THE CITY OF EDINBURG

NOTICE TO BIDDERS

The City of Edinburg is soliciting sealed bids to be received by the City Secretary's Office located at 415 W. University Drive, Edinburg, Texas 78541. City of Edinburg normal business days are Monday through Friday between the hours of 8:00 a.m. to 5:00 p.m. and shall be closed on recognized holidays.

Bids will be received until **3:00 p.m. Central Time**, on **Tuesday, January 03, 2012**, shortly thereafter all submitted bids will be gathered and taken to the Edinburg City Hall Community Room, 1st Floor, to be publicly opened and read aloud. Any bid received after the closing time will not be accepted and will be returned to the bidder unopened. It is the responsibility of the bidder to see that any bid submitted shall have sufficient time to be received by the City Secretary's Office prior to the bid opening date and time. The receiving time in the City Secretary's Office will be the governing time for acceptability of the bids. Bids will not be accepted by telephone or facsimile machine. All bids must bear original signatures and figures. The Bid shall be for:

BID NO. 2012-46
NEW 2012 PUMPER/BRUSH TRUCK

Bidders receiving a "NOTICE TO BIDDERS" and/or "REQUEST FOR PROPOSALS" notice in the mail or reading same in the newspaper are advised that the bidding documents can be downloaded from the City of Edinburg web page address: www.cityofedinburg.com, or may obtain copies of same by contacting the office of:

LORENA FUENTES, PURCHASING AGENT, LOCATED AT 415 W. UNIVERSITY DRIVE, Edinburg, TX 78541 by calling (956) 388-8972 or by e-mailing your request to the following e-mail address: lfuentes@cityofedinburg.com

If you have any questions or require additional information regarding this bid, please contact Mr. Shawn Snider, Fire Chief, at (956) 383-7691.

If Hand-delivering Bids: 415 West University Drive,
c/o City Secretary Department (1st Floor)

If using Land Courier (i.e., FedEx, UPS): City of Edinburg
c/o City Secretary
415 West University Drive
Edinburg, Texas 78541

If Mailing Bids: City of Edinburg
c/o City Secretary
P.O. Box 1079
Edinburg, TX 78540-1079

The City of Edinburg reserves the right to refuse and reject any or all bids and to waive any or all formalities or technicalities and to accept the bid deemed most advantageous to the City, and hold the bids for a period of **60** days without taking action.

Bids must be submitted in an envelope sealed with tape and prominently marked on the lower left hand corner of the bid envelope with corresponding bid number and title.

CITY OF EDINBURG
INSTRUCTIONS TO BIDDERS

DEVIATION FROM SPECIFICATION

Please read your specifications/requirements thoroughly and be sure that the SERVICES offered comply with all specifications/requirements. Any variation from the specifications/requirements must be clearly indicated by letter attached to your bid referencing variations on a point-by-point basis. If no exceptions are noted, and you are the successful bidder, it will be required that the SERVICES be provided as specified.

PURPOSE

1. The purpose of these specifications/requirements and bidding documents is for the purchase of **NEW 2012 PUMPER/BRUSH TRUCK** for the City of Edinburg.

2. The SERVICES to be furnished under this bid shall be as specified in these bid documents. All specifications/requirements shown are minimum. There is no intention to disqualify any bidder who can meet these specifications/requirements.

SUBMITTAL OF BID

Bids will be submitted in sealed envelopes upon the blank bid form attached hereto. Each bid must be completely filled out and **SUBMITTED IN ORIGINAL FORM**, complete with all supporting documentation. Bids submitted by facsimile (fax) or electronically will **NOT** be accepted. Submittal of a bid in response to this solicitation for Bids constitutes an offer by the Bidder. Bids which do not comply with these specifications/requirements may be rejected at the option of the City. Bids must be filed with the City of Edinburg, before opening day and hour. No late Bids will be accepted. They will be returned to Bidder unopened (if properly identified).

If Hand-delivering Bids:	415 West University Drive, c/o City Secretary Department (1st Floor)
If using Land Courier (i.e., FedEx, UPS):	415 West University Drive, c/o City Secretary Department (1st Floor), Edinburg, Texas 78541
If Mailing Bids:	P.O. Box 1079, Edinburg, TX 78540-1079

PREPARATION OF BID

Bids MUST give full firm name and address of bidder, and be manually signed. Failure to do so will disqualify your bid. Person signing bid must show title or AUTHORITY TO BIND HIS/HER FIRM IN A CONTRACT.

