

VILLAGE OF DOWNERS GROVE
Report for the Village Council Meeting
3/1/2016

SUBJECT:	SUBMITTED BY:
Authorization for the Purchase of a Replacement Fire Engine	Nan Newlon Director of Public Works

SYNOPSIS

A resolution has been prepared to authorize execution of an agreement for the purchase of a replacement fire engine from Ferrara Fire Apparatus, Inc. of Holden, Louisiana in an amount not to exceed \$651,648.00.

STRATEGIC PLAN ALIGNMENT

The Strategic Goals for 2015-2017 identified *Exception Municipal Services*.

FISCAL IMPACT

The FY16 Equipment Replacement Fund budget provides \$700,000 for the replacement of one fire engine. This purchase will eliminate the need for a future purchase and replacement of the heavy rescue squad in the Fleet Vehicle Replacement Plan.

RECOMMENDATION

Approval on the March 8, 2016 consent agenda.

BACKGROUND

Staff is requesting authorization to purchase a 2016 Ferrara fire engine from Ferrara Fire Apparatus, Inc. This vehicle will replace a 2005 engine (which will be placed in reserve) as well as a 1995 Pierce Saber and a 2002 Pierce heavy rescue squad (both will be sold). This purchase will provide a dual purpose vehicle while reducing the size of the fleet. This unit will function as a fire engine as well as make specialized rescue tools and equipment readily available on a front line response vehicle. Combining the two vehicles will reduce operating costs while improving efficiency, service levels and capabilities.

Staff evaluated several fire apparatus and determined that the Ferrara unit was best suited for the needs of the Village. Pricing for this unit is provided through the Houston Galveston Area Council Cooperative Purchasing Program for governmental entities. Purchase of this unit will be completed through AEC Fire and Safety who is the Illinois representative for Ferrara Fire Apparatus.

ATTACHMENTS

Resolution
Agreement

RESOLUTION NO. _____

**A RESOLUTION AUTHORIZING EXECUTION OF AN
AGREEMENT TO PURCHASE A FIRE APPARATUS
BETWEEN THE VILLAGE OF DOWNERS GROVE
AND FERRARA FIRE APPARATUS, INC.**

BE IT RESOLVED by the Village Council of the Village of Downers Grove, DuPage County, Illinois, as follows:

1. That the form and substance of a certain Agreement (the "Agreement"), between the Village of Downers Grove (the "Buyer") and Ferrara Fire Apparatus, Inc. ("FFA"), for a 2016 Ferrara Igniter MVP Fire Engine, as set forth in the form of the Agreement submitted to this meeting with the recommendation of the Village Manager, is hereby approved.

2. That the Village Manager or Mayor and Village Clerk are hereby respectively authorized and directed for and on behalf of the Village to execute, attest, seal and deliver the Agreement, substantially in the form approved in the foregoing paragraph of this Resolution, together with such changes as the Manager shall deem necessary.

3. That all resolutions or parts of resolutions in conflict with the provisions of this Resolution are hereby repealed.

4. That this Resolution shall be in full force and effect from and after its passage as provided by law.

Mayor

Passed:

Attest: _____

Village Clerk

**AGREEMENT BETWEEN THE VILLAGE OF DOWNERS GROVE AND
FERRARA FIRE APPARATUS, INC. FOR THE PURCHASE OF A FIRE APPARATUS**

This Agreement is made this ____ day of _____ 2016 by and between Ferrara Fire Apparatus, Inc. ("FFA") of Holden, Louisiana and the Village of Downers Grove, Illinois, an Illinois municipal corporation with offices at 801 Burlington Avenue, Downers Grove, Illinois 60515, ("Village").

WHEREAS, the Village became a member of the Houston-Galveston Area Council ("H-GAC"), which is a regional planning commission and political subdivision of the State of Texas; and

WHEREAS, H-GAC has instituted a cooperative purchasing program which includes many contractors from which to purchase goods and services; and

WHEREAS, FFA is an approved H-GAC contractor; and

WHEREAS, the Village wishes to purchase a fire apparatus from FFA through the H-GAC cooperative purchasing program; and

WHEREAS, FFA is willing to manufacture and sell to the Village the below specified fire apparatus for compensation and in accordance with the terms and conditions described in this Agreement.

NOW, THEREFORE, in consideration of the mutual benefits that will result to the parties in carrying out the terms of this Agreement, it is agreed as follows:

1. Recitals. The provisions set forth in the recitals are incorporated into and made a part of this Agreement.

2. Scope. FFA shall manufacture and sell to the Village a Ferrara Igniter Plus Cab MVP with Waterous CS 1500 GPM Pump and a 500 Gallon UPF Water Tank ("Apparatus") in accordance with the specifications attached hereto and incorporated herein as Exhibit A.

3. Payment. The Village shall pay to FFA Six Hundred Fifty-one Thousand Six Hundred Forty-eight Dollars and No Cents (\$651,648.00) for the Apparatus. Any additional work performed that will increase the agreement price in excess of this amount must be approved in writing by both parties. The Village shall pay FFA the full purchase price within thirty (30) days of execution of this Agreement. The Village is exempt from Illinois sales or use tax for direct purchases of materials and supplies.

4. Delivery. Delivery of the Apparatus shall be F.O.B. Downers Grove, Illinois within 330 calendar days after receipt and acceptance by FFA of the fully executed Agreement. FFA shall not be held liable for damages for failure to make delivery as a result of fire, flood, riots, strikes, chassis shortages, or delays caused by its suppliers, any act of God, or any other circumstances beyond the control of FFA.

5. Inspection. During the manufacturing of the Apparatus, the Village shall have a right to inspect, by its authorized representative, any material, components or workmanship as herein specified. Materials, components or workmanship that have been rejected by the Village as not in accordance with the terms of the contract specifications shall be replaced by FFA at no cost to the Village. The Village shall then inspect the completed Apparatus upon delivery and shall give written notice of any defects within ten (10) business days. The Apparatus shall be deemed accepted if the Village fails to give such notice.

6. Performance Bond. FFA shall provide a Performance Bond, in a form approved by the Village, to the Village in an amount equal to the full purchase price prior to receiving payment from the Village. The Village agrees that the bond shall be deemed fully released upon the Village's acceptance of the Apparatus and the warranty period shall commence to cover the apparatus.

7. Warranties. The Apparatus and all its components shall be warranted as set forth in the specifications attached as Exhibit A. In addition to said warranties, in the event the Apparatus is out of service, through no fault of the Village, for fifty percent (50%) or more of the time within eighteen (18) months from the date of delivery to the Village, the Village shall have the option to return the apparatus to FFA and FFA shall be required to accept the return of the Apparatus and reimburse the Village for the full purchase price within thirty (30) days of a demand therefor.

8. Copyright or Patent Infringement. FFA agrees to indemnify, defend, and hold harmless the Village against any suit, claim, or proceeding brought against the Village for alleged use of any equipment, components, systems, or services provided by FFA that constitutes a misuse of any proprietary or trade secret information or an infringement of any patent or copyright.

9. Indemnification. FFA shall indemnify and hold harmless the Village and its officers, employees and agents from any and all liability, losses or damages the Village may suffer as a result of claims, demands, suits, actions or proceedings of any kind or nature in any way resulting from or arising out of negligent action on the part of FFA under this Agreement. This provision shall survive termination of this Agreement.

10. Equal Employment Opportunity. During the performance of this Agreement, the Consultant agrees as follows:

1. That it will not discriminate against any employee or applicant for employment because of race, color religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
2. That, if it hires additional employees in order to perform this Agreement or any portion thereof, it will determine the availability (in accordance with the Department's Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.

11. Sexual Harassment. FFA, as a party to a public contract, certifies that it has a written sexual harassment policy.

12. Drug Free Work Place. FFA, as party to a public contract, certifies and agrees that it has a drug free workplace policy and will provide a drug free workplace.

13. Non-Discrimination. Consultant, its employees and subconsultants, agree not to

commit unlawful discrimination and agree to comply with applicable provisions of the Illinois Human Rights Act, the Public Works Employment Discrimination Act, the U.S. Civil Rights Act and Section 504 of the Federal Rehabilitation Act, and rules applicable to each. The equal opportunity clause of the Department of Human Rights rules is specifically incorporated herein.

The Americans with Disabilities Act (42 U.S.C. 12101) and the regulations thereunder (28 CFR 35.130)(ADA) prohibit discrimination against persons with disabilities by the State, whether directly or through contractual arrangements, in the provision of any aid, benefit or service. As a condition of receiving this Agreement, the undersigned vendor certifies that services, programs and activities provided under this Agreement are and will continue to be in compliance with the ADA.

14. Campaign Disclosure Certificate. FFA shall comply with the Campaign Disclosure Certificate attached hereto and incorporated herein by reference as Exhibit B.

15. Patriot Act Compliance. FFA represents and warrants to the Village that neither it nor any of its principals, shareholders, members, partners, or affiliates, as applicable, is a person or entity named as a Specially Designated National and Blocked Person (as defined in Presidential Executive Order 13224) and that it is not acting, directly or indirectly, for or on behalf of a Specially Designated National and Blocked Person. FFA further represents and warrants to the Village that FFA and its principals, shareholders, members, partners, or affiliates, as applicable are not, directly or indirectly, engaged in, and are not facilitating, the transactions contemplated by this Agreement on behalf of any person or entity named as a Specially Designated National and Blocked Person. FFA hereby agrees to defend, indemnify and hold harmless the Village, and its elected or appointed officers, employees, agents, representatives, engineers and attorneys, from and against any and all claims, damages, losses, risks, liabilities and expenses(including

reasonable attorney's fees and costs) arising from or related to any breach of the foregoing representations and warranties.

16. Cooperation with FOIA Compliance. FFA acknowledges that the Freedom of Information Act may apply to public records in possession of the Consultant. Consultant shall cooperate with the Village in its efforts to comply with the Freedom of Information Act. 5 ILCS 140/1 et. seq.

17. Governing Law. This Agreement will be governed by and construed in accordance with the laws of the State of Illinois. Venue is proper only in the County of DuPage, Illinois.

18. Successors and Assigns. The terms of this Agreement will be binding upon and inure to the benefit of the parties and their respective successors and assigns; provided, however, that neither party will assign this Agreement in whole or in part without the prior written approval of the other.

19. Waiver of Contract Breach. The waiver by one party of any breach of this Agreement or the failure of one party to enforce at any time, or for any period of time, any of the provisions hereof will be limited to the particular instance and will not operate or be deemed to waive any future breaches of this Agreement and will not be construed to be a waiver of any provision except for the particular instance.

20. Amendment. This Agreement will not be subject to amendment unless made in writing and signed by both parties.

21. Severability of Invalid Provisions. If any provisions of this Agreement are held to contravene or be invalid under the laws of any state, country or jurisdiction, contravention will not invalidate the entire Agreement, but it will be construed as if not containing the invalid provision and the rights or obligations of the parties will be construed and enforced accordingly.

22. **Notice.** Any notice will be in writing and will be deemed to be effectively served when deposited in the mail with sufficient first class postage affixed, and addressed to the party at the party's place of business. Notices shall be addressed to designated representatives of both parties as follows:

**Village Manager
Village of Downers Grove
801 Burlington Ave.
Downers Grove, IL 60515**

Ferrara Fire Apparatus, Inc.

Holden, LA

IN WITNESS WHEREOF, the Parties have executed this Agreement on the date indicated above.

Ferrara Fire Apparatus, Inc.

Village of Downers Grove

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

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INTENT OF PROPOSAL SPECIFICATIONS

It is the intent of these PROPOSAL specifications to cover the furnishing and delivery, to the Downers Grove Fire Department a complete pumper apparatus equipped as hereinafter specified.

These proposal specifications exceed the minimum requirements of the Fire Department and are intended to provide details of construction and materials, and where not otherwise specified are left to the discretion of Ferrara Fire Apparatus, Inc.

Ferrara Fire Apparatus, Inc. shall be solely responsible for the design and construction of all non-specified features. The apparatus shall conform to the current edition of the National Fire Protection Associations Pamphlet.

Ferrara Fire Apparatus, Inc. is an established manufacturer with a certainty of being capable of furnishing parts, service and technical assistance for the next TWENTY (20) Years.

Ferrara Fire Apparatus, Inc. is furnishing satisfactory evidence of its ability to construct the specified apparatus and certifies that the location of the factory where the apparatus is to be built is at 27855 James Chapel Road, Holden, LA 70744.

This proposal is accompanied by a set of manufacturer's specifications consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform.

QUALITY AND WORKMANSHIP

The design of the apparatus proposed shall embody the modular design and construction technique as outlined.

The workmanship is of the highest quality in its respective field. Special consideration has been given to the following points: accessibility of the various components, which require periodic maintenance operations for ease of operation, including both pumping and driving operations and symmetrical proportioning of the overall apparatus.

Construction utilized shall be rugged and safety factors have been provided to carry loads as specified and to meet the road requirements and speed conditions as set forth under "Performance Tests and Requirements".

Welding shall not be employed in the assembly of the apparatus in a manner that shall prevent the removal of major component parts for service and/or repair. This includes the following but is not limited to compartment doors, hinges, fender liners, running boards, hosebeds, and pump panels, etc.

VEHICLE STABILITY

A. The height of the fully loaded vehicle center of the gravity shall not exceed the chassis manufacturer maximum.

B. The front to rear weight distribution of the fully loaded vehicle shall be within the limits set by the chassis manufacturer. The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer, under full load and all other loading conditions.

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C. Difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7%.

PERFORMANCE TEST AND REQUIREMENTS

A. The apparatus will meet the performance requirements at elevations of 2000 feet (610m) above sea level.

B. The apparatus will meet the performance requirements while stationary on any grade of up to and including 6% in any direction.

C. From a standing start, the vehicle will attain a true speed of 35 mph (56 km/h), within 25 seconds on a level road.

D. The apparatus will obtain a minimum top speed of 50 mph (80 km/h) on a level road.

E. The apparatus will be able to maintain a speed of at least 20 mph (32 km/h), on any grade up to and including 6%.

F. The apparatus will be tested and approved by Underwriters Laboratories Incorporated in accordance with the standard practices for pumping engines.

ROAD TEST

Each manufacturer will conduct road tests to verify that the complete apparatus is capable of compliance:

A. The test will be conducted on a dry, level, paved road that is in good condition. The engine will not operate in excess of the maximum no load governed speed.

B. Acceleration test will consist of two runs in opposite direction over the same route.

C. The vehicle will attain a true speed of 35 mph (56 km/h) from a standing start within 25 seconds.

D. The vehicle will attain a minimum top speed of not less than 50 mph (80 km/h).

E. If the apparatus is equipped with an auxiliary braking system, the apparatus manufacturers will road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

F. The service brakes will bring the fully laden apparatus to a complete stop from an initial speed of 20 mph (32 km/h) in a distance not exceeding 35 feet (10.7M) by actual measurement, on a substantially hard, level surface road that is free of loose material, oil, or grease.

FAILURE TO MEET TESTS

In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the Ferrara Fire Apparatus, Inc. within thirty (30) days of the date of the first trials.

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Such trials shall be final and conclusive and failure to comply with changes, as the purchaser may consider necessary to conform to any clause of the specifications within thirty-(30) days after notice is given to Ferrara Fire Apparatus, Inc. of such changes shall also be because of rejection of the apparatus.

Permission to keep or store the apparatus in any building owned or occupied by the purchaser or its use by the Fire Department during the above-specified period with the permission of the Ferrara Fire Apparatus, Inc. shall not constitute acceptance.

PRODUCT LIABILITY INSURANCE

Due to the high cost of replacement of said Fire Apparatus and to protect the customer of its full rights, Ferrara Fire Apparatus, Inc. carries garage liability insurance equal to or in excess of \$26,000,000.00.

SERVICE

Ferrara Fire Apparatus, Inc. has an authorized dealer and service center within 12 miles of the Downers Grove Fire Department.

The authorized dealer shall employ Fire Apparatus technicians to insure the customer that service shall be provided.

The dealer certifies that they shall stock at least one replacement part for all valves, primers, door latches, pump impellers, gauges, or any replacement part that might go wrong with this apparatus when it is in warranty. This shall insure the customer that he shall get quick service on any warranty problem.

INFORMATION SUPPLIED AT TIME OF DELIVERY

Information required at time of delivery to be supplied by Ferrara Fire Apparatus, Inc. shall include:

The manufacturer's record of apparatus construction details, including the following information:

- (a) Owner's name and address
- (b) Apparatus manufacturer, model, and serial number
- (c) Chassis make, model, and serial number
- (d) GVWR of front and rear axles
- (e) Front tire size and total rated capacity in pounds (kilograms)
- (f) Rear tire size and total rated capacity in pounds (kilograms)
- (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
- (h) Engine make, model, and serial number, rated horsepower, related speed, and governed speed
- (i) Type of fuel and fuel tank capacity
- (j) Electrical system voltage and alternator output in amps
- (k) Battery make, model, and capacity in cold cranking amps (CCA)
- (l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- (m) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (n) Pump transmission make, model, serial number, and gear ratio

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- o) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (p) Water tank certified capacity in gallons or liters
- (q) Paint manufacturer and paint number(s)
- (r) Company name and signature of responsible company representative

Certification of slip resistance of all stepping, standing, and walking surfaces

The pump manufacturer's certification of suction capability

A copy of the apparatus manufacturer's approval for stationary pumping applications

The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed

The pump manufacturer's certification of the hydrostatic test

The certification of inspection and test for the fire pump or the industrial supply pump

If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source

If the apparatus is equipped with an air system, test results of due air quality, the SCBA fill station, and the air system installation

Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)

Written load analysis and results of the electrical system performance tests required in Chapter 13

When the apparatus is equipped with a water tank, the certification of water tank capacity

Ferrara Fire Apparatus, Inc. shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

Manufacturer's name and address

Country of manufacture

Source for service and technical information

Parts replacement information

Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)

Wiring diagrams for low voltage and line voltage systems to include the following information:

- (a) Pictorial representations of circuit logic for all electrical components and wiring
- (b) Circuit identification

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- (c) Connector pin identification
- (d) Zone location of electrical components
- (e) Safety interlocks
- (f) Alternator-battery power distribution circuits
- (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

Lubrication charts

Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems

Precautions related to multiple configurations of aerial devices, if applicable

Instructions regarding the frequency and procedure for recommended maintenance

Overall apparatus operating instructions

Safety considerations

Limitations of use

Inspection procedures

Recommended service procedures

Troubleshooting guide

Apparatus body, chassis, and other component manufacturer's warranties

Special data required by NFPA 1901

Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results

A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

Ferrara Fire Apparatus, Inc. shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied.

LIABILITY

Ferrara Fire Apparatus, Inc. shall defend any and all suits and assume all liability for the use of any patented process, advice or article forming a part of the apparatus or any appliance furnished under contract.

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APPARATUS PURCHASE

The specified apparatus will be purchased under the HGAC contract.

PENALTY CLAUSE

Each day the vehicle exceeds the contracted delivery date a \$100.00 per day, per unit penalty clause shall be assessed.

PAYMENT TERMS

100% of the purchase amount shall be paid within thirty (30) days of execution of the contract.

Pre-Payment Terms-

1. Proposed delivery timeframe after receipt / acceptance of contract (or purchase order) will not begin until payment amount is received by Ferrara Fire Apparatus, Inc.
2. If pre-payment is late and if the Fire Department elects not to have the delivery extended, **\$95.00** per unit, per calendar day will be deducted from the pre-payment discount at time of final invoice.

PERFORMANCE BOND

Ferrara Fire Apparatus, Inc. shall furnish a Performance Bond equal to one hundred (100%) percent of the total contract amount. The Performance Bond shall insure the prompt and complete performance of the contract.

VIRTUAL MANUFACTURING

The manufacturer shall have a web site available for the customers to 'watch' their unit being produced. The "Trucks in Production" shall be updated a minimum of three (3) times per week.

The web site shall also include documentation of cab and body crash tests, take a virtual tour of the production facility, videos of both current and new innovative products, updates on trade shows, photos of new deliveries and the opportunity to include customer 'Action Photos'.

Customer shall be able to access the web site without the requirement of a password.

PRINCIPAL DIMENSIONS

The apparatus shall have the following dimensions:

Overall Length: 36' - 4-5/8"

Overall Height: 10' - 6-1/4"

Wheelbase: 236"

Cab to Axle: 156"

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CERTIFIED WELDERS

The manufacturer shall employ individuals that are certified aluminum and stainless steel welders. The welders shall be certified by an outside testing laboratory. The certifications shall be available for viewing through the Human Resources office upon request.

BODY WEIGHT DOCUMENTATION

The manufacturer shall weigh each body prior to mounting on the chassis. The information shall be included in the documentation of the finished vehicle. Each body produced by the manufacturer shall be weighed, not just one body per model.

DRAWING, PROPOSAL

There shall be a proposal drawing submitted to the Fire Department. This drawing shall be a visual interpretation of the apparatus proposed.

DRAWING, APPROVAL

Prior to construction, the successful bidder shall provide three (3) approval drawings of the apparatus for the Fire Department's review. The drawings shall show such items as the chassis being utilized, lights, horns, sirens, pump panels, and all compartment locations and dimensions. The blueprint shall be a visual interpretation of the unit as it is to be constructed. The purchaser shall sign all drawings. One (1) print shall be retained by the Fire Department, the dealer/sales representative shall retain one (1) print, and one (1) print shall be returned to the manufacturer.

DRAWINGS, REVISED APPROVAL

The original set of drawings, after being reviewed by the Fire Department, shall be revised to reflect any changes made by the Fire Department.

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference will be held at the factory prior to the actual construction of the vehicle(s). The conference will be held in the manufacturer's facility with four (4) representatives of the Fire Department and appropriate representatives of the manufacturer.

Transportation, lodging and meals will be the responsibility of the manufacturer.

PRE-PAINT INSPECTION TRIP

There will be a pre-paint inspection for four (4) representatives of the Fire Department at the facility where the apparatus is being constructed. The inspection trip will be completed before the unit is painted. Factory and Sales representatives will be available at the time of inspection.

Transportation, lodging and meals will be the responsibility of the manufacturer.

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FINAL INSPECTION TRIP

There will be a final inspection for four (4) representatives of the Fire Department at the facility where the apparatus is being constructed. The inspection trip will be completed when the apparatus is complete. Factory and Sales representatives will be available at the time of inspection.

The final inspection will include at a minimum:

- Full access to the build file and factory personnel to provide answers for any issues found.
- Unit will be placed on a lift that will allow full inspection of the undercarriage.
- Road test shall be accommodated.
- Unit will be taken to pump test area where the pump and plumbing can be inspected while flowing water.
- General apparatus orientation and operation shall be provided at the pump test pit.

