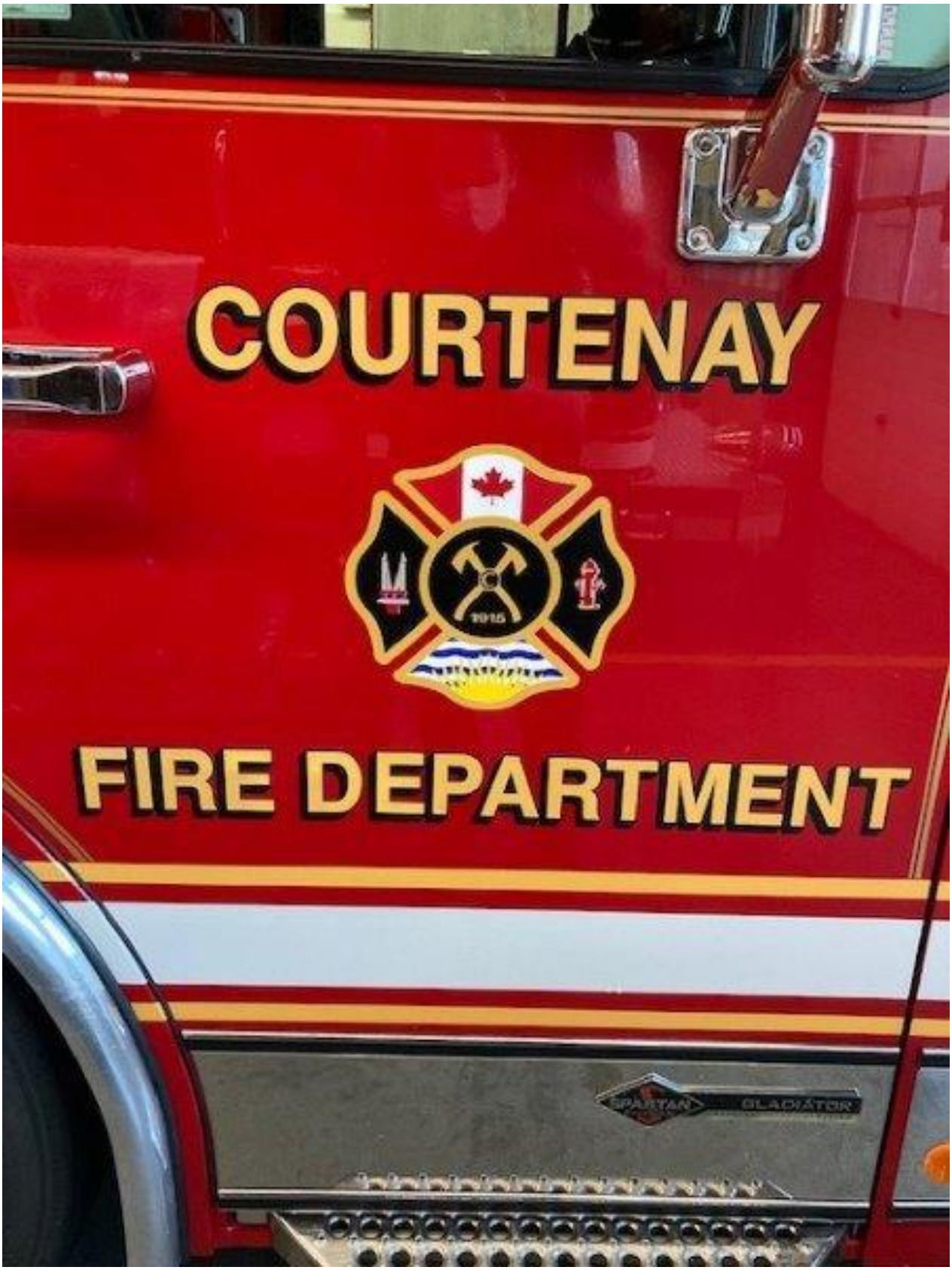

KEEP BACK
150 METERS

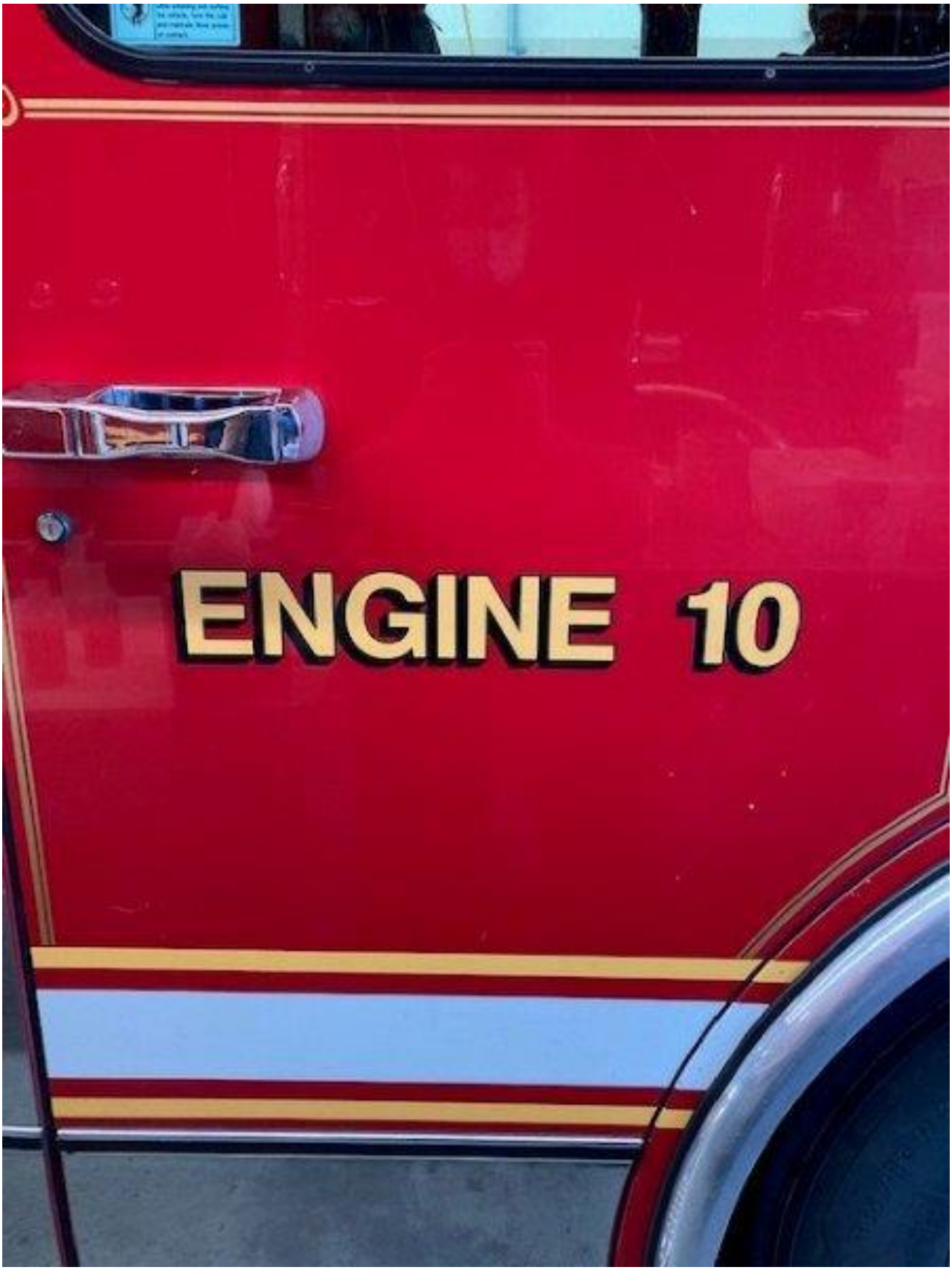