Firm name and authorized signature must appear on each page that calls for this information. The legal status of the Respondent/Bidder whether corporation, partnership, or individual, shall also be stated in the bid. A corporation shall execute the bid by its duly authorized officers in accordance with its corporate by-laws and shall also list the state in which it is incorporated. A partnership Respondent/Bidder shall give full names and addresses of all partners. All partners shall execute the bid. Partnership and Individual Respondent/Bidder shall state in the bid the names and addresses of all persons with a vested interest therein. The place of residence of each Respondent/Bidder, or the office address in the case of a firm or company, with county and state and telephone number, shall be given after the signature.

ALTERATIONS/AMENDMENTS TO BID

Bids **CANNOT** be altered or amended after opening time. Alterations made before opening time must be initialed by bidder guaranteeing authenticity. No bid may be withdrawn after opening time without acceptable reason in writing and only after approval by the City of Edinburg.

INSTRUCTIONS TO BIDDERS (Continued):

SALES TAX
State sales tax must not be included in the bid.

SUBSTITUTIONS
No substitutions or cancellations will be permitted without written approval of City of Edinburg.

NO BID RESPONSE
If unable to submit a bid, bidder should return inquiry giving reasons.

EXCEPTIONS
Any additions, deletions, or variations from the following specifications/requirements must be noted. The bidder shall attach to his/her bid sheet a list of any exceptions to the specifications/requirements if unable to do so, on specification sheet.

BRAND OR MANUFACTURER REFERENCE
Unless otherwise specified, any catalog or manufacturer's reference or brand name used in describing an item is merely descriptive, and not restrictive, and is used only to indicate type and style of product desired. Bids on alternate brands will be considered if they meet specification requirements. If a bidder quotes on equipment other than the one(s) specified in the bid, sufficient specifications and descriptive (pictured literature) data must accompany same to permit thorough evaluation. In the absence of these qualifications, he/she will be expected to furnish the product called for.

DELIVERY
Number of days required to deliver SERVICES after receiving order must be stated in the bid. Failure to so state will obligate bidder to complete service delivery within ONE day. Delivery time may be considered as basis of award.

DELAY IN SERVICE DELIVERY
When delay can be foreseen, Bidder shall give prior notice to City of Edinburg. Bidder must keep City of Edinburg advised at all times of status of order. Default in promised service delivery (without acceptable reasons) or failure to meet specifications/requirements, authorizes the City of Edinburg to purchase such SERVICES elsewhere and charge increase in cost to defaulting vendor. Acceptable reasons for delayed delivery are as follows: Acts of God (floods, tornadoes, hurricanes, etc.), acts of government, fire, strikes, war; Actions beyond the control of the successful bidder.

SERVICE DELIVERED PRICING
Bids in units of quantity specified - extend and show total. In the event of discrepancies in extension, unit prices will govern. Bids subject to unlimited price increase will not be considered.

VALID BID TIME FRAME
The City may hold bids 60 days after bid opening without taking action. BIDDERS shall be required to hold their Bids firm for the same period of time.

RIGHT TO REJECT/AWARD
The City of Edinburg reserves the right to refuse and reject any or all Bids, and to waive any or all formalities or technicalities, and to make such awards of contract as may be deemed to be the best and most advantageous to the City of Edinburg.

INSTRUCTIONS TO BIDDERS (Continued):

INDEMNIFICATION CLAUSE

The Bidder agrees to indemnify and save harmless the City, from all suits and actions of every nature and description brought against them or any of them, for or on account of the use of patented appliances, products or processes, and he shall pay all royalties and charges which are legal and equitable. Evidence of such payment or satisfaction shall be submitted upon request of the Purchasing Agent, as a necessary requirement in connection with the final estimate for payment in which such patented appliance, products or processes are used.