Transportation, lodging and meals will be the responsibility of the manufacturer.

TRANSPORTATION

To insure proper break-in of all components while still under warranty, the apparatus shall be delivered over the road under its own power (Rail and/or truck freight shall not be acceptable).

DELIVERY

The manufacturer will deliver the completed apparatus within three hundred thirty (330) calendar days from the pre-construction meeting. The pre-construction meeting shall take place within 30 days from receipt of an order.

The manufacturer shall not be held liable for changes arising from its failure to make or delay in making delivery because of fire, flood, strike, riot, chassis shortage, accidents, acts of God, or any circumstances beyond our control.

MANUFACTURER SERVICE CONTACTS

The manufacturer must have a 24 hour/ 7 day a week, toll-free emergency hot line. The manufacturer must be capable of providing both in-house and on-site service for the apparatus. The service technicians shall be EVT certified in compliance with NFPA 1071 classifications F2 through F6. On-site service and maintenance shall be the primary function, to eliminate the vehicle having to leave the Fire Department jurisdiction. Copies of the certifications shall be made available through the Human Resources office.

SERVICE VEHICLES

The manufacturer shall have a minimum of 10 full time, company owned, service vehicles. The vehicles shall be available 24 hours a day, seven days a week to respond to customer needs. The Service Vehicles shall be operated by full time EVT Certified Technicians.

REPLACEMENT PARTS

Replacement parts shall be available directly from the manufacturer, as well as the dealer and/or service centers.

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SERVICE CENTER

Certified Fleet Services
560 N. Michigan St.
Elmhurst, Illinois 60126
(630) 279-8083

Jean Ross Company
P.O. Box 1223
Woodstock, Illinois 60098
815-206-2881

CUSTOM CHASSIS

It is the intent of the technical specifications contained herein to ensure the custom cab and chassis specified shall be engineered, designed, and manufactured exclusively for heavy-duty continuous use in extreme environments and rigorous adverse conditions.

Each custom cab and chassis shall be manufactured in strict compliance with all applicable requirements as set forth in the current edition of the NFPA (National Fire Protection Association) pamphlet 1901 with maximum safety as the key focus throughout the design and development phase of each fire and rescue chassis.

FRONT BUMPER

The front bumper extension shall be 80,000 PSI high tensile steel channel, minimum (10.5" high x 3" wide x 1/4" thick approximately). The bumper is designed to protect the front of the apparatus from head-on & angled, impact loads. The bumper shall be securely bolted directly to frame members with grade "8" hardware. The bumper shall be backed full width and full height with 1/4" thick steel for strength and rigidity. The bumper backing shall be formed in the same manner and shape as the outer bumper. The bumper corners shall also be supported in the same manner to withstand side/angular impacts.

The bumper shall be painted job color.

TOW EYES, FRONT

Two (2) chrome plated tow eyes shall be mounted thru the front bumper fabricated from 1" thick #C1018 cold drawn steel. The tow eye shall have an inside diameter of 2.0" with chamfered edges. The tow eyes shall be attached with Grade 8 bolts.

FRONT BUMPER EXTENSION

There shall be a twenty-four inch (24") frame extension provided. The extension shall be made from heavy-duty steel in both C-channel and tubular shapes. The frame rail extension material shall measure 7" high x 3-1/2" wide x .375" wall thickness.

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Extension shall be bolted to the chassis frame rails through reinforcement plates, backed by the engine mounting crossmember. Fasteners utilized shall be Grade 8 bolts.

GRAVELSHIELD

A gravelshield constructed of 1/8" (.125") embossed aluminum tread plate shall be installed above the frame extension between the bumper and the front face of the cab.

BUMPER COMPARTMENT, DRIVER'S SIDE

There shall be a compartment provided in the front bumper gravelshield, driver's side fabricated of 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

COVER, DRIVER'S SIDE FRONT BUMPER COMPARTMENT

The driver's side bumper compartment shall have a raised hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch.

BUMPER COMPARTMENT, CENTER

There shall be a compartment provided in the front bumper gravelshield, centered between the frame rails fabricated of 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

COVER, CENTER FRONT BUMPER COMPARTMENT

The center bumper compartment shall have a raised hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch.

BUMPER COMPARTMENT, OFFICER'S SIDE

There shall be a compartment provided in the front bumper gravelshield, passenger's side fabricated of 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

COVER, OFFICER'S SIDE FRONT BUMPER COMPARTMENT

The officer's side bumper compartment shall have a raised hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch.

MECHANICAL SIREN

One (1) Federal Signal Q2B siren model #Q2B-012PSD electro-mechanical siren shall be mounted on the extended front bumper, driver's side outboard. The Q2B siren shall be a streamlined, chrome plated siren designed to provide reliable and long-life operation. The electro-mechanical siren shall produce the distinctive Q2B sound that is a registered trademark of Federal Signal, and shall be provided with a heavy duty clutch and an electric brake.

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The Q2B siren shall measure 10.5" high x 14" long x 10" deep and shall produce 123 decibels at ten feet. The siren shall operate off the vehicles 12V system. The Q2B siren shall be pedestal mounted in the front of emergency vehicles.

The siren brake switch shall be located within reach of the driver.

SIREN WIRING

The siren activation switch shall be wired through the chassis park brake and operate in the "Response Mode" only.

SIREN FOOT SWITCHES

Two (2) foot operated switches shall be installed, one (1) on each side on the driver and officer's side wired to the mechanical siren.

AIR HORN, PASSENGER'S SIDE

There shall be one (1) 24" long Grover air horn installed in compliance with NFPA through the front bumper, passenger's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system through an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability.

AIR HORN, DRIVER'S SIDE

There shall be one (1) 24" long Grover air horn installed in compliance with NFPA through the front bumper, driver's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system through an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability.

SPEAKER, DRIVER'S SIDE

There shall be one (1) speaker installed through the front face of the bumper, driver's side, outboard.

One (1) Federal Signal DynaMax model ES100 speaker shall be provided. The 100-watt speaker shall be of compact design and shall be 5.5" high x 5.9" long x 2.67" deep. The speaker shall be fully encapsulated with no terminals exposed and built to withstand tough conditions.

The DynaMax speaker shall be constructed of solid aluminum and incorporate the driver and projector into the housing. This shall allow the speaker to operate at a cooler temperature and shall run more efficiently than conventional speakers. The DynaMax speaker shall meet SAE J1849, CAC Title 13, Class A requirements.

RECEIVER HITCH, BELOW FRONT BUMPER

One (1) Class 3 receiver hitch shall be installed below the front bumper centered between the frame rails utilizing grade eight bolts.

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There shall be one (1) 12v Quick Connect, battery powered lead, wired to the chassis electrical system to supply a portable winch. The connector shall be located at the receiver location.

A warning label permanently affixed in close proximity of the receiver shall be installed stating manufacturer's suggested maximum load rating.

PORTABLE WINCH

A Warn Series XD9000i, 9000 lb. portable electric winch shall be provided to mount in the specified Winch receivers. The winch shall be equipped with the portable framework, 12VDC quick connections and direct drive cone brake, heavy duty thermally protected series wound industrial electric motor and a hardened steel 3-stage planetary gear train.

A 25' industrial remote control head shall be provided with the remote plug mounted directly on the winch housing. The winch shall be equipped with 100' of 5/16" EIPS industrial grade wire rope, including hook. A four-way fair lead roller assembly shall be provided at the winch opening. The winch shall meet all requirements as outlined in NFPA 1901. A storage mount shall be fabricated to store the winch in a compartment.

RECEIVER HITCHES, LEFT/RIGHT/REAR OF BODY

Three (3) Class 3 receiver hitches shall be installed, one (1) on each side below the left and right side rear body compartments and one (1) below the rear step utilizing grade eight bolts.

A warning label permanently affixed in close proximity of the receiver shall be installed stating manufacturers suggested maximum load rating.

12 VOLT WINCH QUICK CONNECTS

There shall be three (3) 12v Quick Connect, battery powered leads, wired to the chassis electrical system to supply a portable winch. The connectors shall be located one (1) each at the receiver locations.

AIR HORN CONTROL, LANYARD

There shall be one (1) Lanyard air horn control installed in the cab between the driver and the officer. The Lanyard shall be wired through the chassis air brake system.

AIR HORN WIRING

The air horns shall be active in both the "Scene" and "Response Mode".

SWITCH, HORN/AIR HORN SELECTOR

A driver controlled horn/air horn selector switch shall be installed in the cab and operate either air horn(s) or chassis electric horn through the horn ring button.

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FRONT AXLE

The front axle shall be a Meritor MFS-20 with 23,000-pound capacity equipped with oil seals and transparent cover for oil level inspection.

CHASSIS WHEELBASE

The chassis wheelbase shall be 236 inches.

CHASSIS FRAME RAILS

The chassis frame rails shall be constructed of 110,000-PSI minimum yield steel that has been formed into a "C" channel shape with dimension of 10.50" x 3.50" x .375 inches.

An inner frame liner of 110,000 Pound minimum yield with dimension of 9.69" x 3.13" x .313" shall be provided for additional strength and to reduce deflection. The frame liner shall run from centerline of front axle to rear of the mainframe rail. This liner shall be mitered at 45 degrees at the front axle.

The resulting frame system shall have a minimum section modulus of 30.38 cubic inches with a resisting bending moment of 3,342,000-inch pounds per rail.

The frame rails shall be powder coated in order to insure superior paint adhesion. Frame cutouts for the engine shall be made with a plasma torch in order to minimize the heat-affected zone caused by the cut.

All frame-mounted components shall be secured with grade eight bolts with hardened washers and distorted thread locknuts. Flanged head bolts with nylon locking nuts, or huck bolts shall not be acceptable.

PAINT, FRAME RAIL

The chassis frame rails, cross members, fuel tank and air reservoirs shall be completely encapsulated in a ruggedized, protective coating. The air reservoirs, reservoir hanger straps and fuel tank shall all be treated separately prior to assembly. The frame, cross members, bumper backing reinforcement plate, radiator skid plate, spring hangers, cab lock mounts and required bolts shall all be in place prior to treatment to ensure complete coverage.

F-Shield, a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

This corrosion prevention system is designed to repel deicing agents commonly used on winter roadways. Moving parts, such as steering linkages, cab locks, spring suspensions, axles, etc., shall not be coated with this material, but shall be painted with high quality gloss black paint.

The color of the F-Shield shall be red.

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STEERING SYSTEM

The steering system shall be a package certified by TRW for the application. All components after the steering column to the drag link shall be manufactured by TRW.

The steering system shall use a TAS-65 steering gear with an RCS-55 slave gear, which has the capacity to static steer the chassis loaded to 22,500 pounds with 425-size tires. The use of two (2) equal size gears or a single gear with an assist cylinder shall not be acceptable.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer. Cramp angle is set to achieve the greatest turning radius possible with the selected components of the vehicle. Each front wheel is set to zero degrees. The wheel is then turned until it reaches the steering stops. This measurement is the cramp angle.

FRONT SUSPENSION

The front suspension shall be parabolic (taper leaf) spring type, with four (4) leaves 23,000 pounds capacity. The leaves shall be a minimum of 4" wide x 54" long (flat), with grease fittings for lubrication installed in the spring pins. Axle stops with energy absorbing jounce bumpers shall be supplied on the spring top pad. Double acting Koni shock absorbers shall be provided on the front suspension.

FRONT BRAKES

The front axle shall be equipped with EX-225 air operated disc brakes and ventilated rotors.

CRAMP ANGLE

The cramp angle of the front axle shall be 41 degrees.

FRONT TIRES

The front tires shall be Goodyear 425/65-R22.5 Load Range "L" G-296 MSA all-weather treads with a capacity of 23,000 pounds.

FRONT WHEELS

The front axle wheels shall be Alcoa Polished Aluminum for 425 tires with a rating of 23,000 pounds.

FRONT WHEEL TRIM

The front axle wheels shall be trimmed with stainless steel hub and lug nut covers. The axle's hub covers shall be equipped with holes for oil level viewing.

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MUD FLAPS, FRONT

The front axle mud flaps shall be constructed from hard black rubber and installed behind the front axle.

REAR AXLE

The rear axle shall be a Meritor RS-30-185 with a 33,000 pound service rating. The axle shall be equipped with oil seals.

REAR SUSPENSION

The rear axle suspension shall be rated up to 33,000 pounds capacity. The main spring pack shall have thirteen (13) leaves with a four (4) leaf auxiliary pack. The suspension shall be a torque leaf, variable rate, self-leveling slipper type.

REAR AXLE DIFFERENTIAL

The Meritor RS series rear axle shall have a standard differential.

VEHICLE TOP SPEED

The rear axle shall be geared for a top speed of 60-62 MPH at governed engine speed.

REAR BRAKES

The rear axle shall be equipped with 16-1/2" x 8-5/8" S-Cam air operated brakes with automatic slack adjusters.

REAR TIRES

The rear tires shall be Goodyear 315/80R22.5 L/20 Ply- G670RV all-weather treads with a rated capacity of 33,000 pounds.

REAR WHEELS

The rear wheels shall be Alcoa Polished aluminum, 9.00" X 22.5" 10-bolt, hub-piloted type. The outside wheels shall be polished on the outer surface. The ground rating shall be a minimum of 33,000 pounds.

REAR WHEEL TRIM

The rear axle wheels shall be trimmed with stainless steel "Lincoln Hat" hub and lug nut covers.

TIRE PRESSURE MONITORING SYSTEM

Each tire installed on the apparatus shall be equipped with a tire pressure monitoring device. The device shall consist of a valve stem cap with an LED tire alert to indicate tire pressure conditions. The LED shall flash when the tire drops 8 psi below the factory setting.

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REAR DUAL TIRE EQUALIZATION SYSTEM

The dual rear tires shall be supplied with Crossfire tire equalization valves and stainless braided balance lines. This system shall provide dual tire blowout protection, as well as, slow leak protection between the rear tires.

HOSE AND HARNESS ROUTING

Battery cables, hydraulic hoses and air lines shall be routed through the vertical face of the chassis frame rails using bulkhead connectors. The use of grommets through frame rails, as well as running hoses or cables under, over or ahead of the chassis frame rails to achieve positive connections shall not be acceptable.

For ease of maintenance, the wiring harnesses, hydraulic hoses and air hoses shall be divided down each frame rail. The hydraulic and air hoses shall be run, primarily, down the inside of the right side frame rail, while the electrical harnesses shall be run, primarily, down the left side frame rail. Harnesses and hoses shall be mounted using rubber coated, stainless steel holders and, where necessary, heat resistant zip loom.

AIR BRAKE SYSTEM

The air brake system shall meet the requirements of FMVSS-121. The system shall consist of three (3) reservoirs with a total capacity of 5100 cubic inches. The system shall be of dual circuit and quick build up design powered by an engine mounted gear driven air compressor. The system shall be protected by a heated air dryer with heated automatic moisture ejector on the wet tank and quarter turn brass drain valves on the other tanks.

The system shall be plumbed using color-coded nylon airlines with brass push-lock fittings.

ANTI-LOCK BRAKES W/ATC & ELECTRONIC STABILITY CONTROL

The apparatus shall have a Wabco ABS-based Electronic Stability Control (ESC), which offers another level of vehicle control. This automatic braking management system reduces the possibility of a side rollover and assists in the directional stability of the apparatus. Upon reaching critical lateral acceleration thresholds, the system intervenes to regulate the vehicle's deceleration and braking functions. Reducing the engine's RPM by overriding the foot throttle input and applying the engine retarder (if equipped) to slow the apparatus giving the driver added control and maneuverability. The ESC shall also apply braking power to selective wheel of the front and rear axles to assist in stabilizing the apparatus to its intended direction. This selective braking application and reduction of speed and torque reduces the possibility of spinouts and side rollovers even in adverse conditions.

A Wabco 4-channel Anti-Lock Braking System shall be installed which includes four (4) wheel sensors and four-(4) modulators to control and compensate braking force at each wheel. This system shall monitor all wheel ends regardless of suspension type, and which axle it sees braking forces first.

An ABS warning light shall be installed on the driver's dash that remains illuminated until the vehicle is moving at least four (4) miles per hour. An ABS test switch shall be installed in the "Diagnostic Information Panel" that when pressed, sends the system into diagnostic mode causing the ABS light to blink (I/O) indicating a flash code. A listing of flash code definitions is included in the Wabco Owner's Manual.

Automatic Traction Control (ATC) shall be installed to sense wheel slip, apply air pressure to brakes, and reduce engine torque to provide improved traction. An ATC indicator light shall illuminate when the system is active.

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A mud and snow switch shall be provided. When the switch is in the "ON" position, it shall allow momentary wheel slip to obtain traction under extreme mud and snow conditions.

The system also includes a Steering Angle Sensor (SAS), which informs the system of the degree in which the steering is turned to one side or the other. Along with the SAS, an ESC module is mounted mid frame at the rear of the chassis cab to detect roll, pitch, and yaw angles and computes which wheel(s) brake(s) shall be acted upon.

ACCESSORY AIR TANKS

Two (2) 1700 cubic inch additional reservoirs shall be connected to the chassis air system to provide an air supply for accessories such as air powered tools. The reservoirs shall include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

DEDICATED AIR HORN RESERVOIR

One (1) 1700 cubic inch additional reservoir shall be connected to the chassis air system to provide an air supply for the chassis air horns. This reservoir shall include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

AIR DRYER

The air system shall include a Wabco System Saver 1200 air dryer with integral 12-volt heated moisture ejector. The air dryer shall have a spin on desiccant cartridge and incorporate an integral turbo cutoff valve. The turbo cutoff allows the air dryer to purge water and contaminants without any loss of turbo boost or engine horsepower.

AUXILIARY AIR OUTLET

There shall be one (1) air outlet installed inside the driver's doorstep area plumbed to the vehicle's air system. The outlet shall incorporate a pressure protection valve to prevent interference with the vehicles air brake system.

ENGINE

The vehicle shall be equipped with a Cummins ISL 450 turbocharged diesel engine. Standard features include an electronic governor, electronically controlled unit injectors, Farr air cleaner, a 12-volt starter Delco 39 MT, and an 18.7 CFM compressor. The oil filter shall be a full flow and bypass design.

This engine conforms to the US 2013 EPA regulations for heavy-duty diesel engines.

ENGINE SPECIFICATIONS

- Model: ISL
- Number of Cylinders: Six (6)
- Bore and Stroke: 4.49" X 5.69"
- Displacement: of 8.9 L
- Rated Horsepower: 450 @ 2100 RPM
- Peak Torque: 1250 @ 1400 RPM

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- Governed Speed: 2200 RPM

TRANSMISSION

The chassis shall be equipped with an Allison 3000 EVS automatic transmission. It shall have 4th gear operating controls and programmed for Fire Apparatus vocation. An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The transmission shall be geared to provide one-to-one ratio in fourth gear for fire pump applications. This dedicated "lockup" circuit is provided for pump operation. The transmission fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the governed engine speed.

The transmission shall be equipped with an automatic neutral feature. Applying the parking brake shall command the transmission to neutral, regardless of drive range requested on the shift selector which shall require re-selecting the drive range to shift out of neutral.

The transmission shall be equipped with dual PTO ports with engine speed capabilities. The transmission shall be cooled by the radiator-mounted heat exchanger. The transmission fluid shall meet Allison specification TES-295.

TRANSMISSION SHIFTER, PUSH BUTTON

The transmission shall be controlled by an Allison push button shifter internally illuminated for night operation. The shifter shall be mounted on the dash to the right of the steering column. The transmission shall be capable of five (5) speed operation.

The transmission shall be equipped with the oil level sensor (OLS); this sensor shall allow the operator to obtain an indication of the fluid level on the shift selector. The sensor display shall provide the following checks - correct fluid level, low fluid level and high fluid level.

DRIVELINES

The chassis shall be equipped with Neapco 1710 series driveshaft with full round yokes and universal joints. The driveshaft tubing shall be a minimum of 4.00" diameter with .134" wall thickness. The drivelines shall be balanced at a minimum of 3000 RPM.

FIRE PUMP MOUNTING

Extra heavy-duty mounting brackets shall be bolted to the chassis frame rails for the installation of the fire pump. The mounting brackets shall be positioned aligning the pump insuring the angular velocity of the driveline joints are the same at each end allowing for full capacity performance with minimal vibration.

ENGINE COMPRESSION BRAKE

The engine shall come equipped with a Jacobs "C-Brake" compression brake controlled by two (2) switches located in the cab - an on/off and low/medium/high. The compression brake shall interface with the anti-lock brake controller to prevent engine brake operation during adverse braking conditions.

A pump shift, interlock circuit shall be provided to prevent the engine brake from activating during pumping operation.

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ENGINE COOLING SYSTEM

The engine cooling system shall have the capacity to cool the engine according to the engine manufacturer's requirements.

RADIATOR

The engine radiator shall be of a bolted design and have a minimum core area of 1570 square inches. The top and bottom tanks shall be stamped 11-gauge steel. The tanks shall be attached to the header assemblies with a minimum of fifty (50) 5/16" bolts. The spacing between fasteners shall not exceed 2.00" in order to minimize the possibility of leaks.

The header plates shall be made of 16-gauge brass while the tubes shall be .0068-inch thick brass and .076 by .625 inches in size. The tubes shall have a smooth bore with welded seams which allows for cleaning of the radiator.

The radiator shall contain three rows of tubes with a minimum of 98 tubes per row for a total of not less than 294 tubes. The tubes shall be arranged in an inline profile across the core. Louvered serpentine fins constructed of copper with a density not greater than 16 fins per inch shall be used in the construction of the radiator.

The radiator tubes shall be attached to the header plates with a Beta-Weld dual bonding process. The coolant side connection shall be welded, while the airside shall be soldered.

The top tank shall include an integral deaeration tank, which removes air from the engine water. The top tank shall include a sight glass for coolant level inspection without removing the radiator cap. A low coolant warning shall be incorporated to alert the driver.

The bottom tank of the radiator shall incorporate oil to water plate-type cooler for the transmission. The cooler is designed to cause a turbulent flow of the transmission oil through the core to force heat transfer. The cooler shall be sufficient to cool an Allison Transmission without output retarders.

To minimize stress from road and engine vibrations on the radiator, a shock mount shall be used. This mounting system shall consist of .375" outside diameter long threaded rods, washers and bolts plus heavy rubber shock absorbers.

A high efficiency fan shall be surrounded by a formed welded fan shroud. The sweep of the fan shall not exceed the width of the radiator core. Fan diameters that exceed the width of the radiator core shall not be acceptable.