COURTENAY
Serving With Pride Since 1915

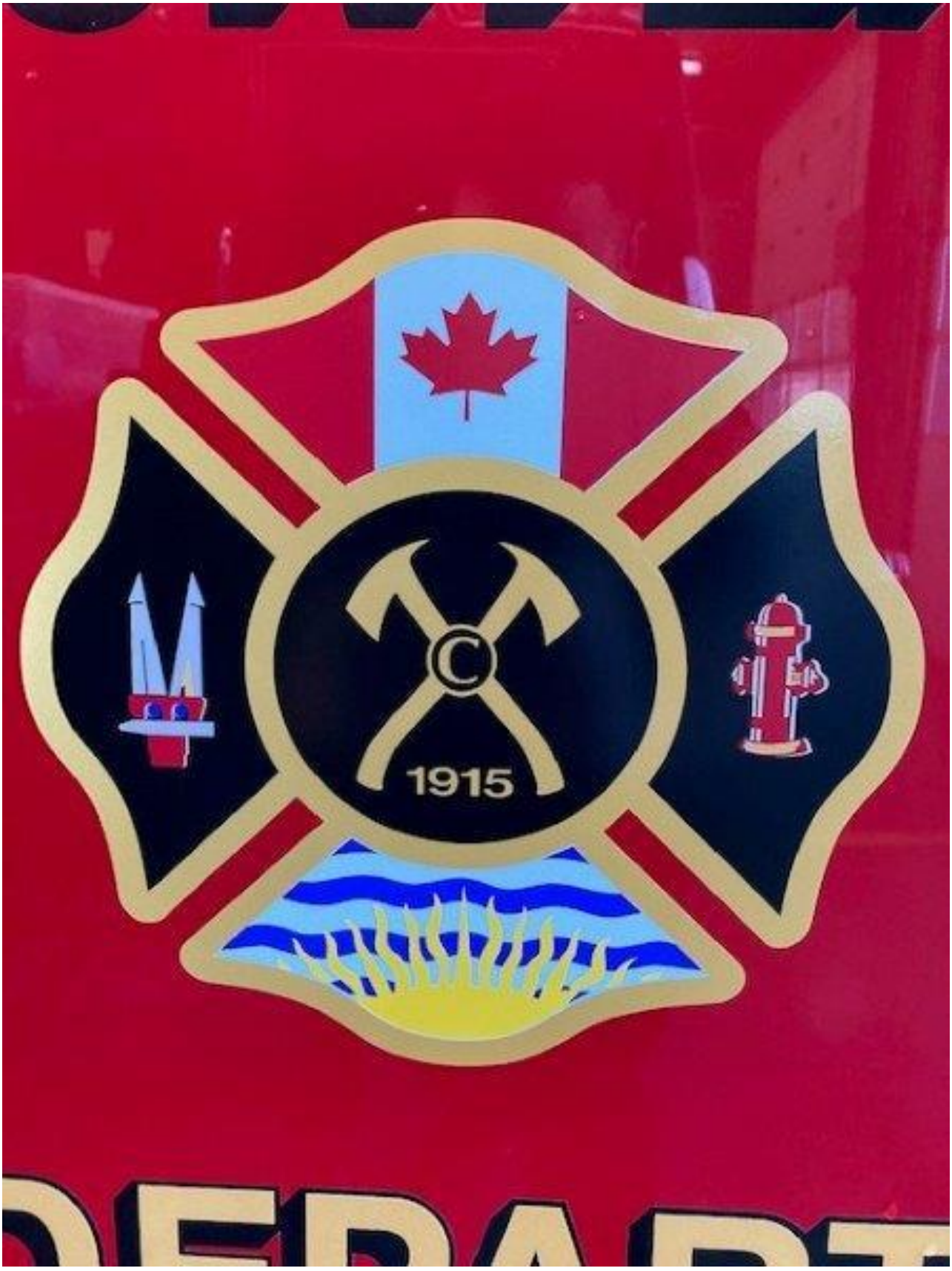

911






COURTENAY
FIRE DEPARTMENT
SPARTAN
GLADIATOR


ENGINE 10


1915