ADDENDA

Bidder shall carefully examine the bid forms, specifications/requirements, and instructions to Bidders. Should the bidder find discrepancies in, or omissions from bid forms, specifications/requirements, or other documents, or should he/she be in doubt as to their meaning, he/she should at once notify the Purchasing Agent (Edinburg City Hall, 956-388-8972) and obtain clarification by addendum prior to submitting any bid. Explanations, interpretations, and supplemental instructions shall be in the form of written Addenda which shall become a part of the Contract documents. Said Addenda shall be mailed, e-mailed, hand delivered and/or faxed, to all prospective Bidders. All Addenda issued in respect to this project shall be considered official changes to the original bid documents. Verbal statements in response to inquiries and/or requests for explanations shall not be authoritative nor binding. It shall be the Bidder(s) responsibility to ensure that they have received all Addenda in respect to this project. Furthermore, Bidders are advised that they must recognize, comply with, and attach a signed copy of each Addendum which shall be made part of their Bid Submittal. Bidder(s) signature on Addenda shall be interpreted as the bidder's "recognition and compliance to" official changes as outlined by the City of Edinburg and as such are made part of the original solicitation documents. Failure of any bidder to receive any such addendum or interpretation shall not relieve such Bidder from its terms and requirements. Addendums are available online at www.cityofedinburg.com.

PAYMENT

The City of Edinburg will execute payment by mail in accordance with the State of Texas Pay Law after SERVICES have been provided and invoiced. No other method of payment will be considered.

SYNONYM

Where in this bid package ITEMS OR SERVICES is used its meaning shall refer to the purchase of NEW 2012 PUMPER/BRUSH TRUCK as specified.

ASSIGNMENT

Neither the Bidder's contract nor payment due to an awarded vendor may be assigned to a third party without the written approval of the Purchasing Department for the City of Edinburg.

INTERPRETATIONS

Any questions concerning the conditions and/or specifications/requirements with regards to this solicitation for Bids shall be directed to the designated individuals as outlined in the Request for Bids. Such interpretations, which may affect the eventual outcome of this request for Bids, shall be furnished in writing to all prospective Bidders via Addendum. No interpretation shall be considered binding unless provided in writing by the City of Edinburg in accordance with paragraph entitled "Addenda".

INSTRUCTIONS TO BIDDERS (Continued):

MULTIPLE VENDOR CONTRACTS

Bidders are advised that the City of Edinburg may award Service Contracts to multiple vendors based on low bid per item basis. All items specified on the "Bid Form" **must** reflect the individual unit prices. The City of Edinburg reserves the right to award all items individually or in any combination thereof

STATUTORY REQUIREMENTS

It shall be the responsibility of the successful Bidder to comply with all applicable State & Federal laws, Executive Orders and Municipal Ordinances, and the Rules and Regulations of all authorities having jurisdiction over the work to be performed hereunder and such shall apply to the contract throughout, and that they will be deemed to be included in the contract as though written out in full in the contract documents. (To include issues related to health, environmental, and safety to name a few.)

BIDDER'S EMPLOYEES

Neither the Bidder nor his/her employees engaged in fulfilling the terms and conditions of this Purchase Contract shall be considered employees of the City. The method and manner of performance of such undertakings shall be under the exclusive control of the vendor on contract. The City shall have the right of inspection of said undertakings at any time.

RIGHT TO WAIVE

City of Edinburg reserves the right to waive or take exception to any part of these specifications/requirements when in the best interest of the City of Edinburg.

COOPERATIVE PRICING

Bidders are advised that in addition to responding to our "local" solicitation for bids/Bids with Dealer pricing, vendors/contractors are encouraged to provide pricing on the below referenced items/products/services based on BuyBoard, TX-MAS, H-GAC and/or any other State of Texas recognized and approved cooperative which has complied with the bidding requirements for the State of Texas. If bidding other than or in addition to "dealer" pricing, kindly duplicate the bid forms for each bid being provided from a cooperative contract. Any and all applicable fees must be included. All cooperative pricing must be submitted on or before bid opening date and hour.

TIME ALLOWED FOR ACTION TAKEN

The City of Edinburg may hold bids **60** days after the opening of Bids without taking action. Bidders are required to hold their Bids firm for same period of time.

PREPARATION OF BID

The City of Edinburg shall not be held liable for any costs incurred by any bidder for work performed in the preparation of and production of a bid or for any work performed prior to execution of contract.

CONFIDENTIAL INFORMATION

Any information deemed to be confidential by the bidder should be clearly noted on the pages where confidential information is contained; however, the City cannot guarantee that it will not be compelled to disclose all or part of any public record under Texas Public Information Act, since information deemed to be confidential by the bidder may not be considered confidential under Texas Law, or pursuant to a Court order.

INSTRUCTIONS TO BIDDERS (Continued):

VERBAL THREATS

Any threats made to any employee of the City, be it verbal or written, to discontinue the providing of item/material/services for whatever reason and/or reasons shall be considered a breach of contract and the City will immediately sever the contract with the Vendor on contract.