CHARGE AIR COOLER

The charge air cooler shall be constructed of aluminum with cast, aluminum side tanks. The cooler shall have a frontal core area of not less than 1033 square inches.

The exterior fins shall be louvered serpentine design constructed of .006-inch thick aluminum and have a density no greater than seven (7) fins per inch. The internal fins shall be designed to create air turbulence in order to increase heat transfer efficiency.

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The charge air cooler shall be mounted directly ahead of the radiator and to the radiator headers. Rubber isolators shall be used at the mounting points to reduce transmission of vibrations.

The piping between the charge air cooler and engine shall use four-(4) ply silicone woven Nomex hoses with stainless steel bands. The bands are used to maintain the shape of the hose during changing turbo boost pressures. The hoses shall be attached with stainless steel constant tension hose clamps.

COOLING SYSTEM FAN

The engine cooling system shall incorporate a thermostatically controlled fan clutch. When the fan clutch is disengaged, the vehicle shall have improved vehicle performance, cab heating in cold climates, and fuel economy, while eliminating the potential dangers associated with a fan going from non-rotating to rotating as found with other style fan clutches.

The fan shall automatically lock-up when the vehicle is placed in pumping mode.

A shroud and recirculation shields system shall be used to ensure that once air has passed through the radiator, the same air is not drawn through again.

RADIATOR COOLANT, LONG LIFE

The coolant system shall contain a mixture to keep the coolant from freezing to a temperature of -34 degrees F.

The coolant supplied shall be Long Life Coolant compatible with the engine manufacturer's requirement.

COOLANT HOSES

The chassis shall be equipped with silicone hoses for the radiator and heater circuits.

COOLANT HOSE CLAMPS

Gates PowerGrip clamps shall be provided for all coolant and heater hoses. The maintenance-free clamps retain dynamic tension and never need retightening. These clamps stop leaks, even on out-of-round applications. The clamps are made from a heat sensitive thermoplastic with memory to prevent over or under tightening. The clamps shall have a temperature range of -40 degrees F to -302 degrees F.

AUXILIARY ENGINE COOLER

The cooling system shall have a tube and bundle engine cooler mounted in the upper radiator water pipe. Water from the fire pump shall be circulated through 1/2" tubing to the cooler. A valve located on the pump panel shall control the cooling circuit.

ENGINE BLOCK HEATER

A Phillips 1000-watt 120-volt AC engine coolant heater shall be installed into the engine cylinder block. The coolant heater plug shall be located in the driver's step well.

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BLOCK HEATER WIRING

The engine block heater shall be wired to a separate Auto Eject specific to the block heater. The Auto Eject cover shall be provided with a KUSSMAUL label, 091-55NP-04, marked "BLOCK HEATER - 120 VOLT A.C. INPUT".

20 AMP SUPER AUTO-EJECT, BLOCK HEATER

There shall be provided one (1) super auto-eject type receptacle model 091-55-20 wired to the engine block heater. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle shall be provided with a weatherproof cover. The cover shall be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto-eject receptacle shall be mounted in a location specified by the Fire Department and is designed to accept a 120V AC from a shoreline plug.

The UL maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 20-amp receptacle should not carry more than 16-amp continuous load. When adding the different amperage draws of the components being installed on the chassis, be sure to figure in whether the components shall draw a continuous load or intermittent load.

The Auto Eject cover shall be a Kussmaul 091-55BL, blue in color.

SHORE POWER INLET PLATE

A shore-power "Inlet Plate" shall be permanently affixed at or near the power inlet.

The plate shall indicate the following:

- Type of Line Voltage
- Current Rating in Amps
- Power Inlet Type (DC or AC)

FUEL TANK

The chassis shall be equipped with a 65-gallon rear mounted fuel tank. The tank shall be constructed of stainless steel with stainless steel mounting straps and rubber isolators secured to the bottom flange of the chassis frameroils. The tank shall be baffled to prevent sloshing, vented, and have a drain plug installed on the bottom. A 240-33 ohm fuel-sending unit shall be provided and broadcast across the SAE J1939 data link.

The tank shall be certified to meet FMCSR 393.65 and 393.67.

FUEL LINES

The fuel lines shall be wire braid reinforced fuel grade hose. They shall have reusable fittings and be routed along the inside of the frame rails. Fuel lines shall be protected against chaffing by non-conductive, frame mounted standoff fasteners and, where necessary, with heavy-duty plastic zip loom.

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FUEL SHUTOFF VALVE

One (1) fuel shutoff valve shall be installed in the suction side of the fuel lines near the fuel filters to prevent the loss of prime during fuel filter maintenance.

FUEL FILTER

The Cummins engine shall be supplied with a fuel water separator with a bottom drain valve.

FUEL/WATER SEPARATOR

A Racor model B32001 fuel water separator shall be installed in place of the standard Cummins fuel filter.

EXHAUST SYSTEM

The apparatus shall contain a particulate filter and SCR (Selective Catalytic Reduction) device downstream of the engine's turbo. This filter and SCR device are required to maintain US 2010 EPA Emissions. This filter and SCR device replaces the conventional style filter. The location has been engineered, tested, and set to allow for proper regeneration. Therefore, this filter cannot be removed, altered, or relocated.

An indicator light panel for this system shall be located in the cab informing the driver of the systems status. At times a forced regeneration may be required, which would be indicated by a combination of illuminating and/or flashing lights depending on the engine model.

A momentary switch labeled "Regen" shall be located within reach of the driver's seated position. The regeneration switch initiates the forced regeneration. A momentary DPF inhibit switch prevents the vehicle from having the ability to regenerate. Once the inhibit feature has been activated the ignition switch must be cycled off/on to return the vehicle to normal regen. All vehicles equipped with pumping applications shall allow for passive regeneration whenever the system requires and the engine is at its proper parameters unless inhibited by the DPF inhibit switch. In no way shall this feature affect the RPM of the engine being controlled by the pump operator.

The engine exhaust system shall be horizontal in design using stainless steel tubing mounted under the frame rail right side extending forward of the rear wheels.

An exhaust temperature mitigation device shall be installed. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ALTERNATOR

The alternator shall be a Delco Remy model 55SI 430 amp. The alternator shall be engine driven via a poly-groove power belt with an automatic tensioner. The alternator shall be a brushless design. The alternator shall meet all current applicable NFPA 1901 Edition requirements for performance.

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BATTERY SYSTEM

The battery system shall be a single system consisting of six (6) Group 31, 12-volt DC, heavy-duty, high cycle automotive batteries. The battery bank shall have a minimum group rating of 3750 cold cranking amperes (CCA) and a reserve of 1,080 minutes at 80 degrees Fahrenheit.

All battery wiring shall be welded battery cable capable of handling 125% of the actual load. It shall be run through a heat resistant flexible nylon "HTZL" loom rated at a minimum of 300 degrees Fahrenheit. All cable connections shall be machine crimped and soldered.

BATTERY BOXES

The chassis batteries shall be mounted in welded and bolted stainless steel battery box. The battery hold-downs shall be made of structural, stainless steel angle. Painted carbon steel battery boxes shall not be acceptable.

STAINLESS STEEL BATTERY BOX COVERS

Each battery box shall include a stainless steel cover which protects the top of the batteries from road spray. Each cover shall include flush latches which shall keep the cover secure as well as a handle for convenience when opening.

BATTERY JUMPER STUDS

One (1) set of battery jumper studs shall be provided on the chassis. The studs shall be connected to the chassis batteries with 1/0 color coded cables, red for the positive cable and black for the negative cable. The studs shall be protected with color coded plastic covers when not being used.

A tag shall be provided for positive/negative terminals.

The battery jumper studs shall terminate at the front step well area driver's side.

SWITCH, MASTER BATTERY DISCONNECT

The chassis batteries shall be wired in parallel to a single 12-volt electrical system, controlled through a heavy-duty, Guest brand rotary type, master disconnect switch. The master disconnect switch shall be located within easy access of the driver upon entering or exiting the cab. All electrical circuits shall be disconnected when the switch is in the "OFF" position.

TOTAL SYSTEM LOAD MANAGER W/HIGH IDLE

The apparatus shall be equipped with a Class 1 Total System Manager (TSM) for performing electrical load management. The TSM shall have two (2) modes of operation, a "Calling Right of Way" and a "Blocking Right of Way". The "Blocking Right of Way" mode is activated only when the park brake is set. Load shedding shall "only" occur when the apparatus is in the "Blocking Right of Way" mode or when the battery voltage level reaches your programmed shed level.

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Outputs 1-12 shall be independently programmable to sequence on with the ignition or master warning switch. Outputs 1-12 shall also be programmable to be activated during the "Calling Right of Way" mode and/or the "Blocking Right of Way" mode. Output 13 is a user configurable output and is programmable for activating between 10.5 and 15 volts. Output 14 shall provide a low voltage warning for an isolated battery. Output 15 shall be designated to activate a fast idle system. Output 16 shall provide a low voltage alarm that activates at the NFPA required 11.8 volts.

The Total System Manager shall have an internal digital display to indicate systems voltage is in normal operation mode and indicates the output configuration during programmable mode.

The Total System Manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a metal enclosure to enhance EMR/RFI protection.

BATTERY CHARGER

A Kussmaul Auto Charge 1200 series model 091-187-12-Remote shall be mounted in the vehicle to maintain the chassis electrical system.

The onboard automatic battery charger shall sense battery voltage drop and recharge the batteries to full capacity. The state of charge shall be indicated by the bar graph located on the front of the unit.

The charger shall have the following operational specifications:

Input:	120 volts, 60 Hz, 10 amps
Output:	12 volts DC, 40 Amps
Input Fuse:	15 amps, Fast Acting
Voltage Sense:	Remote Electronic

The battery charger shall supply a 'single battery bank' with automatic operation and with an aluminum enclosure. The system shall have a built-in sense circuit to check battery voltage 120 times a second; the system shall compensate for voltage drop in charging wires and provide quick recharging with no overcharging. The unit shall include front panel connections for a remote display.

SUPER AUTO-EJECT, 20 AMP

There shall be provided one (1) super auto-eject type receptacle model 091-55-20. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle shall be provided with a weatherproof cover. The cover shall be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto eject receptacle shall be mounted in a location specified by the Fire Department and is designed to accept a 120V AC from a shoreline plug.

The UL maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 20-amp receptacle should not carry more than 16-amp continuous load. When adding the different amperage draws of the components being installed on the chassis, be sure to figure in whether the components shall draw a continuous load or intermittent load.

The Auto Eject cover shall be a Kussmaul 091-55YW, yellow in color.

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SHORE POWER INLET PLATE

A shore-power "Inlet Plate" shall be permanently affixed at or near the power inlet.

The plate shall indicate the following:

- Type of Line Voltage
- Current Rating in Amps
- Power Inlet Type (DC or AC)

DISPLAY, BAR GRAPH

The charger shall include a model 091-199-001 remote digital display.

UREA STORAGE TANK

There shall be a 5-gallon urea tank located in the L1 body compartment. The L1 compartment door shall serve as the access door for filling this tank. There shall be a urea level gauge located in the cab's main instrument panel.

CUSTOM CAB

The Command cab shall be an engine forward, extended long four-door, (raised roof) full tilt cab. The cab shall be an "Open Interior" roll cage design requiring no inner walls or vertical interior supports. The cabs roof shall be raised 21 inches providing additional headroom above the crew area. The raised portion shall start midway over the driver and officer seats. The cabs seating capacity for emergency personnel shall be eight.

All storage areas inside the cab shall fully comply with NFPA 1901 restraint requirements of 9G's.

CRASH TEST

The cab shall exceed the strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R. The test shall consist of an impact load test and a vertical load test to the cab.

The cab shall have a frontal impact test via pendulum, with an impact load in excess of 127% of the ECE-29R Standard. The estimated speed of the 3736-lb (1698-kg) pendulum shall be a minimum of 18.2 mph. The cab doors shall be closed during the impact test but be able to open after impact. There shall be no passenger intrusions or any structural component failures. The cab shall meet or exceed all criteria of this portion of the test.

In conjunction with the frontal impact test, a vertical load test shall be implemented to the cab. The cab roof shall be loaded with a minimum of 65,979 lbs. (29.53 metric tons). There shall be no failure to the cab structure or mountings, any passenger compartment intrusion or degradation of occupant survival space, or any other structural failure. The cab shall meet or exceed all criteria of this portion of the test.

A complete photographic, video, data, and dimensional record of these tests shall be available and placed on record for customer evaluations.

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CAB MATERIALS

The cab shall be constructed entirely of aluminum alloy extrusions and 3/16" (.188) thick, 5052-H32 alloy, marine grade aluminum sheets. The corner posts, door slam posts, roof rails and doorframes shall be made of custom extrusions designed specifically for this cab with slots for inserting the skin. The rear wall and roof shall be reinforced with a grid of rectangular extrusions, which are welded to the overall cab extrusion framework. The front corner caps shall consist of castings designed specifically for this cab with relief areas cast in place for attachment of roof skin and intersecting structural extrusions. Overlapping formed corner caps are not acceptable.

CAB DIMENSIONS

- Overall width skin to skin: 100 inches minimum
- Overall vehicle width: 120 inches (w/standard mirrors)
- Overall length: 154 inches
- Cab Height Front: 87 inches
- Cab Height Rear: 108 inches
- Center of front axle to back of cab: 80 inches
- Windshield area: 4200 square inches
- Front grill opening: 470 square inches
- Side grill opening: 105 square inches
- Cab full tilt angle: 45 degrees
- Cab full tilt height: 209 inches
- Floor to ceiling in front: 60 inches
- Floor to ceiling in rear: 79 inches
- Engine cover height: not to exceed 27-1/2" front-to-back and side-to-side
- The Driver shall have no less than 24-1/4" of hip room
- The Officer shall have no less than 23-1/4" of hip room

DOUBLE WALL CAB FACE

The cab front shall be of double wall construction resulting in a sealed firewall. The inner and outer walls shall both be formed from 3/16" thick, 5052 H32 alloy aluminum with structural aluminum reinforcements. This design provides for increased structural integrity, crew safety, and reduced road noise in the passenger area. The outer wall is used for mounting forward lighting, grill and windshield wipers. The inner portion shall be treated with a heavy black undercoating material for corrosion prevention.

SEALED ENGINE TUNNEL

The engine tunnel shall be a structural part of the passenger cab, constructed from welded 3/16" aluminum plate and reinforced with aluminum extrusions. The rear of the engine tunnel shall be no less than 75" inches from the rear wall of the cab, allowing maximum legroom for forward facing passenger. After welding, the seams shall be completely sealed with silicone caulking.

Engine enclosures that are not an integral part of the cab structure are not acceptable.

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The interior of the engine tunnel shall be insulated with 1" thick foil backed insulating foam, attached with stud and button method. A cross-section analysis of the insulation shall reveal a 1/8" thick barrier material for additional noise and heat insulation.

CAB FLOORS

Cab floors shall be constructed from an aluminum extruded frame and 3/16" thick aluminum plate. Floor mats and insulation are detailed later in this specification.

The forward cab floor shall be as large as possible for both the driver and officer. Floorboards shall extend in width from the side of the engine tunnel all the way to the cab door inner panel. They shall extend forward from the seat riser to the inner portion of the double wall cab face. The officer shall have approximately 28" of foot room.

The entire rear floor of the cab, to reduce trip and fall hazards, shall be a single plane. In applications requiring the use of a top-mounted PTO, a raised area in the floor may be required.

For maximum crew comfort and elimination of leg fatigue during emergency responses, the floor beneath the rear facing jump seats shall be large enough for a seated firefighter to rest both feet side-by-side. Cab floor designs that are wide enough for only one foot shall not be accepted.

CAB CORROSION PROTECTION

A corrosion preventative material shall be applied during cab construction. A ten-(10) year warranty against corrosion perforation shall be provided for the cab.

WHEEL WELL LINERS

Full wheel well liners shall be installed beneath the cab to protect the bottom of the cab from road splash. The liners shall be constructed of aluminum and be full width.

The wheel well liners shall be attached with threaded fasteners and be easily removable for service.

FENDERETTES

Bright polished stainless steel fenderettes shall be installed at the wheel well openings. A rubber gasket shall be installed between the fenderette and cab to eliminate contact of dissimilar metals.

WINDSHIELD

The windshield shall have approximately 4200 square inches of unobstructed viewing area. It shall be a two-(2) piece design with tinted automotive safety glass, with a wraparound design. A .030-inch thick vinyl layer shall separate the laminated glass.

All other cab glass shall be tinted and tempered.

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INTERMITTENT WINDSHIELD WIPERS

Two electric "Pantograph" style windshield wipers shall be installed on the front face of the cab. The motors shall operate through a 72-degree sweep and include 24-inch blades to give superior wiper coverage. A washer reservoir of not less than 70 ounces shall be mounted to a latched door recessed in the officer's step.

A switch located on the turn signal control arm shall operate the intermittent wipers.

EXTERIOR GRAB HANDLES

Stainless steel handrails with a knurled, slip-resistant finish shall be positioned behind each cab door. Grab rails shall be minimum 24" in length. Molded rubber gaskets shall be mounted between the grab handles and the cab in order to prevent corrosion due to dissimilar metals being in contact.

EXTREME DUTY CAB INTERIOR

Cab floors shall be covered with a pebble grain rubber matting with barrier type insulation. Edges of the insulation shall be trimmed with extruded aluminum angle for a pleasing appearance.

An insulated covering shall be fitted over the engine tunnel. Made from the same material as the cab floor insulation, this covering shall insulate the cab from engine heat and noise. A Cast Products aluminum door on top of the engine tunnel shall provide access for fluid checks.

The back side of the engine cover, as well as a 2" to 3" return on the top side, shall be covered with a sprayed aluminum panel and be of sufficient strength to allow for 9G resistant mounting of any optional hand lights, entry tools, or other fire rescue equipment specified by the customer.

The cab shall have a custom built, smooth aluminum plate dashboard, overhead console, glove box, instrumentation panel and switch panel. The front overhead console shall include room for the three sun visors and the door open indicator light.

The front door posts shall be trimmed with styled aluminum covers that conceal any wiring, as well as including a mounting area for rubberized grab handles. The center windshield post shall be covered with F-Shield paint finish.

Prior to installing the headliner and rear wall padding, minimum R-7 insulation shall be installed between the interlocking extrusions.

These covers serve to finish the interior, cover wiring harnesses and insulate the interior from sound and heat.

CAB STEPS

All cab steps shall be of a stationary, fixed design that use no moving parts and requires no periodic maintenance other than cleaning.

There shall be an open-grip, bright finish step at each cab door opening. The area under the step shall be enclosed to prevent road dirt from entering the cab. There shall be provisions made at the front of the step for easily flushing out any dirt accumulation.

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At each door opening there shall also be an intermediate cab step. Intermediate steps shall be full width of the doorstep area and constructed from embossed aluminum tread plate.

CAB STEP HEIGHTS

The distance from level ground to the first cab step shall be 19-21 inches (24" with Independent Front Suspension), without using swing-down style or under-cab "stirrup" auxiliary steps.

The distance from first cab step to intermediate step shall be approximately 12.5 inches front and rear.

The distance from intermediate step to cab floor shall be approximately 9.5 inches in the front and 12 inches in the rear.

CAB DOORS

All cab doors shall be full length, designed to cover the step well area. Each cab door shall be flush type with a minimum opening of 85 degrees.

The front doors shall be approximately 40" wide by 78.5" tall. The doors shall have a two-piece window, one operational and one fixed. The combined viewing area shall be no less than 796 square inches. For added safety, the front door windows shall slant down for maximum visibility.

The rear doors shall be approximately 34" wide by 86.5" tall. The doors shall have a two-piece window, one operational and one fixed. The combined viewing area shall be no less than 867 square inches. The crew area windows shall have a dark tint applied.

The doors shall include a bulb style rubber seal around the perimeter of each door frame ensuring a weather tight fit.

The cab doors shall use internal and external paddle latches with a rubber gasket isolating the latch from the painted outside surface. The external latch shall have a chrome plated finish and the interior stainless steel. Both latches shall be oversized for easy access with a gloved hand.

Dovetail catch assemblies shall be installed in the doorjamb. The dovetail catch shall be V-shaped providing a positive catch and release system.

DOOR HINGES

Each cab door shall be attached to the cab with two concealed automotive style hinges with restraining strap.

CAB DOOR LOCKS

There shall be individual manual twist type door locks at each door handle. In accordance with FMVSS 206, all exterior door locks shall be keyed alike.

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WINDOW REGULATORS

All cab door windows shall be electrically operated. The driver's door shall contain four (4) switches to control the operation at each door. All remaining doors shall contain one (1) heavy-duty switch to control the window operation at that door.

SLIDING CAB WINDOW, LEFT SIDE

A vertical sliding window shall be installed in the left sidewall of the cab between the front and rear door. The window area shall be approximately 16-1/2" wide by 33-1/2" high with dark tint.

SLIDING CAB WINDOW, RIGHT SIDE

A vertical sliding window shall be installed in the right sidewall of the cab between the front and rear door. The window area shall be approximately 16-1/2" wide by 33-1/2" high with dark tint.

CAB TILT LOCK

The cab shall be supported at four points. At the front, there shall be two center bonded bronze bushings. At the rear, there shall be two hydraulic locking latches.

The cab shall tilt 45 degrees by means of a pair of hydraulic cylinders driven by the electric pump. The tilt system geometry shall be designed in such a way that the maximum hydraulic pressure in the system does not exceed one-half the pressure rating of the cylinders or pump when the cab is empty. This allows the Fire Department to leave some equipment in the cab when maintenance is required (although this equipment must be secured).

Once the cab is fully tilted, a safety latch shall automatically engage and act as a positive lock. The lock is released by a pull cable. The hydraulic cylinders shall be equipped with velocity fuses to prevent the cab from falling, should the hydraulic system fail.

The front of the cab pivots and rides on the center bonded bushings by means of lubricated pivot pins that retain the cab yoke in the bushings. The bushings allow limited movement of the cab, and isolate the cab from noise and vibration.

The rear mounts consist of a pair of hydraulic cab latches mounted on rubber cushioned mounting brackets. Latches release when the pressure in the tilt system exceeds 500 PSI.

An ignition interlock system shall be installed for cab tilt operation. Cab tilt operation requires the master battery switch to be in the on position with the parking brake applied.

CAB TILT PUMP W/MANUAL BACKUP

An electric over hydraulic cab lifting pump shall be provided to tilt the cab for engine and transmission service. The pump shall be operated by a remotely wired control box with coiled cord, weather resistant plug, and receptacle. An interlock shall be provided preventing the cab from inadvertently rising until the transmission is placed in the neutral position and the parking brake is set.