MATHEMATICAL ERRORS

In the event that mathematical errors exist in any bid, unit prices/rates -v- totals, unit prices/rates will govern.

AUDIT

The City of Edinburg reserves the right to audit the vendor's books and records relating to the performance of this contract. The City of Edinburg, at its own expense, shall have the right at all reasonable times during normal business hours and upon at least twenty-four (24) hours' advance notice, to audit, to examine, and to make copies of or extracts from the books of account and records maintained by the vendor(s) with respect to the Supply/Service and/or Purchase Contract. If such audit shall disclose overpayment by City to vendor, written notice of such overpayment shall be provided to the vendor and the amount of overpayment shall be promptly reimbursed by vendor to the City. In the event any such overpayment is not paid within ten (10) business days after receipt of such notice, the unpaid amount of such overpayment shall bear interest at the rate of one percent (1%) per month from the date of such notice until paid.

PAST PERFORMANCE

Vendor's past performance shall be taken into consideration in the evaluation and award of Service Contract for the Purchase of SERVICES.

JURISDICTION

Contract(s) executed as part of this solicitation shall be subject to and governed under the laws of the State of Texas. Any and all obligations and payments are due and performable and payable in Hidalgo County, Texas.

VENUE

The parties agree that venue for purposes of any and all lawsuits, cause of action, arbitration, and/or any other dispute(s) shall be in Hidalgo County, Texas.

CONFLICT OF INTEREST

CHAPTER 176 OF THE TEXAS LOCAL GOVERNMENT CODE

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the records administrator of the City of Edinburg not later than the 7th business day after the date the person becomes aware of facts that require the statement be filed. See Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor. For more information or to obtain Questionnaire CIQ go to the Texas Ethics Commission web page at www.ethics.state.tx.us/forms/CIQ.pdf.

INSTRUCTIONS TO BIDDERS (Continued):

IF YOU HAVE ANY QUESTIONS ABOUT COMPLIANCE, PLEASE CONSULT YOUR OWN LEGAL COUNSEL. COMPLIANCE IS THE INDIVIDUAL RESPONSIBILITY OF EACH PERSON OR AGENT OF A PERSON WHO IS SUBJECT TO THE FILING REQUIREMENT. AN OFFENSE UNDER CHAPTER 176 IS A CLASS "C" MISDEMEANOR.

AWARD

For purposes of this project, award will be contingent on approval of budget.

SPECIAL CIRCUMSTANCES

In the event that the City of Edinburg has an immediate need for a particular service(s) that is/are on contract and the successful vendor on contract is not able to meet the special service delivery needs of the City of Edinburg, the City of Edinburg reserves the right to purchase such services elsewhere to fulfill its' immediate need.

TERMINATION OF CONTRACT

The City of Edinburg reserves the right to terminate the contract if, in the opinion of the City of Edinburg, the successful vendor's performance is not acceptable, if the City is being repeatedly over charged, improperly charged, no funds are available, or if the City wishes, without cause, to discontinue this contract. Termination will be in written form allowing a 30-day notice. The bidder shall be afforded the same right to terminate this contract in the same manner.

INSURANCE REQUIREMENTS

If the contract amount is over twenty-five-thousand dollars ($25,000) for construction of the project, the successful bidder shall provide a bid guarantee, give a good and sufficient bond in the full amount of the contract price for the faithful performance of such contract, executed by a surety company authorized to do business in the State of Texas, in accordance with Article 5160, Vernon's Texas Civil Statutes, and amendments thereto. A payment bond in the full amount of the contract price to assure payment shall be required by law of all persons supplying labor and material in the execution of the project provided for in the contract documents.

A bid guarantee equivalent to five percent (5%) of the bid price will be required from each bidder. The "bid guarantee" shall consist of a firm commitment, such as a bid bond, certified check or other negotiable instrument accompanying a bid as assurance that the bidder will upon acceptance of his/her bid, execute such contractual documents as may be required within the time specified.

A performance bond on the part of the contractor for one-hundred percent (100%) of the contract price will be required. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

A payment bond on the part of the contractor for one-hundred percent (100%) of the contract price will be required. A "payment bond" is one executed in connection with a contract to assure payment, as required by law, of all persons supplying labor and material in execution of the work provided for in the contract documents.

Bidders are expressly advised to review the contract documents fully and insurance requirements of the proposed contract as to their legal requirements and the causes which may lead to the disqualification of a bidder and/or rejection of a bid proposal. No bid may be withdrawn within a period of sixty (60) days after the dated fixed for opening the bids. Unless all bids are rejected, the Owner will give Notice of Award of Contract to the successful bidder as soon as possible consistent with the time for a thorough analysis of bids submitted. Bidders are expected to inspect the site of work and to inform themselves regarding all local conditions which may affect their bid.

A bid guarantee, performance and payment bond will not be required for contracts zero to $25,000. The City will specify in the contract that no money will be paid to the contractor until the project has been completed and final acceptance has been made by the City.

CITY OF EDINBURG
REQUEST FOR BIDS FOR
NEW 2012 PUMPER/BRUSH TRUCK

BID NO. 2012-46

BID OPENING DATE: January 03, 2012 at 3:00 p.m.

It is the intent of this Request for Bids to describe and ultimately make it possible for the City of Edinburg to purchase the below mentioned **NEW 2012 PUMPER/BRUSH TRUCK.**

GENERAL REQUIREMENTS AND AGREEMENT FOR NEW 2012 PUMPER/BRUSH TRUCK

1. **INSTRUCTIONS:** The specifications herein describe the minimum acceptable quantities and product requirements for **NEW 2012 PUMPER/BRUSH TRUCK** for the City of Edinburg. Bidders are to have thoroughly read and understood these specifications prior to bid submission. Bidders must submit delivery time and date for supplies requested. Bidders which fail to meet specifications will not be considered

2. **SPECIFICATIONS: (ATTACHMENT A, Pages 1-68)**

CITY OF EDINBURG
BID FORM FOR
NEW 2012 PUMPER/BRUSH TRUCK

BID NO. 2012-46

BID OPENING DATE: January 03, 2012 at 3:00 p.m.

I/We submit the following bid in **ORIGINAL FORM** for **NEW 2012 PUMPER/BRUSH TRUCK** according to City of Edinburg requirements, less tax:

NOTE: In addition to responding to our "local" solicitation for bids/proposals vendors/contractors are encouraged to provide pricing on the above referenced items/products/services based on Buyboard, H-GAC, TXMAS and/or any other State of Texas recognized and approved cooperative which has complied with the bidding requirements for the State of Texas (any and all applicable fees must be included). All cooperative pricing must be submitted on or before bid/proposal opening date and hour.

CHECK ONE

☐ **BUYBOARD** ☐ **H-GAC** ☐ **TXMAS** ☐ **DEALER/LOCAL**
☐ **TX DIR** ☐ **TFC** ☐ **OTHER** _____
Specify

CONTRACT NUMBER: _____ (if applicable) COMMODITY NUMBER: _____ (if applicable)

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	NEW 2012 PUMPER/BRUSH TRUCK	$_____	$_____
		TOTAL		$_____

Note: The City reserves the right to consider each group as a separate bid and award any or all, whichever may be more advantageous to the City. The City reserves the right to increase or decrease the quantities depending on availability of funds.

All Addenda issued in respect to this project shall be considered official changes to the original bidding documents. It shall be the Bidder(s) responsibility to ensure that all Addenda have been received. Furthermore, bidders are advised that they must recognize, comply with, and attach a signed copy of each Addendum which shall be made part of their Bid Submittal. Bidder(s) signature on Addenda shall be interpreted as the vendor's "recognition and compliance to" official changes as outlined by the City of Edinburg and as such are made part of the original bidding documents.

BID FORM FOR NEW 2012 PUMPER/BRUSH TRUCK (Continued):

Respectfully submitted this _____ day of _____, 2011.

SIGNATURE: _____

TYPE/PRINT NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

_____

TELEPHONE NO.: _____

FAX NO.: _____

EMAIL: _____

New 2012 Pumper/Brush Truck
Specifications: Attachment A

INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to provide a complete apparatus equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus for service in the Department, these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction for all features. The National Fire Protection Association Standard 1901, current edition, unless otherwise specified in these specifications, shall prevail.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of twenty-five years.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. They shall also show that they are in a position to render prompt service and to furnish replacement parts for said apparatus.

Because of the severe service requirements the department will impose on this apparatus, each bidder shall provide a list of at least six (6) departments serving populations of over 250,000 in which similar apparatus utilizing the brand of chassis proposed have been in service for over one year. This list shall include contact names and phone numbers.