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In the event of electrical failure, a hydraulic manual backup shall be provided to tilt the cab.

COMPARTMENT, LEFT SIDE EXTERIOR CAB

One (1) exterior storage compartment shall be provided and installed below the cabs floor line and behind the crew door on the left side. The compartment shall be 22" wide x 22" high x 26-1/4" deep with a usable opening of 20-3/4" wide x 21" high. A pan style door shall be provided with stainless steel hinge and paddle style latch.

There shall be one door for the upper and lower cab compartments.

COMPARTMENT, RIGHT SIDE EXTERIOR CAB

One (1) exterior storage compartment shall be provided and installed below the cabs floor line and behind the crew door on the right side. The compartment shall be 22" wide x 22" high x 26-1/4" deep with a usable opening of 20-3/4" wide x 21" high. A pan style door shall be provided with stainless steel hinge and paddle style latch.

There shall be one door for the upper and lower cab compartments.

HEATING/AIR CONDITIONING SYSTEM

The climate control system shall use three (3) heater-air conditioner units.

The front circuits shall use two (2) heater-air conditioning units, mounted under the dash on the driver's side and under the officer's side. These units are each rated at 14,700 BTU heating and 19,200 BTU cooling. The units shall blow up toward the windshield through adjustable vents in the dash. Additionally, there shall be two (2) adjustable vents on each side to direct air at the lower portion of the driver and officer seating areas. Two switches, including low/med/high and heat/off/AC, shall control the front system.

A blend air switch shall be installed to operate both the front heating and cooling systems. This provides hot and dry air for defogging purposes.

The two front systems shall combine to put out a total of 688 CFM air flow.

The rear circuit shall use one large heater-air conditioner unit with a rating of 34,150 BTU cooling and 36,000 BTU heating. It shall be mounted under the forward facing rear seats. Ducting shall run up the rear wall to adjustable vents (minimum of six) running along the center of the ceiling toward the front of the cab. Two (2) switches including high/med/low and heat/off/AC shall control the unit. In addition to the rear control switches, there shall be an ON/OFF switch located near the driver to disable the rear unit if needed.

The rear system shall put out a total of 640 CFM air flow.

The total system shall have a capacity of 72,550 BTU cooling, 65,400 BTU heating and a total in-cab air flow of 1,328 CFM.

The entire roof and back wall shall be heavily insulated with 1" foam to enhance the cooling system.

Both heaters shall be plumbed with a shut off valve at the engine.

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The air conditioning system shall be powered through two (2) engine driven 9.5 cubic inch compressors.

Two (2) roof top condensers, each rated at 38,700 BTU, shall be provided.

The two (2) roof top condenser housings shall be black in color.

SEAT MATERIAL

The seats shall be covered with Durawear material.

SEAT COLOR

The cab seats shall be gray in color.

DRIVER'S SEAT

The driver's seat shall be a Bostrom Model Sierra high-back with air ride suspension. The seat shall have 4-way adjustability by the driver in accordance with SAE J1517. The seat shall be equipped with an integrated 3-point seat belt with an automatic retractor. The belt shall be red in color to meet current NFPA requirements.

OFFICER'S SEAT

The officer's seat shall be a Bostrom Tanker 450 SCBA with air suspension seat. Seat back shall include a spring-loaded flip-up headrest. The seat shall be equipped with a 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The belt shall be red in color to meet current NFPA requirements.

There shall be a SmartDock Gen II hands-free SCBA holder provided with the seat. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat.

There shall one (1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

CREW SEAT, DRIVER'S SIDE REAR FACING

One (1) outboard, rear facing, seat shall be installed behind the driver. The seat shall be Bostrom Tanker 450 SCBA non-suspension seat. The seat back shall include spring-loaded flip-up headrest. The seat shall be equipped with 3-point seat belt with automatic retractor. The belt shall be red in color to meet current NFPA requirements.

There shall be a SmartDock Gen II hands-free SCBA holder provided with the seat. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat.

There shall be one (1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

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CREW SEAT, OFFICER'S SIDE REAR FACING

One (1) outboard, rear facing, seat shall be installed behind the officer. The seat shall be Bostrom Tanker 450 SCBA non-suspension seat. The seat shall include a spring-loaded flip-up headrest. The seat shall be equipped with a 3-point seat belt with automatic retractor. The belt shall be red in color to meet current NFPA requirements.

There shall be a SmartDock Gen II hands-free SCBA holder provided with the seat. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat.

There shall one (1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

CREW SEATS, INBOARD FORWARD FACING

Two (2) inboard, forward facing seats shall be installed in the crew area. The seats shall be Bostrom Tanker 450 SCBA non-suspension seats. Seat backs shall include spring-loaded flip-up headrest. The seat shall be equipped with a 3-point seat belt with automatic retractor. The belts shall be red in color to meet current NFPA requirements.

There shall be one (1) Zico model ULLH air bottle bracket with a "CRS" (Collision Restraint Straps) provided with each seat. The brackets shall be a "Load & Lock" Walkaway style in compliance with the latest edition of NFPA. Each bracket shall consist of a back plate, short footplate, two non-mar double-coated seats, and adjustable strap assembly. The back plates and footplates are black thermoplastic coated for years of trouble-free service. One-Size fits all U.S. made 30 to 60 minute rated self-contained breathing apparatus.

There shall be two (2) SCBA seat cavity removable panels provided for a smooth back when the breathing air apparatus is not in use.

FRONT GRILLE

The front grille shall be a mirror polished stainless steel box style assembly with 448 square inches of open area. The grille shall measure 48" wide x 23.13" high x 1.56" deep.

The front grille shall be personalized that reads DOWNERS GROVE with backlit LED lights activated by the battery on/off switch.

SIDE INTAKE GRILLES W/EMBER SEPARATOR

Bright stainless steel grilles shall be installed approximately 70" above ground level one (1) each side of the cab between the front and rear cab doors. The grilles shall have a minimum open area of not less than 119 square inches serving as an air intake and warm air dispersant system.

An Ember Separator shall be installed between the stainless steel grill and the air filter system allowing fresh air to pass through to the engine while preventing particles of .039 inches (1.0 mm) or larger from entering the system in accordance with the latest version of NFPA easily accessible through the exterior stainless steel grille.

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The right side grille shall be notched to allow easy access without removing the cab handrail.

HEATED/REMOTE CAB MIRRORS

Two side-mounted Ramco heated/ remote single lens mirrors, with bus style arms shall be installed on the cab doors. The convex mirror shall be mounted above the flat lens assembly.

EXTERIOR TRIM, REAR CAB STEP WELL

The rear cab door stepping surfaces shall be trimmed with aluminum tread plate. There shall be tread plate covers that provide access to the chassis battery system.

TREAD PLATE CAB ROOF

The roof of the cab shall be covered with 1/8" (.125") aluminum tread plate. The material shall run between roof rail extrusion, side to side, and from the back of the cab forward to the light bar mounting feet. The tread plate shall be coated with a rust inhibitor and fastened to the cab with stainless steel fasteners. A bead of caulking shall be applied to the perimeter of the tread plate.

ADDITIONAL CAB INSULATION SPRAY

In addition to the standard insulation package the complete under cab, inside the cab ceiling and back wall (before standard insulation is installed), engine tunnel and floor shall be coated with VL-37 spray.

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine and the underside of the entire cab floor shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75" thick including a vertically lapped polyester fiber layer, a 1.0 lb/sf PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The cab floor insulation shall measure .56" thick including a 1.0lb/sf PVC barrier and a moisture and heat reflective foil facing, reinforced with fiberglass strands. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed MVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

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CAB CORROSION PROTECTION AND SOUND DEADENING

The apparatus cab shall be completely covered in one of two types of paint, prior to installation of any interior or exterior components, including insulation and floor mats. This process shall be required to guard against corrosion as well as to keep the cab as quiet as possible for firefighters.

The entire underside and double wall area at the front of the cab shall be cleaned, primed and sprayed with black F-Shield as a finish coat. This shall include any areas that are not normally visible after the cab is complete.

The entire cab interior shall be sprayed with F-Shield, as described later in these specifications. F-Shield shall be sprayed over the ceiling, floor, side walls, forward fire wall, rear wall, dash, engine tunnel, interior cab doors and both sides of the cab door panels.

The cab exterior shall be completely finish painted with DuPont paint, as described later in these specifications. This shall include the areas under any optional rear wall or cab roof diamond plate overlays.

The Fire Department shall, through the Virtual Manufacturing feature described earlier in these specifications, have the ability to see these areas covered with F-Shield prior to installation of items such as engine tunnel insulation, cab interior insulation and headliners, engine tunnel covering, floor mats, cab inner door panels, etc.

As a result of these cab corrosion protection measures, a ten-(10) year warranty against cab corrosion shall be provided to the Fire Department.

HEATER HOSE INSULATION

The heater hoses from the engine to the heater shall be insulated to reduce heat loss.

INTERIOR CAB FINISH

The interior of the cab shall be painted with a dark gray "F-Shield". The cab metal finish shall be covered with a coat of adhesion promoting primer.

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

The headliner (front and rear) and rear wall (if applicable) shall be covered with heavy-duty gray vinyl.

FLOOR MATS/ENGINE TUNNEL COVERING

The floor mats and engine tunnel shall be covered with gray pebble grain vinyl with 1/4" (.250") foam backing. The edges of the floor mats shall be trimmed with bright aluminum angle.

TREAD PLATE FLOORS

The front and rear floors of the cab shall be covered with 1/8" (.125") aluminum tread plate.

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INTERIOR TRIM, REAR WALL ALUMINUM PANEL

The entire interior rear wall of the cab shall be covered with 3/16" (.1875") smooth aluminum plate coated with "F-Shield".

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

The color of the rear wall panel shall match the interior of the cab unless otherwise specified.

CAB GRAB HANDLES, INTERIOR

Two (2) interior grab handles installed in the cab on the "A" posts, one (1) on each side. The grab handles shall be constructed of rubberized steel.

Four (4) interior grab handles installed in the cab, one (1) on each side on top of the front door panels adjacent to fixed window and one (1) on each side on the rear door panels. The grab handles shall be constructed of 1-1/4" knurled stainless steel. The grab rails shall be mounted with chrome plated end stanchions.

There shall be one (1) interior grab handle installed on the inside of each rear cab door. The handles shall extend horizontally with width of the window just above the window sill. The grab handles shall be constructed of bright stainless steel.

GLOVE BOX

The glove box shall be an integral part of the welded aluminum dashboard assembly and located on the officer side of the cab. The storage area of the glove box shall bolt in place for easy service access. The door shall be drop down style and constructed from brushed stainless steel with a recessed latch. The area above the glove box shall be flat for a work surface or optional MDT mounting.

SUN VISORS

The cab shall be equipped with three (3) sun visors. The visors shall be installed on the overhead panel and provide approximately 90 percent coverage across the width of the cab. The visors shall be approximately 26" wide and 6" tall.

UPPER DOOR PANELS

There shall be four (4) interior upper front and rear door panels installed covered with "F-Shield" extending from the window up to the top of the door. The color of the panels shall match the interior of the cab unless otherwise specified.

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated

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polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

LOWER DOOR PANELS

There shall be four (4) interior lower front and rear door panels installed covered with “F-Shield” extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified.

“F-Shield” is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

REFLECTIVE STOP SIGNS

There shall be four (4) "STOP" signs installed in the cab, one (1) on the lower door panel of each cab door.

ENGINE TUNNEL EQUIPMENT MOUNTING PLATE

There shall be one (1) equipment mounting plate installed on the engine tunnel constructed of 3/16” smooth aluminum plate covered with “F-Shield”.

“F-Shield” is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

EQUIPMENT MOUNTING PLATE, RAISED ENGINE TUNNEL PORTION

There shall be one (1) equipment mounting plate installed on the raised portion of the engine tunnel constructed of 3/16” smooth aluminum plate covered with “F-Shield”.

“F-Shield” is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

INSTRUMENTATION

For easy viewing, gauges shall be white faced with black lettering and adjustable intensity, LED backlighting. In order to reduce replacement and maintenance costs, the gauges provided shall be separate from one another and not in a cluster or arrangement. The gauges shall meet SAE J-1939 protocol to eliminate redundant sending units. Gauges must be fully sealed to 6 psi. Gauges shall have an operating temperature range of -40F to 185F. The gauge crystal shall be polycarbonate, anti-fog, and anti-scratch coated. The panels shall be divided into groups of instruments that make identification sensible and easy to view.

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The following panels shall be included:

- One driver side hinged gauge panel
- One driver side message center and indicator light panel
- Driver side pump shift panel (if required)
- Driver side park brake panel
- Driver side diagnostic connector
- Driver side ignition/climate control panel
- Center mounted rocker switch and siren panel, with a maximum capacity of 20 switches
- Officer side information panel

The following instruments shall be included:

- Dial Type speedometer with digital odometer and trip odometer that is active when pumping
- Dial Type tachometer with digital hour meter and trip hour meter along with a digital, four-line diagnostic display
- Dial Type engine oil pressure gauge with warning light and alarm
- Dial Type water temperature with warning light and alarm
- Dial Type transmission temperature with warning light and alarm
- Dial Type front air pressure gauges with warning light and alarm
- Dial Type rear air pressure gauge with warning light
- Dial Type voltmeter
- Dial Type fuel level gauge with low fuel indicator level
- Dial Type Diesel Exhaust Fluid gauge with low level indicator
- Air cleaner restriction light
- High beam indicator
- Parking brake indicator
- Turn signal indicators
- Diagnostic indicators for airbag, engine, transmission, and ABS

An anti-lock braking system (ABS) test switch and parking brake control valve shall be located to the right of the steering column.

SERVICE ACCESS

The driver's instrumentation area shall be made of textured black non-glare panels affixed to the aluminum dash. There shall be a single gauge panel, secured with a bottom hinge and four (4) quarter-turn fasteners. Access to the gauge clusters shall be accomplished simply by releasing the latches and pulling the panel outward. Other gauge access designs are not acceptable.

The chassis electrical panel shall be located in the center of the aluminum dash, between the switch panel and the windshield. There shall be a lift up cover, with two (2) recessed lift-and-turn latches for quick access to the panel. The underside of the panel shall have a pre-printed diagram that clearly depicts the function of each circuit breaker and relay. The vehicle load manager shall be located in this panel. The opening to the electrical shall measure approximately 19" wide near the switch panel and 37" wide toward the windshield.

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Electronic diagnostic connections for the engine, transmission, and ABS brakes shall be located in the lower-left panel on the cab dash.

DRIVER'S INFORMATION DISPLAY

There shall be a 10.8" x 2.44" display panel on the driver's gauge cluster that will illuminate various caution and warning indicator lamps. This display also contains a 340 x 90 monochrome LCD for display of specific and user selectable data. The display unit reads data from the J1939-11 powertrain communications network. Display will be capable of but not limited to the following features:

- Auto Self-Test
- Viewing the state of each digital or analog input to the unit
- Viewing the state of each output
- Allows users ability to set service reminders by distance or hours of operation
- Allows users ability to set data screens in various formats i.e. bar graph / text
- Viewable active and stored powertrain ECU fault data.
- Diagnostics screen allows user to select and view a specific source such as engine / transmission
- Display is selectable between English and metric readings.
- Messages and Icons will pop up in display when a condition exists such as:

Transmission oil life, filter or other service needed as reported by the Allison Transmission ECU
 Engine conditions: Low oil pressure, high coolant temperature, low coolant level, water in fuel, check / stop engine, regeneration needed, high exhaust temp

Indicator lights may also accompany pop up messages:

- Door ajar indicator will also pop up a "Do Not Move Vehicle, Check all doors and Items that Raise or extend beyond apparatus cab or body" message

CHASSIS ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 257 degree Fahrenheit minimum high temperature flame retardant loom.

CHASSIS COLOR CODED WIRING

All chassis wiring shall be type "GXL" in accordance with S.A.E. J1128 and NFPA-1901. ALL wiring shall be **COLOR CODED** and continuously marked with the circuit number and function.

A battery "loop back" ground circuit shall be supplied for the EDS system to reduce the possible effects of Electromagnetic and Radio Frequency Interference.

The chassis cab, engine and transmission shall be electrically bonded to the chassis frame rails with braided ground straps.

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MAIN CENTER DASH

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer. The panel shall be constructed of 5052-H32 Marine Grade, 1/8" thick aluminum plate.

The left dash panel shall include ten (10) switches. There shall be eight (8) switches across the top of the panel and two (2) staggered on the lower portion of the panel. The transmission shifter and instrument lamp dimmer control shall be provided on the right side of the panel.

The center dash panel shall include lighted rocker switches with a legend. The non-specified switches shall be two-position, black switches with an indicator light. All switch legends shall have backlighting provided. The center portion shall be used for electronic siren mounting.

The right dash panel shall be blank.

VEHICLE DATA RECORDER

Apparatus shall be equipped with a Class1 "Vehicle Data Recorder and Seat Belt Warning System" (VDR/SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and antilock brake (ABS) modules mounted on the apparatus. The VDR/SBW will function per NFPA 1901-2009 section 4.11 (Vehicle Data Recorder) utilizing the power train's J1939 data and 14.1.3.10 (Seat Belt Warning) using the Class1 "Seat Belt Input Module" for seat occupied and belt status information.

The VDR data shall be downloadable by USB cable to a computer using either Microsoft™ or Apple™ Operating Systems using Class 1/ O.E.M. supplied reporting software.

There shall be a seat belt indicator system supplied in the cab. The indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

A display panel shall be supplied in the dash area. The panel shall have an audible indicator and a red light display to indicate that a seat belt has not been fastened.

SEAT BELT WARNING SYSTEM

Mounted in the overhead console in the driver's area the indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

STEERING COLUMN

The steering column shall be a Douglas Autotec tilt and telescope. A lever mounted on the side of the column shall control the tilt and telescope features. A Signal-Stat (self-canceling) turn signal switch shall be mounted to the

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column. The steering shaft from the column to the meter box shall have a rubber boot to cover the shaft slip and a second rubber boot to seal the passage hole in the floor.

The steering wheel shall be 18 inches in diameter.

The Signal-Stat turn signal switch shall include the following functions:

- Left and right turn signals
- High beam dimmer control
- Hazard warning switch
- Two speed with intermittent windshield wiper control
- Windshield washer control

SPEEDOMETER, OFFICER'S SIDE

A 2" analog speedometer shall be provided on the right side of the cab to enable the officer to monitor driving speed. The speedometer shall be fully sealed to 6 psi and have an operating temperature range of -40F to 185F. The speedometer shall comply with SAE J-1939 protocol and have a polycarbonate crystal that is both anti-fog and anti-scratch coated.

SWITCH, MANUAL FAST IDLE

There shall be a manual fast idle switch mounted on the dash. When activated, the switch shall increase the engine idle speed to approximately 1200 RPM to allow the alternator to supply additional charging of the apparatus battery system. The fast idle switch shall only operate if all interlocks are met. Apparatus transmission must be in neutral with the parking brake set and the fire pump (if equipped) must not be engaged.

SLIDING MDT STATION

A sliding MDT station shall be installed on the dash, officer's side, constructed of smooth aluminum plate with a rough service coating.

12-VOLT FUSE BLOCKS

There shall be two (2) Blue Sea fuse blocks 5026 installed in a location determined by the customer. The unit shall include a twelve-(12) 12 volt constant power supply ports and grounding buss with easily changeable fuses. The unit shall have a 100 amp total operating range.

CHARGING PORT, 12-VOLT DUAL USB

There shall be one (1) Kussmaul model 019-219, 12-volt USB dual charging port provided in the cab. The charging port shall be equipped with one (1) 1.0 amp connection and one (1) 2.1 amp connection with built in LED indicator that indicates when the device(s) are powered.

The charging port shall be wired to direct battery power with the appropriate wire size and fuse.

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The charging port shall be located in the emergency switch panel.

MAP BOOK HOLDER

A map book holder shall be installed in the cab as directed by the Fire Department. The map book holder shall be constructed of smooth aluminum with a Velcro retaining strap. The map book holder shall be painted to match the interior color of the cab.

RADIO

A Jensen radio with weather band, AM/FM stereo receiver, compact disc (CD) player, and rear iPod input pigtail connector, satellite radio capability, a front panel mini stereo input jack, and four (4) speakers shall be installed in the cab. The CD player shall be compatible with CD-R, CD-RW and MP3 format discs. The radio shall be installed in the left hand overhead position. The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab.

A small antenna shall be located on the left hand side of the cab roof for AM/FM and weather ban reception.

ANTENNA INSTALLATION

There shall be six (6) antennas supplied by the customer and installed by the apparatus body builder.

The items must be sent to the manufacturer in advance, and marked with name and shop order number for identification.

RADIO POWER CIRCUIT

Two (2) 50 amp switched battery power circuit with manual reset shall be installed centered in the dash to activate the radio.

POWER AND GROUND STUDS

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load and one (1) power stud shall be capable of carrying up to a 20 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

ELECTRONIC SIREN

One (1) Federal Signal PA300 Series Model 690010 electronic siren shall be provided. The siren shall be 200W/12V, shall measure 2.3" high x 6.1" long x 7.6" deep and shall meet SAE and Class A requirements. The PA300 siren shall provide wail, yelp, and hi-lo siren tones, as well as the Tap II feature, public address (PA), radio rebroadcast and air horn sound.

The siren shall be protected against failure modes (including reversed polarity) by a replaceable fuse. The PA300 siren shall be provided with a noise-canceling microphone which shall be wired-in to prevent loss or theft. The

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microphone shall provide high quality voice reproduction without feedback “squeal”. The microphone push-to-talk switch shall override any siren signal for instant PA use. The PA and radio volume shall be adjustable by means of a front panel GAIN control feature.

HORN, ELECTRIC

A single electric horn activated by the steering wheel horn button shall be provided.

BACK-UP ALARM

There shall be one (1) Whelen model WBUA107, 107 dB, electronic back-up alarm installed at the rear of the apparatus. The alarm shall be wired to the transmissions output signal and automatically activated when the transmission is shifted into reverse.

LIGHTS, CAB DOME

Four (4) Whelen 6" Round Super-LED model 60CREGCS shall be provided in the cabs headliner. The steady burn 12v interior light shall incorporate six red and six clear Super-LEDs and a clear non-optic translucent hard coated polycarbonate lens for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket shall provide additional protection against environmental elements. The 60CREGCS includes Hi/Low intensity mode standards and On/Off dual switch function. The solid state interior light shall be vibration resistant. The interior light shall be covered by a five year factory warranty.

The white LED lights shall be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed.