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus being furnished under this contract which conform. Computer runoff sheets are not acceptable as

"Contractor's Specifications" Note: Each bidder shall submit their bid in the same sequence as these specifications to allow the department to easily compare bid. There shall be no exception to this requirement.

QUALITY AND WORKMANSHIP

The design of the Apparatus must embody the latest approved automotive engineering practices.

The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points: Accessibility of the various units that require periodic maintenance operations, ease of operation (including both pumping and driving) and symmetrical proportions.

Construction shall be rugged and ample safety factors shall be provided to carry loads as specified and to meet both on and off road requirements and to speed conditions as set forth under "Performance tests and requirements".

Welding shall be employed in the assembly of the apparatus in a manner that will not prevent the ready removal of any component part for service or repair.

DELIVERY

To insure proper break-in of all components while still under warranty, the apparatus shall be delivered under its own power. A qualified delivery engineer representing the contractor shall instruct the Fire Department Personnel in the proper operation, care and maintenance of the equipment delivered.

PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded and a continuous run of ten miles or more will be made, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. The successful bidder shall furnish a Weight Certificate showing weights on front axle, rear axles and total weight for the completed apparatus at time of delivery.

A. The apparatus shall be capable of accelerating to 35 MPH from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed RPM of the engine.

B. From a steady space of 15 MPH the vehicle shall accelerate to 35 MPH within 30 seconds. This shall be accomplished without moving the gear selector.

C. The service brakes shall be capable of stopping the fully loaded vehicle in 35 feet at 20 MPH on level dry concrete highway.

D. The apparatus, fully loaded, shall be capable of obtaining a minimum speed of 50 MPH on a level dry concrete highway with the engine not exceeding its governed RPM (fully loaded).

E. If optioned, the apparatus shall be tested and approved by the Underwriter's Laboratories Incorporated in accordance with their standard practices for pumping engines.

F. The Contractor shall furnish copies of the Pump Manufacturer's Certification of hydrostatic test, the Engine Manufacturer current certified brake horsepower curve, and the Manufacturer's record of pumper construction details when delivered.

If optioned, the vendor, at their expense, shall have the Underwriter's Laboratories Incorporated conduct the tests required by the Underwriter Laboratories Incorporated (Guide for the Certification of Fire Department Pumper subject 822 dated 1995 or latest). A copy of all tests shall accompany the Apparatus.

The contractor shall supply the final manufacturer's furnished certification of GVWR and GAWR on a nameplate affixed to the vehicle.

A permanent plate shall be mounted in the driver's compartment to specify the quantity and type of the following fluids used in the vehicle: Engine oil, engine coolant, chassis transmission fluid, pump transmission lubrication fluid, pump primer fluid (if used) and drive axle lubrication fluid.

A permanent plate in the driver's compartment shall be installed, specifying the seating capacity of the enclosed cab.

Signs that state "OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION" shall be provided and will be visible from each seated position. An accident prevention sign shall be located at the rear step area of the apparatus. It shall warn all personnel that standing on the step while apparatus is in motion shall be prohibited.

A nameplate indicating the chassis transmission shift selector position to be used when pumping shall be provided in the driving compartment and located so that it can be easily read from the driver's position.

LIABILITY

The bidder, if their bid is accepted, shall defend any and all suits and assume all liability for the use of any patented device or article forming part of the apparatus or any appliance furnished under the contract.

GENERAL CONSTRUCTION

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles, so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of NFPA 1901.

The apparatus shall be designed so that the operator could perform all recommended daily maintenance checks easily without the need for hand tools. Apparatus components that interfere with repair or removal of other major components must be attached with fasteners (cap, screws, nuts, etc.) so that the components can be removed and installed with normal hand tools. These components must not be welded or otherwise permanently secured into place.

The GAWR and GVWR of the chassis shall be adequate to carry the fully equipped apparatus including all tanks filled, the specified hose load, unequipped personnel weight, ground ladders and a miscellaneous equipment allowance per NFPA criteria. It shall be the responsibility of the purchaser to provide the contractor with the weight of equipment to be carried if it is in excess of the allowance as set forth by NFPA.

The unequipped personnel weight shall be calculated at 250 lbs. per person times the maximum number of persons to ride on the apparatus.

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

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 loads and all other loading conditions.

The 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 percent.

The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

Where special tools manufactured or designed by the contractor and are required to provide routine service on any component of the apparatus built or supplied by the contractor, such tools shall be provided with the apparatus.