LIGHTS, ADDITIONAL CAB DOME

There shall be Two (2) additional Whelen 6" Round Super-LED model 60CREGCS shall be provided in the cabs headliner. The steady burn 12v interior light shall incorporate six red and six clear Super-LEDs and a clear non-optic translucent hard coated polycarbonate lens for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket shall provide additional protection against environmental elements. The 60CREGCS includes Hi/Low intensity mode standards and On/Off dual switch function. The solid state interior light shall be vibration resistant. The interior light shall be covered by a five year factory warranty

The white LED lights shall be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed.

LIGHT, DOOR AJAR

A Whelen model TIR3 door ajar light shall be located on the cab's ceiling. This light shall be a self-contained flashing light that activates when any of the apparatus doors are open. The lens color shall be red.

An audible alarm shall be installed in conjunction with the door-ajar warning light system. The panel only operates when the ignition switch is in the “On” position and the parking brake released.

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LIGHTS, STEP WELL

Four (4) Whelen OS Series LED model OSC0EDCR shall be provided, one (1) in each cab step well. All step well lights shall be illuminated when any door is opened. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket shall be provided. The OSC0EDCR will contain a 12" non-terminated pigtail. The illumination light shall meet SAE J592 requirements and shall be covered by a five year factory warranty.

LIGHTS, ENGINE MAINTENANCE

Two (2) white 4" LED round lights shall be mounted under the cab. The lights shall automatically activate when the cab is tilted.

STANDARD FRONT LIGHTING

The headlamps, turn signals, front warning, and intersection lights shall be located within chrome warning light modules.

HEADLIGHTS

Four (4) JW Speaker LED rectangular headlights shall be installed in the warning light modules, two (2) each side. The headlights shall be mounted in the lower positions of the module.

TURN SIGNALS

Whelen model 600 amber LED turn signal lamps shall be installed directly above the low beam headlights in the warning light modules.

TURN SIGNAL/MARKER LIGHTS

Whelen model 400 amber LED lamps shall be mounted outboard of the turn signal at a 45-degree angle off the front of the cab. The lamps are part of the warning light module, and are visible from both the front and side of the vehicle.

LED CORNERING LIGHTS

Whelen model 400 flashing LED-cornering lamps shall be mounted below the marker light in the warning light module. The lamps are mounted at a 45-degree angle off the front of the cab and are visible from the side and front of the vehicle.

DOT LIGHTS

There shall be five (5) LED marker lights installed on the cabs roof located as high as practical and spaced per DOT guidelines.

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LIGHTS, CAB

There shall be one (1) Whelen 2G Series model 20C0CDCD 4" LED light mounted under each cab door illuminating the area below providing a safe entrance and exit for cab occupants. All cab ground lights shall automatically activate when any cab door is opened and by a switch located on the dash.

The 12v steady burn compartment light(s) shall incorporate 12 clear LED and a clear optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state compartment light shall be vibration resistant. The 20C0CDCD will contain 350 usable lumens. An installation kit including mounting hardware and rubber gasket shall be provided. The 20C0CDCD will contain a 12" terminated pigtail with a waterproof Deutsch® connector. The compartment light shall be covered by a five year factory warranty.

HEADSET INTERCOM SYSTEM

A Sigtronics Intercom system shall be installed to provide noise suppression while providing clear voice communications for four (4) seated positions in the cab. There shall be an optional connection for the installation of a pump panel station.

Communications are provided by four (4) SE-8 under the helmet headsets. This system includes:

- One (1) Power Cord
- Five (5) Headset Jacks
- Four (4) Headset Hooks
- Three (3) Push-to-Talk Switches

The driver and officer headsets include the intercom and two-way radio communication functions, while the crew headsets are capable of intercom communications and radio communications listening.

MASTER INTERCOM STATION

One (1) Sigtronics master station shall be provided and installed in the cab. The system shall have the capability of installing up to eight (8) positions (Plus exterior positions). This unit shall have mobile radio compatibility. This system shall contain voice activated on/off system, master volume control, two headset jacks with listen level controls, power input connector, and two remote output connectors.

MOBILE RADIO INTERFACE CORDS

The intercom system shall be provided with interface cables between the Department's radio and the SIGTRONICS system for the specified location.

Customer must specify make and model radio.

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DRIVER'S HEADSET STATION

There shall be a model SE-48 headset provided for the driver position. The headset shall provide a single plug under helmet radio transmit headset. It shall have a (PTT) "Push to Talk" located on the dome. The headset shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. High clarity speakers shall be provided with fully shielded cabling to maximize performance. The headset shall have high impact ear cups and provide noise reduction.

The headset shall have a one-(1) year warranty.

OFFICER'S HEADSET STATION

There shall be a model SE-48 headset provided for the officer position. The headset shall provide a single plug under helmet radio transmit headset. It shall have a (PTT) "Push to Talk" located on the dome. The headset shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. High clarity speakers shall be provided with fully shielded cabling to maximize performance. The headset shall have high impact ear cups and provide noise reduction.

The headset shall have a one-(1) year warranty.

CREW POSITION HEADSET STATIONS

There shall be two (2) model SE-8 headsets provided for the seated crew positions. The headsets shall provide a single plug under helmet radio transmit. It shall have a (PTT) "Push to Talk" located on the dome. The headsets shall come with an adjustable volume, noise canceling electric microphone, adjustable head strap, and flexible style boom for rotation of right or left dress. High clarity speakers shall be provided with fully shielded cabling to maximize performance. The headset shall have high impact ear cups and provide noise reduction.

The headsets shall have a one-(1) year warranty.

HEADSET HOOKS

There shall be three (3) headset hooks installed one for each station.

PUMP PANEL BELT STATION

There shall be a pump panel, model 900107 for a single plug located at the pump panel. The adapter shall contain PTT switch and listen level control.

This system includes:

- Standard headset jack with belt clip
- 30' jumper cord
- 5 prong jack with weather cover

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COMPARTMENT, LEFT SIDE EXTERIOR CAB

One (1) exterior storage compartment shall be provided and installed behind the left rear crew door. The compartment shall also have interior access covered with cargo netting. The compartment shall extend above the speedlays for additional storage. The compartment shall be 22" wide x 38-1/2" high x 26-1/4"D with a usable opening of 20-1/2" wide x 37-1/2" high. A pan style door shall be provided with stainless steel hinge and paddle style latch.

There shall be one door for the upper and lower cab compartments.

COMPARTMENT, RIGHT SIDE EXTERIOR CAB

One (1) exterior storage compartment shall be provided and installed behind the right rear crew door. The compartment shall also have interior access covered with cargo netting. The compartment shall extend above the speedlays for additional storage. The compartment shall be 22" wide x 38-1/2" high x 26-1/4"D with a usable opening of 20-1/2" wide x 37-1/2" high. A pan style door shall be provided with stainless steel hinge and paddle style latch.

There shall be one door for the upper and lower cab compartments.

BCD DIVE STORAGE

There shall be two BCD Dive units stored in Forward Facing Seats, inboard of the EMS Compartments. The brackets for the BCD Units shall meet the requirements of NFPA 1901.

REAR CAB STORAGE COMPARTMENTS

There shall be additional rear storage compartments located in the crew area of the cab. One storage compartment shall be installed on the upper rear wall, between the exterior compartments. This storage area shall be covered with F Shield to match the interior of the cab. Webbing shall cover the opening.

The second storage compartment shall be installed in the forward raised roof area. This storage area shall be covered with F-Shield to match the interior of the cab. Webbing shall cover the opening.

CAB PAINT FINISH, TWO TONE

The custom cab shall have a two-tone paint finish. The paint colors shall be furnished by the customer. The break in the color shall be at the bottom of the chassis window, unless otherwise specified by the Fire Department.

All cab exterior components including doors and glass, shall be removed. The complete cab exterior shall be thoroughly sanded, solvent cleaned and finished with high luster polyurethane paint before mounting of body to assure full coverage of paint to all surfaces.

UPPER CAB PAINT FINISH

The upper cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments.

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These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

UPPER CAB PAINT COLOR/CODE

The upper cab paint code shall be Black, 99.

PRIMARY/LOWER CAB PAINT FINISH

The primary/lower cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

PRIMARY/LOWER CAB PAINT COLOR/CODE

The primary/lower cab paint code shall be Red, 854008.

CAB PAINT BREAK LINE STRIPE

A 1/2" wide Spun Gold paint pin stripe with black shade shall be added to the cab, two tone paint scheme. This stripe shall be applied at the break line.

DOOR AJAR SWITCHES

All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver.

A momentary switch shall be provided to clear a door ajar warning alarm for one cycle. When the apparatus is restarted, the Door Ajar Warning shall be active.

PAINT, FRONT BUMPER

The front bumper shall be painted with "F-Shield". The color shall be Red 854008.

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

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"BLACKOUT PACKAGE"

The following items on the apparatus shall be painted with Black "F-Shield": gravelshield, bumper compartment lids, front grille, headlight bezels, light tower shield, side air intakes, cab steps, rub rails, fenderettes, handrail stanchions, slide out steps, upper coffin compartment doors, upper walkway and rear step.

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyurea elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

CARRYING CAPACITY PLATE

A permanently attached carrying capacity plate in accordance with NFPA 1901 Standards shall be installed in plain view of the driver.

The tag shall include the following:

- Overall height
- Overall length
- GVWR
- Seating capacity

SEATING CAPACITY PLATE

A permanently attached Seating Capacity Plate shall be mounted in the cab in plain view that reads "Seating Capacity – 6 People".

Each seating position that is not intended to be used during transit shall be individually labeled as follows:

"WARNING THIS SEAT IS NOT TO BE OCCUPIED WHILE VEHICLE IS IN MOTION"

OCCUPANCY/SEAT BELT PLATE

Occupancy / Seat Belt plates shall be provided and installed visible from each seated position, which reads:

"OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION"

"DO NOT WEAR HELMET" PLATE

A plate shall be installed visible from each seating position that states:

"DO NOT WEAR HELMET WHILE SEATED"

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OVERALL HEIGHT/LENGTH/WEIGHT PLATE

An Overall Height/Length/Weight information plate shall be installed that can be clearly identified and visible to the driver while in the seated position showing the apparatus completed overall height, length, (in feet and inches) and gross vehicle weight (in tons) current to the apparatus manufactured date.

If changes to the vehicle occur while in service, the Fire Department must revise the overall height-length-weight plate.

FLUID CAPACITY PLATE

A permanently affixed fluid data plate shall be installed in the driving compartment to indicate the type and quantities of the following fluid used in the vehicle.

- Engine Oil
- Engine Coolant
- Chassis Transmission Fluid
- Pump Transmission Lubrication Fluid (if applicable)
- Pump Primer Fluid (if applicable)
- Drive Axle Lubrication Fluid
- Air Conditioning Refrigerant
- Air Conditioning Lubrication Oil
- Power Steering Fluid
- Cab Tilt Mechanism Fluid
- Transfer Case Fluid
- Equipment Rack Fluid
- Air Compressor System Lubricant
- Generator System Lubricant
- Front Tire Pressure – Cold
- Rear Tire Pressure – Cold

The following information shall also be supplied on the Fluid Data Plate:

- Chassis Manufacturer
- Production Number
- Paint Number
- Year Built
- Date Shipped
- Vehicle Identification Number

MOVEMENT WARNING PLATE

A permanently affixed Movement Warning plate shall be installed near the door ajar light that reads:

“DO NOT MOVE APPARATUS WHEN LIGHT IS ON”.

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"DO NOT RIDE" PLATE

A permanently affixed "DO NOT RIDE" warning plate shall be installed located on the stepping areas of the vehicle warning personnel that riding on or in these areas while the vehicle is in motion is prohibited.

PUMP ENCLOSURE, SIDE CONTROL

The pump enclosure superstructure shall be constructed of aluminum tubing, channel, angle, and break-formed components. The framework shall be formed by beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main frame work shall be constructed of 3.00 x 3.50, 6063-T6 aluminum extrusions. The break-formed components shall be constructed from 3/16" (1.875) aluminum.

The crossmembers support the substructure and the exterior panels independently from the cab and body. The crossmembers shall be isolated from the frame rails using torsion mounts. The pump enclosure shall be supported at the top of the frame rails, in a minimum of four (4) places. The module shall be secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shifting and stress on the pump enclosure, pump panels, and running boards.

The front of the pump module shall be covered with aluminum tread plate to keep road debris from the front of the pump.

Any pump enclosure constructed using any material other than aluminum or utilizing any other mounting method is not acceptable.

MVP ENCLOSED PUMP MODULE

The pump compartment shall be at the forward section of the body, integral with the remainder of the structure. Pump panels on both sides of the vehicle shall be concealed by roll up doors. This design is required to minimize the effects of the elements on the pump panel components and to maximize usable compartment space on the apparatus.

The forward section of the pump compartment shall be readily accessible for easy service on the pump and plumbing. Removal of the speedlay reloading trays shall allow full access to the pump compartment. Removal of the backboard storage sleeve shall further improve the service access.

Speedlays shall be located ahead of the pump compartment, with one (1) 1-3/4" and one (1) 2-1/2" located at frame rail height, approximately 43" above street level and one (1) 1-3/4" located above the rear 2-1/2" speedlay. The forward 1-3/4" speedlay shall be located under the cab notch.

The pump enclosure shall provide an area above the pump for the installation of deck gun plumbing in the dunnage area.

DUNNAGE AREA W/ TREADPLATE WALLS

There shall be an open area above the pump enclosure for equipment storage trimmed with 1/8" (.125) aluminum tread plate on all vertical interior walls.

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PUMP PANELS

The operator's controls and gauges shall be mounted on pump panels constructed of 1/8" (.125) black anodized, non-glare aluminum. No vinyl coverings shall be acceptable as these surfaces are subjected to rough service and vinyl is susceptible to tearing.

All gauges and controls shall be properly identified with color-coded metal tags. The tags shall be affixed with 3M brand industrial adhesive. The gauges shall be functionally grouped above each control.

The right side panel shall be vertically hinged and shall have push style latches for pump compartment access.

The right side panel shall be constructed of 1/8" (.125) black anodized, non-glare aluminum.

All instruments and controls shall be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control shall be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments shall be placed to keep the pump operator as far as practical from all discharge and intake connections and in a location where they are readily visible and operationally functional while the operator remains stationary.

FULLY HINGED PUMP PANEL, RIGHT SIDE

One (1) vertically hinged pump panel with push style latch shall be installed and constructed of the same material as stated in the pump module specifications. The hinged panel replaces the current right hand lower removable panel for ease of access to the pump compartment during routine maintenance.

PUMP PANEL LIGHT, LEFT SIDE

One (1) individual OnScene Access LED pump panel light with on/off switch shall be mounted under the light shield left side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

PUMP PANEL LIGHT, RIGHT SIDE

One (1) individual OnScene Access LED pump panel light with on/off switch shall be mounted under the light shield right side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

LIGHTS, PUMP COMPARTMENT

Two (2) LED compartment lights shall be installed in the pump compartment for inspection or routine maintenance wired to the pump panel light switch.

PUMP OPERATOR'S PLATFORMS

Two (2) slide-out platforms shall be installed under the operator's panel constructed from 3/16" (.1875) aluminum tread plate. Two (2) sealed roller bearing slides, with a total capacity of 500lbs shall be installed, one (1) on each side of the platform mechanically held in both the retracted and extended positions with a rugged quick-action

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latch. The slide-out platform shall be wired to the open door indicator system activating the light in the cab when the step is in the extended position.

PRESSURE GAUGES, 2-1/2"

The discharges shall be provided with 2-1/2" pressure gauges. The discharge gauges shall be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings reading from zero to 400 PSI.

The gauges shall be installed at each discharge control on the pump operator's panel. On side mount pump applications with push pull handles each gauge shall incorporate a Thuemling Instrument Group 1-piece module assembly consisting of the gauge, push-pull and trim bezel.

The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

GAUGE BEZELS

The pump panel master and pressure gauge bezels shall be standard chrome finish.

PUMP PANEL TAGS

All discharges, gauges, and controls will be properly identified by color-coded metal tags. The metal tags will be affixed with 3M industrial adhesive.

PUMP SYSTEM, WATEROUS CSU SINGLE STAGE

PUMP ASSEMBLY

The pump shall be of single stage construction and comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association.

The pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

The pump body shall be closed-grained gray iron and must be horizontally split in two sections for easy removal of the entire impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping, which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize leakage and facilitate reassembly.

The discharge manifold shall be cast as an integral part of the pump body assembly and provide at least three full 3-1/2" openings located one outlet on the right side of the pump body, one outlet on the left side of the pump body, and one outlet directly on top of the pump discharge manifold.

The impeller shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse-flow, labyrinth-type, and utilize wear rings that resist water bypass and loss of efficiency due to wear.

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The wear rings are to be bronze, and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

The impeller shaft shall be stainless steel, accurately ground to size, and supported at each end by oil or grease-lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component. No sleeve-type bearings shall be used.

The pump transmission shall be rigidly attached to the pump body assembly and be of the latest design incorporating a high strength, involuted, tooth-form Hy-Vo chain drive and driven sprockets capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement is accomplished by a free sliding collar and shall incorporate an internal locking mechanism to insure that collar shall be maintained in ROAD or PUMP position.

For chassis equipped with automatic transmissions, the pump transmission driveline shall have a torque-rating equal to or greater than the maximum net engine torque multiplied times the first gear ratio and torque converter ratio.

The suction fittings shall include removable, die cast, zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

A 3" clapper check valve shall be installed between the suction side of the pump and the tank-to-pump valve. This 3" clapper valve shall eliminate the possibility of a pressure surge expanding the water tank.

Pump system shall utilize an integral discharge manifold system that allows a direct flow of water to all discharge valves.

MECHANICAL SEAL

The midship pump shall be equipped with a high quality, spring loaded, and self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions. This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 PSI.

The mechanical seal assembly shall be 2 inches in diameter and consist of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat, with a Teflon backup seal provided.

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one-piece pump shaft. A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

IMPELLER HUB, FLAME PLATED

The impeller shall have a flame-plated hub to assure maximum pump lift and efficiency despite the presence of abrasive particles, such as fine sand in the water being pumped.

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PUMP SHIFT

An air operated pump shift shall be installed in the chassis cab to engage the fire pump. Provisions shall be made for placing the pump drive system in operation using controls and switches that are clearly identified and within convenient reach of the operator while in the cab.

A green indicator light shall be installed on the cab dash and labeled "Pump Engaged".

Where an automatic chassis transmission is provided, a green indicator light in the driving compartment and a green indicator light located at the pump operator's position shall be provided and shall be energized when both the pump shift has been completed and the chassis transmission is engaged in pump gear.

The light in the driving compartment shall be labeled "OK TO PUMP". The light on the pump operator shall be positioned adjacent to and preferably above the throttle control and shall be labeled "Warning: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON". The green light on the pump operator's panel shall be energized when the pump is engaged, the transmission is in drive, and the parking brake is set.

PRIMING SYSTEM, PUMP

The priming pump shall be a 12-volt Waterous model VPO Oil-Less, positive displacement vane type, electrically driven conforming to the standards outlined in the current edition of NFPA. One (1) priming control shall open the priming valve and start the priming motor. The primer shall be capable of priming without the use of primer oil. The primer shall be connected to the power source with a 300 amp fusible link.

A Vacuum Activated Priming valve (VAP), consists of a stainless steel valve stem, spring and pressure disk in a plastic valve body. A rubber disk forms the seat for the valve stem and also forms a seal between the priming valve inlet and the pump body. A rubber diaphragm forms a seal which allows the valve to open and close while isolating the interior of the priming valve from atmospheric pressure.

PUMP ANODES

Three (3) pump anodes shall be installed on the pump for corrosion protection.

The anode system provides a sacrificial metal alloy which helps to diminish or prevent pump and pump shaft galvanic corrosion.

U.L. TEST POINTS

Two (2) U.L. test plugs shall be pump panel mounted for testing of vacuum and pressures.

U.L. CERTIFICATION, 1500 GPM

The vehicle shall be third party tested and certified by Underwriters Laboratories, Inc. UL testing is recognized as a leading, third party, product safety certification organization for over 100 years. UL has served on the NFPA (National Fire Protection Association) technical committee for over thirty (30) years.

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The testing organization must meet the following minimum requirements:

- Must be nationally recognized testing laboratory recognized by OSHA
- Must comply with the ASTM (American Society for Testing Materials) standard E543 "Determining the qualifications for nondestructive testing agencies"
- Must have more than forty (40) years of Automotive Fire Apparatus safety testing experience and more than fifteen (15) years of factory aerial device testing and Certification experience
- Must not represent, be associated with, or in the manufacture or repair of automotive fire apparatus
- Must provide proof of ten (10) million dollars in excess liability insurance for bodily injury and property damage combined

The pump shall meet and perform the following tests to receive a U.L. Certification.

- 100% of rated capacity at 150 PSI net pump pressure
- 100% of rated capacity at 165 PSI net pump pressure
- 70% of rated capacity at 200 PSI net pump pressure
- 50% of rated capacity at 250 PSI net pump pressure

PUMP TEST CERTIFICATION PLATE

A permanently affixed plate shall be installed at the pump operator's panel. It shall provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit. It shall also provide the position of the parallel/series pump used and the no load governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

A label shall be provided on the pump operator's panel that states the following:

"Warning: Death or serious injury might occur if proper operating procedures are not followed". The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

SUCTION HEADERS

A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the left side of the pump.

A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the right side of the pump with an open bottom flange to accept the front suction plumbing.

FRONT SUCTION INLET

A 5" gated front suction inlet shall be installed vertically thru the front bumper extensions gravelshield and turn 90 degrees forward terminating 5" FNPT x 5" MNST with chrome plated adapter and strainer.

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The suction inlet shall be controlled at the pump operator's panel by an air-operated butterfly valve, with built in relief valve mounting pad, and indicator package. A bleeder valve shall also be provided.

An Akron Model 59 relief valve shall be provided for the front suction adjustable from 50 to 175 PSI and pre-set at the factory at 125 PSI.

The front suction plumbing shall be constructed from schedule 10 stainless steel plumbing with victaulic or roustabout couplings at each end, the plumbing shall be contoured and form fitted routed along the chassis frame rails connecting the pumps suction header plumbing to the front 90 degree elbow.

A warning plate permanently affixed in close proximity of the suction inlet shall be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

A 3/4" push-pull drain valve shall be provided for the front suction located at the lowest point of the plumbing and properly labeled.

PRIMING SYSTEM, FRONT SUCTION

A 12-volt positive displacement vane primer shall be installed for the front suction, electrically driven conforming to the standards outlined in the current edition of NFPA. The system is an oil-less system and environmentally safe. It contains an electric rotary vane type positive displacement primer that operates off 12V or 24V power. The primer motor is totally enclosed to prevent dust, dirt and water from penetrating. The unit is constructed of corrosion resistant anodized aluminum, stainless steel, and composite materials, for wear and corrosion resistance. The control shall be pump panel mounted to operate the priming valve and start the priming motor.

A 6" swivel elbow rotating 180 degrees shall be installed in the front suction plumbing.

INTAKE RELIEF VALVE

There shall be an Akron model 59 suction side relief valve provided in the pump system. The relief valve shall be adjustable from 50-175 psi and set at the factory at 125 psi.

PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY

Fire Research PumpBoss series PBA400-A00 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 6 3/4" high by 4 5/8". 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 engine information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring. Inputs from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

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Engine RPM; shown with four daylight bright LED digits more than 1/2" high
 Check engine and stop engine warning LEDs
 Engine 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
 Pressure and RPM operating mode LEDs
 Pressure / RPM setting; shown on a dot matrix message display
 Throttle ready LED.

A 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 located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

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 and monitoring pressure display shall be programmed at installation for a specific engine.

MASTER GAUGES, 4-1/2"

Two compound 4-1/2" master gauges shall be provided and installed on the pump operator's panel. The intake and discharge gauges are liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings accurate within 1%.

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The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

FILL SUBSURFACE/RETURN LINE

There shall be one (1) subsurface/return line installed in the booster tank. The subsurface/return line shall prevent aeration of the water in the booster tank under low water conditions. The subsurface/return line piping shall be of the same size as the "Tank Fill".

TANK TO PUMP

One (1) 3" ball valve shall be installed between the pump and the water tank. The tank to pump valve shall be a quarter turn fixed pivot design constructed from bronze. The valve shall be controlled by a chrome push/pull locking "T" handle installed at the left pump panel.

VALVE, MASTER DRAIN

There shall be a master drain valve recessed mounted below the pump module under the side running board, connecting all drain lines, with the capacity to discharge water simultaneously from all locations to below the chassis frame rails.

TANK FILL

There shall be a 2" pump to tank fill line installed, with a 2" inline bronze valve and high-pressure flexible hose tested to 1200 PSI. The valve shall be (locking "T" handle) push-pull controlled at the pump operator's panel.

ENGINE COOLER

The engine cooler shall be installed in-line from the discharge side of the pump, and installed in the engine cooling system. There shall be a 1/2", quarter turn valve installed through the pump panel and shall be clearly labeled.

PUMP COOLER

The pump shall have a 3/8" line installed from the pump discharge to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled from the pump operators panel by a 3/8" valve consisting of a cast bronze body with 1/4 turn chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI.

The valve shall be installed through the pump panel and clearly labeled.

PLUMBING SYSTEM

All suction and discharge lines up to 3" shall be constructed of a minimum of Schedule 10 stainless steel pipe, where vibration or chassis flexing may damage or loosen threaded pipes, Victaulic or Roustabout couplings shall be used. All suction and discharge outlets shall have National Standard Threads (NST) and designed for 500 PSIG including, valves, drain cocks, lines, intake, and outlet closures, excluding the tank fill and tank to pump lines (tank side of the valves).

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PUMP/PLUMBING PAINTING

The pump shall be painted black. This includes all intakes, discharges, manifolds, and associated valves.

AKRON / WATEROUS ELECTRIC CONTROL VALVE PACKAGE

All specified discharge valves shall be Waterous bronze chromium plated with Stainless Steel internal parts electrically controlled from the pump operator's panel. All other valves shall be Akron.

Waterous Chromium plated bronze ball valves

- Modular design with interchangeable ends for mounting flexibility
- Floating self-adjusting seal assembly
- Complies with NFPA requirements
- Variety of valve ends
- Design for fast servicing
- Full flow construction

The Akron Swing-Out Heavy-Duty valves are designed for operating pressures to 250 psi (17 bars)

- 10-year warranty against manufacturer's defects
- Available in 1" to 4" sizes
- 90° handle travel 316 stainless steel ball with Hydromax technology
- Improved sealing & increased gating ability
- Flow optimization reduces turbulence while in the gated position and requires lower operating forces
- No lubrication or regular maintenance required
- Simple two seated design (no O-Rings to cut or lose during assembly or maintenance)
- Wide range of available adapters
- Designed and tested to exceed NFPA requirements
- Cast, machined and assembled at Akron Brass's facilities in Wooster, Ohio

All valve packages shall meet current NFPA 1901 Standards for valve operating speeds when controlled by gear, electric actuator, or slow close device.

SUCTION, 2-1/2" LEFT REAR PANEL

One (1) 2-1/2" swing operated ball valve shall be installed at the pump panel, left rear plumbed to the suction side of the pump with 2-1/2" piping, 2-1/2" FNST chrome inlet swivel, brass inlet strainer, chrome plug with chain, and 3/4" drain valve.

A warning plate permanently affixed in close proximity of the suction inlet shall be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

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DISCHARGE ELBOWS

All 2-1/2" side discharge outlets shall terminate with chrome-plated 30-Degree elbows with 2-1/2" MNST threads, chrome vented cap and chain.

DISCHARGES, 2-1/2" LEFT FRONT PANEL

Two (2) Waterous 2-1/2" full-flow ball valves with 3/4" drains shall be installed at the pump panel left front upper and lower plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 2-1/2" RIGHT FRONT UPPER PANEL

One (1) Waterous 2-1/2" full-flow ball valve with 3/4" drain shall be installed at the pump panel, right front upper, plumbed to the discharge side of the pump push-pull controlled from the pump operator's panel.

DISCHARGE, 3-1/2" RIGHT FRONT LOWER PANEL

One (1) Waterous 3-1/2" (Slo-Close) full-flow ball valve with 3/4" drain shall be installed at the pump panel, right front lower, plumbed to the discharge side of the pump equipped with chrome plated 30-degree elbow terminating 3-1/2" MNST threads chrome cap and chain controlled at the pump operator's panel.

DECK GUN PLUMBING, 3-1/2"

One (1) Waterous 3-1/2" (Slo-Close) inline valve with 3/4" drain shall be plumbed to the Deck Gun discharge outlet with 3" pipe terminating 3" FNPT x four (4) bolt flange handwheel controlled at the pump operator's panel. Bright LED lights shall indicate valve position.

PRECONNECT, 2-1/2" LEFT FRONT HOSEBED

One (1) 2-1/2" preconnect shall be installed in the hosebed, left front, plumbed with a Waterous 2-1/2" full-flow ball valve with 3/4" drain terminating 2-1/2" FNPT x 2-1/2" MNST chrome cap and chain push-pull controlled at the pump operator's panel.

NO. 1 SPEEDLAY, 1-3/4" DOUBLE LAY

One (1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One (1) 2" ball valve with 3/4" drain and Chicksan swivel shall be provided plumbed to the speedlay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

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NO. 2 SPEEDLAY, 1-3/4" DOUBLE LAY

One (1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One (1) 2" ball valve with 3/4" drain and Chicksan swivel shall be provided plumbed to the speedlay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

NO. 3 SPEEDLAY, 2-1/2" DOUBLE LAY

One (1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 2-1/2" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One (1) 2-1/2" ball valve with 3/4" drain and Chicksan swivel shall be provided plumbed to the speedlay with 2-1/2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

This speedlay will be in the upper position.

REMOVABLE SPEEDLAY HOSE TRAYS

There shall be three (3) removable speedlay hose trays provided with the apparatus constructed of 3/16" smooth aluminum with handles at each end held in place by horizontal bulkheads at each end of the compartments.

SPEEDLAY COVERS

Three (3) Hypalon speedlay covers shall be provided one each side of the apparatus secured with Velcro sides and stainless steel bottom pushpins preventing hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

The end flaps shall be black in color.

WATER TANK

The tank shall have a capacity of 500 U.S. gallons and shall be constructed of PT3™ polypropylene material. 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 1/2 to 1" as required. Internal baffles are generally 3/8" in thickness.

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ISO CERTIFICATION

The tank must be rectangular in design and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

DESIGN

Each tank is designed to the customer's specification and/or drawing submittal. An approval drawing is sent to the customer prior to commencing manufacturing. Upon receipt of the signed approval drawing, the tank is scheduled for production.

CONSTRUCTION

The booster and/or foam tank shall be of a specific configuration and is so 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 shall provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is 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 interlock with one another and are 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™. Tolerances in design allow for a maximum variation of 1/8" on all dimensions.

WATER FILL TOWER AND COVER

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 be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. 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 shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

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SUMP

There shall be one (1) sump standard per tank. The sump shall be 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 shall incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT 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.

OUTLETS

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 GPM. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

MOUNTING

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 must 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" and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it shall 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. A picture frame type cradle mount with a minimum of 2" x 2" x 1/4" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4" by 6" high are permitted for the purpose of capturing the tank. Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

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CAPACITY CERTIFICATION

All water and foam tanks 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. Each Poly-Tank® III is 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.

TANKNOLOGY™ TAG

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam(s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code shall allow the user to connect with the tank manufacturer for additional information and assistance.

WATER TANK SIZE CERTIFICATION

The manufacturer shall certify the capacity of the water tank prior to the delivery of the apparatus. This capacity shall be recorded on the manufacturer's record of construction and the certification shall be provided when the apparatus is delivered.

GAUGE, WATER LEVEL

A Fire Research TankVision model WLA200-A00 tank indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) 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, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from 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.

GAUGE, AUXILIARY WATER LEVEL

There shall be a pair of Fire Research "MaxVision" water level status lights, with 96 steady burn green, blue, amber, and red LEDs. The light shall provide bright, easy indication of water status. The units shall activate with the application of the park brake.

APPARATUS BODY, 103" WIDE

The 103" wide apparatus body and subframe shall be constructed entirely of marine grade aluminum plate and extrusions.

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BODY SUBFRAME

The main body support cross member extrusions shall be 3" x 4" 6061T6 aluminum alloy, double "I" beam with a wall thickness of 7/16" (.438"). These cross members shall extend the full width of the body to support the compartment framing. The cross members shall be welded to a 3/4" (.750") x 3" solid aluminum, 6061T6 aluminum (alloy frame rail) extrusion. The frame rail extrusion shall be shaped in contour with the chassis frame rails. The frame rail extrusion shall be mounted over a 1/2" (.5") thickness, reinforced rubber cushion to isolate the aluminum subframe from the chassis steel frame rails. The apparatus body structure shall be securely fastened to the chassis frame rails with a minimum of six-(6) 5/8" (.625") cross member OD, steel U-bolts. The main body support cross member shall have a gusset above and below each cross member. The gussets shall be constructed of 2.0" x 4.0" 6063T6 aluminum alloy extrusion with a .190" wall thickness. The gussets shall be continuously welded with 5356 aluminum alloy welding wire to add support to the body sidewalls. The main body supports and the longitudinal double "I" beam supports shall have a "C" shaped rubber tank cushion installed on the top of each member. This rubber extrusion shall conform to the shape of the double "I" beam extrusion to keep the tank cushion in place. This method is used to prevent damage to the tank.

Absolutely no pop-rivets, screws or any other hardware shall be used to hold the rubber tank cushion in place.

BODY CONSTRUCTION

The complete apparatus body structure shall be an all welded construction and be free from nuts, bolts and other fasteners. Upon completion of the weldments, the body shall be completely sanded and deburred for removal of all sharp edges.

The body framework shall be formed from beveled aluminum alloy extrusions and electrically seam welded at each joint using 5356 aluminum alloy welding wire. Body sides shall be formed from 5052 H-32 (marine grade) smooth aluminum plates. The horizontal surfaces above the compartment tops shall be constructed from aluminum tread plate.

The horizontal and vertical frame member extrusions shall be 2.0" x 4.0" with a .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy. This extrusion shall have .190" outside radius corners. The longitudinal frame member, below the lower compartments shall be a 2.0" x 4.0" 6063T6 aluminum alloy extrusion with .190" radius corners. Each body corner shall be a 3.5" x 9-3/4" 6063T6 extruded aluminum section with .210" wall thickness, and shall be welded as an integral part of the body. This extrusion shall have a 1" corner radius.

COMPARTMENT CONSTRUCTION

The compartment sidewalls shall be of one-piece construction. The walls shall be formed from 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate. All compartment floors shall be formed from 3/16" (.1875") aluminum tread plate. The floors shall be welded in place with a continuous weld all around the perimeter to insure maximum strength.

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The external compartment tops shall be constructed of 1/8" (.125") aluminum tread plate. The tops shall have a formed edge, which serves as a drip rail for the compartments below. The compartment tops shall be secured with stainless steel screws to allow for ease of removal for access to the bodies wiring harnesses.

The compartment seams shall be sealed with permanent pliable silicone caulking.

Each compartment shall be vented through a 3" wide x 15" high louver that is machined stamped in a panel located in each body corner extrusion. The panel shall be removable to provide access to service wiring and other mounted components.

COMPARTMENTS, LEFT SIDE

L1

There shall be one (1) compartment installed under the lower 1-3/4" and 2-1/2" double speedlays. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 17-1/2" wide x 17-1/2" high x UREA TANK. The compartment shall have a useable door opening of approximately 17-1/2" wide x 17-1/2" high.

L2

There shall be one (1) compartment installed above the 1-3/4" upper speedlay. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 9-1/2" wide x 44-1/2" high x 27-1/2" deep in the lower section and 84" deep in the upper section to accommodate a stokes basket or other long equipment. The compartment shall have a useable door opening of approximately 9-1/2" wide x 44-1/2" high.

L3

There shall be one (1) compartment installed at the front of the body, containing the left side pump panel. This compartment shall have one (1) roll up door. The compartment shall be approximately 32-1/2" wide x 74" high x pump panel in the lower section and 27-1/2" deep in the upper section. The compartment shall have a useable door opening of approximately 29-1/2" wide x 65" high.

L4

There shall be one (1) compartment installed ahead of the rear axle. This compartment shall have two (2) vertically hinged doors. The interior compartment dimensions shall be approximately 57" wide x 74" high x 27-1/2" deep. The compartment shall have a useable door opening of approximately 57" wide x 65" high.

L5

There shall be one (1) compartment installed above the wheel well. This compartment shall have one (1) horizontally hinged door. The compartment shall be approximately 58" wide x 38" high x 27-1/2" deep. The compartment shall have a useable door opening of approximately 58" wide x 29" high.

L6

There shall be one (1) compartment installed behind the rear axle. This compartment shall have two (2) vertically hinged doors. The compartment shall be approximately 59" wide x 74" high x transverse in the lower section and 27-1/2" deep in the upper section. The compartment shall have a useable door opening of approximately 56" wide x 65" high.

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COMPARTMENT DOORS, LEFT SIDE HINGED

The left side compartment doors shall be constructed entirely from 5052-H32 smooth aluminum plate using a box pan configuration. The outer panel shall be constructed from 3/16" (.1875") smooth aluminum plate and the inner pan stitch welded in place from 1/8" (.125") smooth aluminum plate.

There shall be a 1/4" (.250") hole installed in the lower corners of the inside door pans for drainage. The doors shall have a closed cell neoprene rubber gasket installed around the perimeter of the door to remove water.

Exterior door latches shall incorporate a polished D-paddle handle with rotary style latch. For ease of operation, the D-handle opening shall be large enough to accommodate a gloved hand. The D-paddle latching design shall be subjected to corrosion, water infiltration, and cycle testing to 35,000 cycles. Double doors shall utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle. The door design shall not impede into the compartment opening when in the open position. The watertight door seal shall exceed the current KKK-1822 water infiltration standards. The doors shall be securely fastened to the apparatus body with full-length stainless steel piano hinges using 1/4-20 stainless bolts and locking nuts. The hinges shall be slotted to allow for adjustments.

Absolutely no self-tapping screws or pop rivets shall be acceptable to mount the door mechanisms or slam latch assemblies.

COMPARTMENT DOORS, LEFT SIDE ROLL UP

ROM roll-up doors shall be installed on the left side compartments of the apparatus as specified.

Slats are to be double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact.

The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing.

A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position.

The side compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

COVERS, INTERIOR ROLL-UP DOOR

One (1) roll-up door covers shall be installed in the specified compartments. The cover shall be form fitted and constructed of 1/8" (.125) smooth aluminum plate. The cover shall serve as a protection device against damage

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from movement of interior cargo.

COMPARTMENTS, RIGHT SIDE

R1

There shall be one (1) compartment installed under the lower 1-3/4" and 2-1/2" double speedlays. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 17-1/2" wide x 17-1/2" high x UREA TANK. The compartment shall have a useable door opening of approximately 17-1/2" wide x 17-1/2" high.

R2

There shall be one (1) compartment installed above the 1-3/4" upper speedlay. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 17-1/2" wide x 44-3/4" high x 27-1/2" deep in the lower section and 15" deep in the upper section. The compartment shall have a useable door opening of approximately 17-1/2" wide x 44-3/4" high.

R3

There shall be one (1) compartment installed at the front of the body, containing the left side pump panel. This compartment shall have one (1) roll up door. The compartment shall be approximately 36-1/2" wide x 74" high x pump panel in the lower section and 27-1/2" deep in the upper section. The compartment shall have a useable door opening of approximately 33" wide x 65" high.

R4

There shall be one (1) compartment installed ahead of the rear axle. This compartment shall have two (2) vertically hinged doors. The interior compartment dimensions shall be approximately 57" wide x 74" high x 27-1/2" deep. The compartment shall have a useable door opening of approximately 57" wide x 65" high.

R5

There shall be one (1) compartment installed above the wheel well. This compartment shall have one (1) horizontally hinged door. The compartment shall be approximately 58" wide x 38" high x 27-1/2" deep. The compartment shall have a useable door opening of approximately 55" wide x 29" high.

R6

There shall be one (1) compartment installed behind the rear axle. This compartment shall have two (2) vertically hinged doors. The compartment shall be approximately 59" wide x 74" high x transverse in the lower section and 27-1/2" deep in the upper section. The compartment shall have a useable door opening of approximately 56" wide x 65" high.

COMPARTMENT DOORS, RIGHT SIDE HINGED

The specified right side compartment doors shall be constructed entirely from 5052-H32 smooth aluminum plate using a box pan configuration. The outer panel shall be constructed from 3/16" (.1875") smooth aluminum plate and the inner pan stitch welded in place from 1/8" (.125") smooth aluminum plate.

There shall be a 1/4" (.250") hole installed in the lower corners of the inside door pans for drainage. The doors shall have a closed cell neoprene rubber gasket installed around the perimeter of the door to remove water.

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Exterior door latches shall incorporate a polished D-paddle handle with rotary style latch. For ease of operation, the D-handle opening shall be large enough to accommodate a gloved hand. The D-paddle latching design shall be subjected to corrosion, water infiltration, and cycle testing to 35,000 cycles. Double doors shall utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle. The door design shall not impede into the compartment opening when in the open position. The watertight door seal shall exceed the current KKK-1822 water infiltration standards. The doors shall be securely fastened to the apparatus body with full-length stainless steel piano hinges using 1/4-20 stainless bolts and locking nuts. The hinges shall be slotted to allow for adjustments.

Absolutely no self-tapping screws or pop rivets shall be acceptable to mount the door mechanisms or slam latch assemblies.

COMPARTMENT DOORS, RIGHT SIDE ROLL UP

ROM roll-up doors shall be installed on the right side compartments of the apparatus as specified.

Slats are to be double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact.

The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing.

A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position.

The side compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

COVERS, INTERIOR ROLL-UP DOOR

One (1) roll-up door covers shall be installed in the specified compartments. The cover shall be form fitted and constructed of 1/8" (.125) smooth aluminum plate. The cover shall serve as a protection device against damage from movement of interior cargo.

COMPARTMENT, CENTER REAR

B1

There shall be one (1) compartment installed at the center rear of the apparatus. This compartment shall have one (1) roll up door. The compartment shall have a useable door opening of approximately 41" wide x full height.

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COMPARTMENT DOOR, REAR ROLL UP

A ROM roll-up door shall be installed on the rear compartment of the apparatus.

Slats are to be double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact.

The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing.

A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position.

The rear compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

REAR BODY CONSTRUCTION, FLAT BACK DESIGN

The rear of the apparatus shall be flat back design. No beavertails shall be installed on the unit.

COMPARTMENTS, ROOF TOP STORAGE

Six (6) roof top compartments shall be installed – three (3) on each side of the upper body. The compartments shall be constructed from same material as the body and shall be integral with the body. Each compartment shall have a door constructed from aluminum tread plate. The doors shall have a stainless steel piano type hinge and chest style latch. The interior compartment dimensions shall be determined by customer requirements for equipment storage and engineering. Compartments shall have a 1/2" flange around the opening to prevent water from entering the compartment when the door is closed. The doors shall be held open with gas shocks.

Each compartment shall have a grommet mount LED installed to the compartment inner door pan that activates when the door is open.

The right side compartments are slightly smaller to allow for a landing area above the rear access ladder.

COMPARTMENT, LADDER STORAGE

The apparatus shall be equipped with a ladder storage compartment located under the hosebed. A smooth aluminum door with D-ring latch mechanism shall be located on the rear of the apparatus to facilitate access to the rack. The compartment shall hold one (1) 24' extension ladder, one (1) 14' roof ladder, one (1) 10' folding attic ladder and up to two (2) pike poles.

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STORAGE TUBES, PIKE POLE

Two (2) aluminum tubes shall be installed on the apparatus for pike pole storage. One (1) end shall be notched to allow the poles to be locked in place.

STORAGE MODULE, RESCUE SAW

There shall be one (1) saw storage modules located in the specified compartments to hold two (2) rescue saws. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with gray "F-Shield".

The module shall be angled to allow for additional storage. The front of the module shall have two (2) lift up door to access the additional storage area. The outside of each door shall be equipped with a fabricated saw mount and two (2) chrome dog bone handles.

Saw Mounts will fit a Chain Saw with a 20" Bar.

STORAGE MODULE, BACKBOARD

There shall be a backboard storage module located within the upper section pump panel compartments. This backboard module shall be constructed from welded 3/16" thick smooth aluminum plate, complete with welded partitions. The module shall be designed to carry three (3) backboards. Each opening shall be approximately 3" high x 18" wide x 72" deep. This module shall contain approximately 6-3/4 cubic feet of storage. The outer left and right sections shall be welded to the body structure. The center section shall be completely removable for improved pump service access. The center section shall slide out with the release of two (2) stainless steel butterfly latches.

WHEEL WELL EXTINGUISHER COMPARTMENT, LEFT FRONT

There shall be an extinguisher compartment located in the rear wheel well left front to house two (2) extinguishers (2-1/2" water and 20-pound ABC). The bottom of the compartment shall also be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be stainless steel with a positive mechanical latch.

WHEEL WELL EXTINGUISHER COMPARTMENT, LEFT REAR

There shall be an extinguisher compartment located in the rear wheel well left rear to house two (2) extinguishers (2-1/2" water and 20-pound ABC). The bottom of the compartment shall also be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be stainless steel with a positive mechanical latch.

WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT FRONT

There shall be an air bottle compartment located in the rear wheel well right front to house two (2) spare SCBA cylinders. The bottom of the compartment shall also be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be stainless steel with a positive mechanical latch.

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WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT REAR

There shall be an air bottle compartment located in the rear wheel well right rear to house two-(2) spare SCBA cylinders. The bottom of the compartment shall also be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be stainless steel with a positive mechanical latch.

BODY TRIM

The standard body trim shall include the following:

There shall be drip rail installed over the compartment door openings.

A drip rail shall be located over each compartment door. This drip rail shall form a lip over the exterior door pans to prevent water from running into a compartment.

The vertical rear face of the body shall be covered with smooth aluminum plate.

Two (2) handrails shall be located on the rear of the apparatus, one-(1) handrail per side. Each handrail shall be constructed of 1-1/4" knurled aluminum. The handrails shall be mounted with chrome plated end stanchions. Each handrail shall be sufficient in length to meet all standard requirements.

Two (2) stanchions shall be mounted at the rear of the apparatus hosebed – one (1) on each side. The stanchions shall be 11" long x 3-3/4" wide. Stainless steel scuff plates shall be installed in the hosebed area to prevent deploying hose from damage on stanchion supports. The stanchions shall provide mounting positions for the Zone C warning lights and additional hosebed lighting. All wiring for the upper rear lighting shall be concealed inside the stanchions.

FUEL FILL, RECESSED WITH DOOR

There shall be a recessed fuel fill assembly with a non-locking door mounted on the left side of the apparatus body. The fuel fill assembly shall be equipped with a fuel fill cap, retention ring and hinged door. The assembly shall be properly labeled "DIESEL FUEL ONLY".

MUD FLAPS, REAR

The rear axle mud flaps shall be constructed from hard black rubber and installed at the rear of the body fenders.

RUBRAIL

There shall be an aluminum rubrail installed on both sides of the lower body compartments. The rubrail shall be constructed from "C" channel extrusion. The aluminum rubrail shall be bolted in place with stainless steel bolts, and spaced from the fire body to provide body protection. The solid rubrail shall serve as protection to the side doors when encountering close objects. Tread plate rubrails or welded on shall not be acceptable.

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REAR STEP

The 20" rear step shall be constructed with an anodized aluminum extrusion. This extrusion shall be slotted punched and raised to provide superior traction during wet and cold weather operations. The rear step shall be a two-piece design. The rear step shall bolt on with stainless steel nuts and bolts for replacement. The rear step shall have a space of approximately 1/4" from the rear of the body to allow water runoff.

All running board and step surfaces shall comply with NFPA 1901.

ACCESS LADDER, REAR

There shall be one (1) Zico Quic-Ladder model 3096 with a two-rung fold-down section and six-rung main ladder section. The ladder shall be cast aluminum with a flat, non-skid surface for traction. Each step shall be 3" deep x 15-1/2" wide. The handrails shall be 1-1/4" heavy-walled aluminum tubing, covered between the rungs with ribbed black neoprene.

TOW EYES, REAR

Two (2) 1" thick rear tow eyes constructed of A-36 steel shall be mounted below the frame at the rear of the vehicle. The tow eyes shall be attached to steel weldments that are mounted to the apparatus. The eyes shall have a minimum dimension of three (3) inches. The tow eyes shall be used for towing, not lifting the vehicle.

HANDRAIL, BELOW HOSE BED

There shall be an intermediate handrail installed on the apparatus below the hose bed. The handrail shall be constructed of 1-1/4" knurled aluminum. The handrail shall be mounted with chrome plated end stanchions.

HOSE BED DIVIDER

One (1) hose bed divider shall be manufactured from 1/4" (.250") smooth aluminum plate with an extruded aluminum base welded to the bottom. The divider shall have an extruded track to slide in to allow the hose bed to adjust for different hose capacities. One end of the divider shall have a 3" radius corner. The divider shall be sanded to prevent damage to the hose.

HOSE BED COVER

A 1/8" (.125") aluminum tread plate hose bed cover shall be provided. The cover shall be two (2) door types with continuous stainless steel hinge along each side. The hosebed cover shall have aluminum assist handles and door hold open springs. An open door indicator switch shall be provided and wired the open door indicator system in the cab.

Two (2) Hypalon end flaps shall be provided at the rear of the apparatus. The flaps shall be constructed of 16 oz. heavy-duty, fire retardant Hypalon.

The covers shall be wired the door ajar system.

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The hypalon end flaps shall be secured at the bottom using snaps and Velcro. The end flaps shall completely protect the hose and prevent the hose from inadvertently deploying during normal operation.

The cover shall meet the TIA 03-1 NFPA requirement.

The covers shall be black in color.

HOSE BED CAPACITY

The hose bed shall have the capacity to hold the following:

<u>Quantity:</u>	<u>Size of Hose:</u>	<u>Brand Name of Hose:</u>
TBD at pre-construction conference		

Customer must specify hose to have the correct hose capacity to meet the current NFPA.

STORAGE MODULE, COMPARTMENT L5

There shall be a storage module located in compartment L5. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with gray "F-Shield".

The module shall have an outer dimension of 53-1/8" wide x 27-7/8" high x full depth. The module shall be divided into ten (10) separate storage areas as follows (left to right):

- Position 1 (forward wall): 3" wide x 27-1/2" high
- Position 2 (aft of position 1): 4-3/16" wide x 27-1/2" high
- Position 3 (aft of position 2): 4-1/8" wide x 15" high
- Position 4 (aft of position 3): 8-3/8" wide x 15" high
- Position 5 (aft of position 4): 15-3/8" wide x 15" high
- Position 6 (aft of position 5): 15-3/8" wide x 15" high
- Position 7 (above position 3, 4 & 5): 35-1/2" wide x 3-7/8" high
- Position 8 (aft of position 7): 9" wide x 4-1/2" high
- Position 9 (above position 7): 35-1/2" wide x 3-7/8" high
- Position 10 (aft of position 9): 9" wide x 3-7/8" high

All the position dimensions are interior.

There shall be two (2) 5-1/2" diameter tubes installed on the rear wall of position 4 for storage of D-size Oxygen cylinders.

AIR BAG MODULE, COMPARTMENT R5

There shall be a bag storage module located in compartment R5, rear side wall. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with gray "F-Shield".

The module shall be divided into seven (7) separate storage areas as follows (left to right):

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Position 1 (forward wall): 2-1/2" wide x 26" high
 Position 2 (aft of position 1): 2-1/2" wide x 26" high
 Position 3 (aft of position 2): 1-3/8" wide x 26" high
 Position 4 (aft of position 3): 1-1/2" wide x 26" high
 Position 5 (aft of position 4): 1-1/2" wide x 26" high
 Position 6 (aft of position 5): 1-1/2" wide x 21" high
 Position 7 (aft of position 6): 1-1/4" wide x 21" high

All the position dimensions are interior.

SHELF, PERMANENT

There shall be one (1) permanent shelf constructed from aluminum mounted in the specified location of the compartment. Each shelf shall have a 2" lip at the front and rear for additional strength.

Location: Above Discharges in Compartment R3.

SHELF, ADDITIONAL ADJUSTABLE

There shall be two (2) additional adjustable shelf (shelves) constructed from 3/16" (.1875) smooth aluminum. The shelf shall be approximately 0-28"W x 24-28"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength.

Location: Compartment L4, upper section, forward of the divider.

TRAYS, 250 POUND ROLL OUT

There shall be two (2) roll-out trays supplied, constructed from 3/16" (.1875") smooth aluminum plate. Each tray shall be approximately 0-18"W x 24-28"D. The trays shall have a 3" lip on all sides for additional strength. Each tray shall be mounted on Grant slides with a combined capacity of 250 pounds.

Location: Compartment L4, forward of the divider.

TRAYS, 500 POUND ROLL OUT

There shall be two (2) roll-out trays supplied, constructed from 3/16" (.1875") smooth aluminum plate. Each tray shall be approximately 37-48"W x 24-28"D. The trays shall have a 3" lip on all sides for additional strength. Each tray shall be mounted on Slide Master Slides with a combined capacity of 500 pounds.

Location: Compartment L6 and R6 Floor.

TOOL BOARDS, VERTICAL ROLL OUT

There shall be three (3) vertical tool boards mounted in a specified compartment. Each tool board shall be manufactured from 3/16" smooth aluminum plate. The tool boards shall be approximately 24-28"D x full height and designed to extend 100% of the slide length. One (1) set of Grant 250# slides shall be installed per tool board.

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Location: (2) Two in Compartment L4 and (1) one in Compartment R6.

STORAGE POCKETS, VERTICAL TOOL BOARD

There shall be three (3) 6" deep storage pockets installed at the bottom of the specified vertical slide out tool boards.

TOOL BOARD, VERTICAL ROLL OUT

There shall be one (1) vertical tool board mounted in a specified compartment. The tool board shall be manufactured from 3/16" smooth aluminum plate. The tool board shall be approximately 24-28"D x 0-27"H and designed to extend 100% of the slide length. One (1) set of Grant 250# slides shall be installed per tool board.

Location: Compartment L6, rear of the Chain Saw Storage Module.

COMPARTMENT DIVIDERS

Four (4) compartment dividers shall be mounted in the specified compartment. The divider shall be constructed of 3/16" (.1875") smooth aluminum plate.

Locations: Compartments L2, L4, L6 and R6.

ELECTRICAL SYSTEM

BODY ELECTRICAL

The body electrical system shall be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system shall be comprised of power distribution panels, which interface to the body and chassis through an engineered harnessing system.

All chassis wiring shall be type "GXL" in accordance with S.A.E. J1128 and NFPA 1901. Wiring shall be color coded and include function codes every three (3) inches on both sides.

The electrical wiring harness shall be covered by a black split convoluted loom, rated at a minimum of 275° F.

DISTRIBUTION PANELS

The electrical distribution panels and circuits must be housed in each rear corner compartment or extrusion. The distribution panels shall incorporate a power and ground stud for connection to the internal circuits.

All internal wire end terminals, including locking bulkhead connectors, shall be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals shall be acceptable.

All internal splices shall be ultrasonically welded connections - no butt style connections shall be acceptable. All internal wiring shall be of the high temperature GXL type wire and shall be protected by wiring duct wherever possible.

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Each side electrical distribution panel shall consist of fifteen (15) power distribution relays. The power distribution relays shall be replaceable, SPDT automotive style, rated at a minimum of 30 amperes.

The power distribution relays shall incorporate separate inputs, which are able to accept outputs from a load management system. The load management inputs must allow for the addition of a load management system before, during or after the time of delivery without requiring a rewiring of the existing distribution panel circuits.

Connections to the distribution panel shall utilize Deutsch style bulkhead connectors. Screw clamp type connections are not acceptable.

The distribution panel shall also contain circuits ancillary to the required DOT signals and other body functions.

The complete body electrical system shall be 100% documented and contain independent circuit diagrams with point to point wiring information, as shall as a general component diagram included in the apparatus manual.

The body electrical panel shall be capable of being completely disconnected and fully tested by a computerized circuit analyzer.

All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the driver. Light switches shall be of the marine grade rocker type with integral indicator light to show when lights are energized. All switches shall be appropriately identified.

WIRING PROTECTION

All 12-volt wiring shall be run in high temperature, rated at a minimum of 275° F, split loom for easy access to wires when trouble shooting.

12-VOLT TESTING

The apparatus low voltage system shall be tested and certified. A copy of certification shall be provided to the purchaser with the apparatus.

Reserve Capacity Test

The unit shall be run until all engines and engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load be activated for ten (10) minutes. All electrical loads shall be shutoff after ten (10) minutes and the battery system shall then be capable of restarting the engine.

Alternator Performance Test at Idle

Minimum continuous electrical loads shall be activated while the unit is at idle speed.

Alternator Performance Test at Full Load

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm is sounded by excessive battery discharge as detected by the system or a system voltage of less than 11.8 volts DC for a 12-volt nominal system for more than 120 seconds, shall be considered a test failure.

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Low Voltage Alarm Test

The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm activates. The test shall be considered a failure if the alarm has not sounded within 140 seconds after the voltage drops to 11.8 volts.

EMI/RFI PROTECTION

The apparatus shall be manufactured to incorporate the latest designs in the electrical system with components that are state of the art to insure electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus shall have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI.

The apparatus shall utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus shall be bonded through ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode and/or resistor protected to prevent transient voltage spikes.

In order to prevent the radio frequency interference completely the purchaser shall be requested to provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus.

LIGHTS, 8" LED COMPARTMENT

Two (2) On Scene Solutions "Access Series" 8" LED lights shall be provided with 15 HB, surface mount LED's per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Compartment L1/R1.

LIGHTS, 28" LED COMPARTMENT

Seven (7) On Scene Solutions "Access Series" 28" LED lights shall be provided with 15 HB, surface mount LEDs per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Compartments L2, L5 (2), R2, R5 (2), and B1.

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LIGHTS, 54" LED COMPARTMENT

Ten (10) On Scene Solutions "Access Series" 54" LED lights shall be provided with 15 HB, surface mount LEDs per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Compartments L3, L4 (2), L6 (2), R3, R4 (2) and R6 (2).

DOOR AJAR SWITCHES

All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of the apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver.

LIGHTBAR, 72" WHELEN FN72QLED

A Whelen Edge Ultra Freedom Super-LED Series lightbar model FN72QLED shall be provided. The Edge Ultra Freedom lightbar shall incorporate an anodized extruded aluminum "I" beam chassis with two red Linear-LED corner modules, two red 400 Series Linear-LED endcap lights, two red 400 Series Linear-LED lights, and two white 400 Series Linear-LED lights with clear optic lenses. The Linear-LED corner modules shall incorporate 12 red Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. The red 400 Series Linear-LED lights shall incorporate 12 red Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. The white 400 Series Linear-LED lights shall incorporate 12 white Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. All Linear-LED lights conformal coated PC boards shall provide additional protection against environmental elements. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The FN72QLED shall include rubber endcap gaskets, lens divider gaskets, and cord seal to help prevent water and other elements from entering the lightbar.

The lightbar shall be controlled in the following manner:

Calling for Right of Way - All Positions

Blocking Right of Way - Clear shall not be Active

The lights shall be activated by a single emergency light switch located on the master light switch panel in the cab.

The lightbar shall meet NFPA 1901 edition as configured.

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LIGHTS, ZONE B/D UPPER FRONT BODY

Two (2) Whelen M9 Series Super-LED model M9J shall be installed, one (1) on each side of the upper front corner of the body. The warning light shall incorporate split red/blue Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module shall include a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS, ZONE B/D UPPER REAR BODY

Two (2) Whelen M9 Series Super-LED model M9J shall be installed, one (1) on each side of the upper rear corner of the body. The warning light shall incorporate split red/blue Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module shall include a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS, ZONE C UPPER OUTBOARD

Two (2) Whelen M9 Series Super-LED model M9J shall be installed, one (1) on each side on the upper rear of the apparatus in the outboard position. The warning light shall incorporate split red/blue Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module shall include a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS, ZONE A LOWER

Two (2) Whelen M6 Series Super-LED model M6RC lights shall be installed, one (1) on each side front of the apparatus. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module shall include a M6FC chrome flange and hardware for horizontal mounting.

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LIGHTS, ZONE B/D FRONT LOWER

Two (2) Whelen M6 Series Model # M6V2RC combination 180° warning/perimeter light shall be provided on each side of the front bumper. The M6V2RC shall incorporate Linear Super-LED® and Smart LED® technology. The configuration of the M6V2RC shall be a M6 V-series red warning light and a perimeter light with a clear non-optic polycarbonate lens. The warning light shall consist of two V-series PC boards containing six red Super-LEDs on each PC board. Clear optic collimators and reflectors will be installed with each PC board for maximum illumination. The perimeter light shall consist of six white Super-LEDs installed on the scene light PC board. The perimeter light shall be installed at 45° angle with a TIR reflector for supreme radiance. The warning light assembly and the perimeter light assembly are installed on a main PC board.

The warning light shall include an internal flasher with 25 Scan-Lock™ flash patterns including low power and steady burn. The M6V2RC shall also be provided with a synchronize feature. The M6V2RC warning light shall meet KKK 1822F, NFPA 1901, and NFPA 1917 specifications. The M6V2RC perimeter light shall meet AMD 024 with two M6V2RC on each side of the vehicle and NFPA 13.10.1.2 for one M6V2RC up to six feet.

The lens/reflector assembly shall be sealed and resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The light engine shall be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The PC boards shall be conformal coated for additional protection.

The M6V2RC shall be furnished with 12" unterminated pigtailed. Rubber gasket, screws, and screw grommets shall be included for installation. The M6V2RC, with the aid of two screws, shall have the ability to be installed as a surface mount light. The warning light shall be covered by a five year factory warranty.

Voltage: +12v

Size: H=4.31", W=6.70", D=2.25"

Amp Draw Warning: 1.40 Amps

Amp Draw Perimeter: 0.62 Amps

Lens Color: Clear

LIGHTS, ZONE B/D MIDSHIP LOWER

Two (2) Whelen M6 Series Model # M6V2RC combination 180° warning/perimeter light shall be provided in each rear wheel well area. The M6V2RC shall incorporate Linear Super-LED® and Smart LED® technology. The configuration of the M6V2RC shall be a M6 V-series red warning light and a perimeter light with a clear non-optic polycarbonate lens. The warning light shall consist of two V-series PC boards containing six red Super-LEDs on each PC board. Clear optic collimators and reflectors will be installed with each PC board for maximum illumination. The perimeter light shall consist of six white Super-LEDs installed on the scene light PC board. The perimeter light shall be installed at 45° angle with a TIR reflector for supreme radiance. The warning light assembly and the perimeter light assembly are installed on a main PC board.

The warning light shall include an internal flasher with 25 Scan-Lock™ flash patterns including low power and steady burn. The M6V2RC shall also be provided with a synchronize feature. The M6V2RC warning light shall

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meet KKK 1822F, NFPA 1901, and NFPA 1917 specifications. The M6V2RC perimeter light shall meet AMD 024 with two M6V2RC on each side of the vehicle and NFPA 13.10.1.2 for one M6V2RC up to six feet.

The lens/reflector assembly shall be sealed and resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The light engine shall be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The PC boards shall be conformal coated for additional protection.

The M6V2RC shall be furnished with 12" unterminated pigtailed. Rubber gasket, screws, and screw grommets shall be included for installation. The M6V2RC, with the aid of two screws, shall have the ability to be installed as a surface mount light. The warning light shall be covered by a five year factory warranty.

Voltage: 12v

Size: H=4.31", W=6.70", D=2.25"

Amp Draw Warning: 1.40 Amps

Amp Draw Perimeter: 0.62 Amps

Lens Color: Clear

LIGHTS, ZONE B/D REAR LOWER

Two (2) Whelen M6 Series Super-LED model M6J lights shall be installed, one (1) on each side rearward portion of the apparatus. The warning light shall incorporate split red/blue Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting.

LIGHTS, ZONE C LOWER

Two (2) Whelen M6 Series Super-LED model M6J shall be installed, one (1) on each side on the lower rear of the apparatus. The warning light shall incorporate split red/blue Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light shall be covered by a five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting.

STOP, TURN AND BACK-UP LIGHTS

Stop, turn and backup lights shall be Whelen M6 Series, individual fixtures. The red stop (LED) light shall be model M6BTT, the turn light shall be a model M6T amber (LED) type with directional arrow, and the backup light shall be a white (LED) model M6BUW.

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HOUSING, REAR TAIL LIGHT ASSEMBLY

The fixtures shall be mounted on each rear face of the body in a model M6FCV4, four (4) lighthouse chrome housing.

LIGHT, REAR DIRECTIONAL

A Whelen Traffic Advisor model TAL65 shall be provided. The traffic advisor shall incorporate a rectangular extruded black aluminum chassis with six amber 500 Series LED lights. The 500 Series lights shall be installed with a clear optic hard coated polycarbonate lens. The 500 Series lights shall incorporate 40 amber 5mm LEDs. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and foam in place gasket shall provide additional protection against environmental elements.

The solid state traffic advisor shall be vibration resistant. The TAL65 shall include model TACTLD1 control head that includes remote flash control. The TACTLD1 shall have four programmable directional sequence flash patterns of left, right, split, and flash. The TACTLD1 includes an auxiliary flash option when attached to +12v DC to flash the traffic advisor. The LED display on the control head shall replicate the TAL65 directional sequence. The traffic advisor control head shall have a rear panel dip switch for the ability to set eight additional Scan-Lock™ flash patterns. The TAL65 will contain a 15' interconnecting cable with quick disconnect feature. The LED modules shall be covered by a five year factory warranty. The TAL65 shall have for mounting rear PEM nuts/thru-bolt end caps with hardware.

The rear directional light shall be recessed mounted in the body.

CLEARANCE LIGHTS AND REFLECTORS

Clearance lights and reflectors shall be LED lights, which include two (2) red marker lights, four (4) red rectangular reflectors, two (2) amber rectangular reflectors and one (1) red three light cluster recessed in the rear step.

LIGHTS, UNDERBODY

There shall be six (6) Whelen 2G Series model 20C0CDCD ground lights provided. The 12v steady burn compartment lights shall incorporate 12 clear LED and a clear optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state compartment light shall be vibration resistant. The 20C0CDCD will contain 350 usable lumens. An installation kit including mounting hardware and rubber gasket shall be provided. The 20C0CDCD will contain a 12" terminated pigtail with a waterproof Deutsch® connector. The compartment light shall be covered by a five year factory warranty.

LIGHT, LICENSE PLATE

A Whelen OS Series LED model OSC0EDCR shall be provided at the rear of the apparatus to illuminate the license plate. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and

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chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45 degree angle chrome housing shall be provided for surface mounting. The OAC0EDCR will contain a 12" non-terminated pigtail. The illumination light shall meet SAE J592 requirements and shall be covered by a five year factory warranty.

LIGHTS, 12-VOLT SURFACE MOUNT SCENE

Three (3) pair of Fire Research Spectra MAX LED model SPA260-Q20 surface mount lights shall be provided and installed. The lights shall be mounted with four (4) screws to a flat surface. It shall be no more than 5 7/8" high by 14 1/2" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

The lamphead shall have sixty (60) ultra-bright white LEDs, 56 for flood lighting and 4 to provide a spot light beam pattern. It shall operate at 12/24 volts DC, draw 13/6.9 amps, and generate 20,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

The lights shall be installed, one (1) on each side of the cab between the front and rear doors.

The cab mounted scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE.

The scene lights shall be installed, one (1) on each side of the body in the upper front corners.

The front side body mounted scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE.

The scene lights shall be installed, one (1) on each side of the body in the upper rear corners.

The rear body side mounted scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE.

LIGHTS, 12-VOLT SURFACE MOUNT SCENE

One (1) pair of Fire Research Spectra LED Flood and Loading Lights model SPA900-Q65 surface mount lights shall be provided and installed. The light shall be mounted with four (4) screws to a flat surface. It shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

The light shall have twenty-four (24) white LEDs. It shall operate at 12/24 volts DC, draw 6/3 amps and generate 5000 lumens of light. The lens shall redirect the light along the vehicle and out onto the working area. The lamp head housing shall be aluminum with a chrome colored bezel.

The scene lights shall be installed, one (1) on each side on the upper rear outboard corners of the body.

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The upper rear body mounted scene lights shall be controlled by a scene light switch located in the cab and rear of body labeled REAR SCENE and when the transmission is placed into reverse.

LIGHTS, DRIVER/PASSENGER'S SIDE BROW

Two (2) brow lights shall be installed on the front cab roof, one (1) on the driver's and one (1) on the passenger's side. The mounting brackets shall be attached to the bottom of the lamp head and be machined to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

Two (2) Fire Research Spectra Max LED Floodlight model SPA800-Q28 contour roof mount lights shall be installed. The mounting brackets shall attach to the bottom of the lamphead and be machined to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.

The lamphead shall have 84 ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 12/24 volts DC, draw 19.2/9.6 amps, and generate 28,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead shall be no more than 5 7/8" high by 14" wide. The lamphead and mounting bracket shall be powder coated. The LED scene light shall be for fire service use.

The cab mounted brow lights shall be controlled by a light switch located in the cab labeled BROW LIGHT.

LIGHT TOWER

One (1) Knight 2, manufactured by Command Light, part number KL415D, light tower shall be provided for installation on the apparatus. The location of the light tower and its controls shall be installed according to instructions given by the customer and the requirements of the light tower manufacturer.

The light tower shall extend 87-1/2" above the mounting surface and shall extend to full upright position in less than 15 seconds. The overall size of nested light tower shall be approximately 33" wide x 47" long x 14" high and weigh approximately 165 pounds.

Light Tower Construction and Design:

The light tower assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

The light tower shall be tested in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

Light Tower Electrical System:

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The light tower shall be a two-stage articulating device with a lighting bank on top of the second stage capable of continuous 360 degree rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the light bank and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. Power for the light bank shall be supplied through power collecting rings thus allowing continuous 360 degree rotation in either direction.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast as required by NFPA1901.

Light Tower Floodlights:

The Command Light shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Fire Research Corporation
Number of lamp heads:	Four (4) Spectra SPA100-Q20
Voltage:	12 VDC
Watts of each lamp head:	220 watt
Total watts of light tower:	880 watts
Amperage per lamp head:	18 amps
Total amperage of light tower:	100 amps
Total Lumens of light tower:	80,000 lumens

Configuration: The light heads shall be mounted in two (2) on each side of the light tower, giving two (2) vertical lines of two (2) when the lights are in the upright position.

CONTROLS, LIGHT TOWER

The light tower shall be controlled with a hand-held 15 foot umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

- Switches, one (1) for each light bank.
- Switch for optional light bank rotation.
- Switch for the optional strobe.
- Switch for lamp tree rotation.
- Switch for elevating lower stage.
- Switch for elevating upper stage.
- Indicator light to indicate when light bank is out of roof nest position.
- Indicator light to indicate when light bank is rotated to proper nest position.

BACK LIGHT, LIGHT TOWER

A backlight option shall be provided on the light tower. The lower pair of light heads shall be capable of being rotated about a horizontal axis. Thus, providing light down on the vehicle or up to 180 degrees from the fixed position of all other heads.

The control shall have a switch supplied for the backlight rotation option.

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COLOR, LIGHT TOWER

The finish of the light tower shall be electrostatically powder coated gray.

GENERATOR, ABOVE ROOF TOP COMPARTMENTS

The generator shall be installed above the roof top compartments in the recessed area as far forward as possible.

HYDRAULIC GENERATOR

There shall be a Harrison 6.0MCR generator installed on the apparatus. The alternator is a 2-pole, 3600 rpm, capacitor controlled generator with class H insulation. The generator shall be a commercial type with heavy-duty bearing and of brushless design to ensure low maintenance. No brushes or slip rings shall be allowed. The reservoir shall include an oil level gauge, oil temperature gauge, fill cap, fill strainer, and a booster unit to provide a positive pressure to the pump suction port.

SPECIFICATIONS

- Height - 18"
- Width - 33"
- Depth - 14"
- Weight - 230lbs
- Max kW - 6.0
- AMPS@120V - 50
- AMPS@240V - 25
- HP Required - 12
- Torque Required - 52.5
- Max System Pressure - 2350 psi

Manufacturer shall provide a Limited Lifetime Warranty when service requirements are met.

GENERATOR METER PANEL

There shall be one (1) Harrison Generator quad meter panel provided and installed. This meter shall provide frequency, line voltage, and ampere for each line.

PTO, GENERATOR

A clutch driven 10-bolt heavy-duty engine driven PTO (Power Take off Unit) shall be installed on the EVS transmission to run the generator. The output side of the PTO shall have a SAE "B" pad or a keyed 1.25" shaft. A switch located in the cab shall be furnished to activate the PTO. A neutral switch interlock shall be provided preventing accidental engagement of the PTO unless the transmission is in the neutral position.

LIGHT, GENERATOR PTO INDICATOR

A green light to indicate that the PTO is in gear shall be mounted in the cab and on the pump panel.

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BREAKER PANEL

A General Electric breaker box with 240 main breaker and four (4) 120 volt circuit breakers shall be installed. The breaker box shall include a master breaker sized according to the generator output. The breaker box shall be located in a compartment as specified by the engineering department to meet the current NFPA specifications.

WIRING PROTECTION

All 120-volt wiring shall be run in high temperature, rated at a minimum of 275° F, split loom for easy access to wires when trouble shooting.

120-VOLT ELECTRICAL SYSTEM TESTING

The following 120 volt electrical wiring and associated equipment tests shall be performed.

DIELECTRIC VOLTAGE

A dielectric voltage withstand test of 900 volts for one (1) minute.

ELECTRICAL POLARITY VERIFICATION

There shall be an electrical polarity verification to determine that connections have been properly made.

OPERATIONAL TEST - there shall be the following operational tests conducted.

1. **CRANKING TIME**
The cranking time until the prime mover (generator) starts and runs.
2. **VOLTAGE, FREQUENCY, AMPERES**
The voltage, frequency, and amperes are tested at continuous full rated load.
3. **OPERATIONAL INDICATORS**
The prime mover (generator) oil pressure, water temperature, transmission temperature, hydraulic temperature, and the battery charge rate, as applicable, the ambient temperature and an altitude.
4. **OPERATIONS TEST**
The power source shall be operated at 100 % of its nameplate voltage for a minimum of two (2) hours.

POWER SOURCE SPECIFICATION PLATE

A permanently affixed plate shall be installed near operator's position. The plate shall provide the operator with the following information:

- Rated voltage(s) and type (AC or DC)

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- Phase
- Rated frequency (at rated voltage(s))
- Rated Amperage
- Continuous rated watts
- Power source engine speed

RECEPTACLES, 20 AMP/120 VOLT TWIST LOCK

There shall be two (2) NEMA # L5-20, 120 volt 20 amp twist-lock receptacles shall be installed wired to the breaker panel. A weatherproof spring loaded cover shall be installed over the receptacles.

Location: To be determined at Pre-Construction Conference.

4 WAY JUNCTION BOX

One (1) Akron Brass, electrical junction box model EJB-L5-20 shall be provided. The Electrical Junction Box shall be constructed of heavy-duty, cast aluminum with a ¼" thick walls and the four corner edges shall be at least ½" thick to withstand the roughest of handling. A carrying handle shall be an integral part of the Junction Box's casting and be large enough to fit a fully gloved hand. The junction box must be internally lit. Each side of the electrical junction box shall be fitted with polypropylene faceplates. The faceplates shall be backlit so that plug orientation to the receptacle is quick and easy to align. Each electrical junction box shall be equipped with four-(4) L5-20 receptacles (two on each side) as specified by the user. Each receptacle shall be equipped with a spring-loaded snap cover and marked in white lettering with that receptacle's voltage and ampere rating. All electrical receptacles, plugs and snap type weatherproof covers shall be UL Listed components.

BRACKET, JUNCTION BOX

One (1) junction box mounting bracket shall be installed on the apparatus as directed by the Fire Department. The bracket shall be constructed of diamond plate that is cut, bent, and welded to meet the dimensions of the junction box. The box shall be lined with PVC material to protect the junction box.

REEL, ELECTRIC CORD

There shall be one (1) Hannay Model ECR1616-17-18, electric rewind electric cord reel provided. The cord reel shall have 200' of 10-3 wire cord. The reel shall be mounted as directed and shall be controlled by a 12-volt switch. The cord reel shall be wired to the breaker panel.

The electrical cord provided on the reel shall be black in color.

The electric cord reel shall be installed in the specified compartment.

HOSE/CORD ROLLERS

There shall be one (1) 4-way roller assembly installed to guide the hose/cord on and off the spool to prevent chafing of the apparatus paint.

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HOSE/CORD STOP

There shall be one (1) Hannay hose/cord stop model HS-3 attached at the end of each hose/cord.

PLATE, POWER REWIND REEL

A permanently affixed plate shall be installed in a readily visible location adjacent to any permanently connected reel that indicates the following:

- Current Rating
- Current Type
- Phase
- Voltage
- Total Cable Length

REEL, AIR

There shall be one (1) Hannay model EFH1514-17-18, electric rewind air hose reel mounted in a location to be determined by the Fire Department and connected to the Chassis Accessory Air Tanks. The reel shall contain 200' of 3/8" air line.

The air reel(s) shall be installed in the specified compartment(s).

Location: Compartment R4 Forward.

HOSE/CORD ROLLERS

There shall be two (2) 4-way roller assemblies installed to guide the hose/cord on and off the spool to prevent chafing of the apparatus paint.

HOSE/CORD STOPS

There shall be two (2) Hannay hose/cord stops model HS-3 attached at the end of each hose/cord.

BODY PAINT FINISH, TWO TONE

The body shall be painted two colors. The paint break shall be determined by the Fire Department.

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Box pan compartment doors shall be painted separately to assure proper paint coverage on body, door jambs, and door edges.

All painted surfaces shall be completed in accordance with the following procedure to insure a lasting finish:

- Metal surfaces shall be sanded to remove all burrs and imperfections, before etching and treatment.
- A wax & grease solvent shall be used to clean and prep the aluminum surface. The surface shall then be rinsed with fresh water. This step removes wax, grease and other surface contaminants, thus leaving a bright, clean,

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and conditioned surface.

- A self-etching, metal primer shall be applied next. The self-etching primer shall fill all of the minor imperfections, scratches, etc. In the metal. This step produces a corrosion resisting conversion coating that prevents off oxidation and other surface contaminants leaving a surface that gives excellent paint adhesion.
- A sandable primer shall be sprayed on the metal that seals the surface for the polyurethane paint. A minimum coating thickness of 2 MIL shall be applied. Primer is then sanded smooth leaving the best surface for top coat.
- The apparatus body shall then be painted with a minimum of three (3) coats of color and a base coat.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

UPPER BODY PAINT FINISH

The upper body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Box pan compartment doors shall be painted separately to assure proper paint coverage on body, door jambs, and door edges.

The apparatus body shall then be painted with a minimum of three (3) coats of color and a base coat.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

UPPER BODY PAINT COLOR/CODE

The apparatus upper body paint code shall be Black, 99.

LOWER BODY PAINT FINISH

The lower body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Box pan compartment doors shall be painted separately to assure proper paint coverage on body, door jambs, and door edges.

The apparatus body shall then be painted with a minimum of three-(3) coats of color and a base coat.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

LOWER BODY PAINT COLOR/CODE

The apparatus lower body paint code shall be Red, B8241EX.

PAINT, INTERIOR COMPARTMENT

The interior of the body compartments shall be painted with "F-Shield".

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"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

UNDERCOATING, APPARATUS BODY

The underside of the apparatus body shall be sprayed with F-Shield sealant that assists in the prevention of rust and corrosion.

SCOTCHLITE STRIPE

There shall be a 4" wide Scotchlite stripe located on the apparatus cab and body. The stripe shall cover a minimum of fifty percent (50%) of the cab, body sides and of the rear of the apparatus. The stripe shall also cover twenty-five percent (25%) of the front of the apparatus. The stripe shall be installed to meet the current NFPA requirements.

The striping shall be white in color.

The reflective stripe shall run straight from the headlights to the rear of the body on each side of the apparatus.

STRIPE, REAR CHEVRON

A minimum of fifty percent of the rear vertical surface of the unit shall be overlaid with a reflective material, installed in an alternating "Chevron" pattern (sloping down and away from the centerline) at a 45-degree angle. Each stripe shall be 6" wide and the colors of striping shall be in compliance with the current edition of NFPA 1901.

The Chevron striping shall be 3M red and lime green.

LETTERING

There shall be a maximum of sixty (60) 3" tall Spun Gold letters applied to the apparatus. The lettering shall also have a one color shade applied.

EQUIPMENT MOUNTING

Equipment supplied by the Fire Department will be mounted as directed by the Authorized Official of the Fire Department.

Equipment will be mounted by Ferrara Fire Apparatus.

WARRANTY, BODY PARTS & LABOR

There shall be a two (2) year extended body mechanical parts and labor warranty provided with the apparatus. The apparatus shall be free of defects in material and workmanship for a warranty period of two (2) years after the date on which the apparatus is first delivered to the original purchaser.

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WARRANTY, CAB/CHASSIS PARTS & LABOR

The manufacturer shall provide a limited parts and labor warranty to the purchaser of the cab and chassis for a period of two (2) year, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, CAB STRUCTURAL

The cab structure shall be warranted for a period of ten (10) years or 100,000 miles whichever may occur first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY STRUCTURAL

There shall be a ten (10) year body warranty on each new fire body/heavy-duty rescue apparatus. The bodies are to be free of structural failures caused by defective design or workmanship for a warranty period of ten (10) years after the date on which the vehicle is first delivered to the original purchaser or 100,000 miles, whichever occurs first.

WARRANTY, CAB PAINT

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the date of delivery to the original purchaser or in service for the first 100,000 actual miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY PAINT/CORROSION

There shall be a four (4) year paint/corrosion warranty provided. This warranty shall cover perforation, blistering, peeling, or any other adhesion defects caused by defective manufacturing methods, or material selections, for a warranty period of four (4) years or 100,000 miles which occurs first, after the date of which the vehicle is first delivered to the original purchaser.

WARRANTY, FRAME CORROSION

Ferrara Fire Apparatus, Inc. (the "Company") warrants to the original user-purchaser only of a Ferrara Fire Apparatus, Inc. chassis which, with the Company's application of Ferrara "F-Shield" and barring customer's removal of "F-Shield" in all or in part, that the frame and frame cross members shall be free of corrosion for the lifetime of the vehicle.

Ferrara Fire Apparatus, Inc. obligation under this warranty is strictly limited to replacing or repairing, as the Company may elect, any part or parts of such frame or frame members, which the Company's examination discloses to be defective in material or workmanship. This company reserves the right to require any such repairs to be made either at a Company owned service facility or another approved service facility at the Company's option. Transportation cost to and from the servicing location is the responsibility of the user- purchaser.

This warranty shall be null and void if the frame shows any evidence of grinding or sanding, alterations, cutting, splicing, welding or drilling of rails or flanges without the written authorization of Ferrara Fire Apparatus, Inc. and

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proper reapplication of "F-Shield". Further, this warranty shall be void if the vehicle shows signs of abuse, neglect, or evidence of being operated in a manner or purpose not recommended by Ferrara Fire Apparatus, Inc.

Nothing contained in this warranty shall make Ferrara Fire Apparatus, Inc. liable beyond the express limitations hereof; for loss, injury or damage of any kind to any person or entity resulting from any defect or failure of the chassis.

WARRANTY, FRAME RAIL

The chassis frame and crossmembers shall be provided with a lifetime material and workmanship limited warranty to the original purchaser. The warranty shall cover the chassis frame and crossmembers as being free from defects in material and workmanship that would arise under normal use and service.

Warranties for frames not including cross members shall not be acceptable.

WARRANTY, MERITOR AXLE

FRONT AXLE

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application.

REAR AXLE

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application.

WARRANTY, DIESEL ENGINE

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

WARRANTY, TRANSMISSION

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

WARRANTY, ANTI LOCK BRAKE SYSTEM

The ABS brake system shall be warranted for a period of three (3) years/300,000 miles.

WARRANTY, WATEROUS FIRE PUMP

Waterous warrants, to the original Buyer only, that products manufactured by Waterous will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date the product is first placed in service, or five and one-half (5 1/2) years from the date of shipment by Waterous, whichever period shall be the first to expire; provided the buyer notifies Waterous, in writing, of the defect in said product within the warranty period, and said product is found by Waterous to be nonconforming with the aforesaid warranty.

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WARRANTY, PLUMBING SYSTEM

There shall be a ten (10) year pump plumbing warranty provided. The warranty covers all plumbing components used in construction of the fire apparatus water/foam plumbing system against defects and workmanship, provided the apparatus is used in a normal and reasonable manner. The warranty is extended only to the original user-purchaser for a period of 10 years from the date of delivery.

WARRANTY, WATER TANK

The poly tank manufacturer warrants each tank to be free from manufacturing defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in fire suppression). The warrant is transferable, with written approval of the manufacturer. Each tank is inspected and tested for leaks prior to leaving the manufacturing facility. The tank shall be installed in the vehicle in accordance with the manufacturer's guidelines.

MANUAL, CHASSIS OPERATION

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

MANUALS, ENGINE AND TRANSMISSION OPERATION

There shall be two (2) printed hard copy sets of the engine operation manual and two (2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis.

MANUALS, APPARATUS BODY

There shall be two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

MANUALS, FIRE PUMP

There shall be two (2) copies of pump manuals provided to the Fire Department.

WIRING DIAGRAMS, CAB/CHASSIS

There will be a complete digital set of electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color.

The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus.

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These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

WIRING DIAGRAMS, APPARATUS BODY

There will be a complete set of generic electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color.

The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus.

These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

This document will refer the user to the appropriate drawing and page number and to sections of the drawing(s) by the means of letter and number coordinates. The schematic will show all harnesses used in the apparatus cab, chassis and body that is supplied by the chassis and body manufacturer.

Modifications to the manufactured standard harnesses are to be documented and properly indexed for quick identification.

A complete wire number, color, and function listing will accompany the schematics.

LADDER, 10' FOLDING

There shall be one (1) Alco-Lite Model FL-10, 10' folding ladder(s) provided with the apparatus. The ladder shall be aluminum, single-section with rubber feet. The ladder shall meet or exceed the latest NFPA standards.

LADDER, 14' ROOF

There shall be one (1) Alco-Lite model PRL-14, 14' roof ladder supplied with the apparatus. The ladder shall be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladder shall meet or exceed the latest NFPA standards.

LADDER, 28' 2-SECTION EXTENSION

There shall be one (1) Duo-Safety model 1200-A, 28' two-section ladder supplied with the apparatus. The extension ladder shall be aluminum with steel spurs on one end. The ladder shall meet or exceed the latest NFPA standards.

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AKRON INTAKE VALVES

An Akron Brass 7983 revolution Intake Valve will be provided on each Pump 6" Intake. The inlet will be determined at pre-construction.

DEALER SUPPLIED EQUIPMENT

The following equipment shall be supplied by the dealer:

Key Fire Hose

13 ea. Big 10 - (FDNY) 1-3/4" x 50' (Choose Color)

7 ea. Big 10 - 2-1/2" x 50' (Choose Color)

12 ea. Big 10 - 3" x 50' (Choose Color)

8 ea. Pro Flow - 5" x 100'

EXHIBIT A

Exhibit B
Campaign Disclosure Certificate

The Campaign Disclosure Certificate is required pursuant to the Village of Downers Grove Council Policy on Ethical Standards and is applicable to those campaign contributions made to any member of the Village Council.

Said Campaign Disclosure Certificate requires any individual or entity bidding to disclose campaign contributions, as defined in Section 9-1.4 of the Election Code (10 ILCS 5/9-1.4), made to current members of the Village Council within the five (5) year period preceding the date of the bid or proposal release.

By signing this Agreement, Consultant agrees to refrain from making any campaign contributions as defined in Section 9-1.4 of the Election Code (10 ILCS 5/9-1.4) to any Village Council member and any challengers seeking to serve as a member of the Downers Grove Village Council.

Under penalty of perjury, I declare:

- Consultant has not contributed to any elected Village position within the last five (5) years.

Signature

Print Name

- Consultant has contributed a campaign contribution to a current member of the Village Council within the last five (5) years.

Print the following information:

Name of Contributor: _____
(company or individual)

To whom contribution was made: _____

Year contribution made: _____ Amount: \$ _____

Signature

Print Name

Suspension or Debarment Certificate

Non-Federal entities are prohibited from contracting with or making sub-awards under covered transactions to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement for goods or services equal to or in excess of \$100,000.00. Contractors receiving individual awards for \$100,000.00 or more and all sub-recipients must certify that the organization and its principals are not suspended or debarred.

By submitting this offer and signing this certificate, the Bidder certifies to the best of its knowledge and belief, that the company and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any federal, state or local governmental entity, department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction, or convicted of or had a civil judgment against them for a violation of Federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (2) of this certification: and
4. Have not within a three-year period preceding this application/proposal/contract had one or more public transactions (Federal, State or local) terminated for cause or default.

If the Bidder is unable to certify to any of the statements in this certification, Bidder shall attach an explanation to this certification.

Company Name: _____

Address: _____

City: _____ Zip Code: _____

Telephone: () _____ Fax Number: () _____

E-mail Address: _____

Authorized Company Signature: _____

Print Signature Name: _____ Title of Official: _____

Date: _____