PURCHASER'S RIGHTS

The Purchaser reserves the right to accept or reject any or all bids as it deems to be of their best interest to do so.

EXCEPTIONS TO SPECIFICATIONS

The following Chassis, Pump and Body specifications shall be strictly adhered to. Exceptions shall be allowed if they are equal to or superior to that specified and provided they are listed and fully explained on a separate page entitled "Exceptions to Specifications". The exception list shall refer to specification page number and paragraph. Proposals taking total exception to specifications or total exception to certain parts of the specifications such as Electrical Systems, Body or Pump, will not be accepted. Apparatus shall be inspected upon apparatus completion for compliance with specifications. Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.

If the bidder takes an exception, on the exception page, the bidder must state an option price to bring their specifications into full compliance with the Department specifications. Failure to provide this information shall be cause to reject the proposal as being non-responsive.

GENERAL WARRANTY

A warranty shall be offered for each new fire apparatus manufactured for a period of one (1) year from the date of delivery.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities.

STRUCTURAL WARRANTY – ALUMINUM BODY WARRANTY

A structural warranty shall be provided by the apparatus manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years.

PLUMBING WARRANTY

A Stainless Steel Plumbing/Piping warranty shall be offered for each new fire apparatus manufactured for a period of ten (10) years from the date of delivery.

PAINT WARRANTY

A ten (10) year limited paint warranty shall be provided by the apparatus manufacture.

MODEL

The chassis shall be a Spartan Force model or comparable equal. The cab and chassis shall include design considerations for emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

The chassis shall have a vehicle identification number that reflects a 2012 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis.

APPARATUS TYPE

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 1000 gallons per minute. The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The chassis shall feature a 4 X 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

The front gross axle weight rating (GAWR) of the chassis shall be 18,000 pounds. This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

The rear gross axle weight rating (GAWR) of the chassis shall be 24,000 pounds. This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

PUMP PROVISION

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

CAB STYLE

The cab shall be a custom, fully enclosed, MFD model with a flat roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer six (6) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

CAB STYLE (continued)

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.50 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 21.50 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.125 of an inch thick, one hundred percent primary aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches.

CAB UNDERCOAT

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

CAB SIDE DRIP RAIL

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.

The cab shall be painted with PPG Industries paint.

The lower paint color shall be PPG FBCH 71528 Red. Contact Fire Chief for final color choice.

CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

CAB PAINT INTERIOR

The visible cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

CAB ENTRY DOORS

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

CAB STRUCTURAL WARRANTY

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

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 275 degree Fahrenheit minimum high temperature flame retardant loom. All wiring shall be installed within frame rail and protected.

DATA RECORDING SYSTEM

The chassis shall have a Class One Vehicle Data Recorder system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well of the cab.

POWER & GROUND STUD

A 40 amp battery direct power and ground stud shall be provided and installed in the electrical distribution panel. The stud shall be size #10 and protected with a 40 amp circuit breaker.

All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.

ENGINE

The chassis engine shall be a Cummins ISC8.3 engine. The ISC8.3 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 380 horse power at 2000 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1050 foot pounds of torque at 1400 RPM with 506 cubic inches (8.3 liter) of displacement.

The ISC8.3 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

ENGINE (continued)

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab. Wiring harness shall be protected and installed within frame rail.

CAB ENGINE TUNNEL

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with a high-idle speed control which shall be pre-set to maintain the engine idle at a pre-determined rate when activated manually. This device shall operate when the master switch is activated and safely interlocked only to function when the transmission is in neutral with the parking brake set.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

AUXILIARY ENGINE BRAKE

The engine shall utilize a variable geometry turbo (VGT). The VGT auxiliary engine brake shall be an integral part of the turbo and shall offer a variable rate of exhaust flow, which when activated shall slow the engine and in turn slow the vehicle.

The VGT shall actuate the vehicle's brake lights when engaged as an auxiliary brake. A cutout relay shall be installed to disable the VGT when in pump mode or when an ABS event occurs. The VGT engine brake shall activate at a 0% accelerator throttle position when in operation mode.

AUXILIARY ENGINE BRAKE CONTROL

An engine variable geometry turbo brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The variable geometry turbo brake control shall be controlled through an on/off rocker switch.

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

FLUID FILLS

The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible through the front left side mid step.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM discreet wire remote throttle circuit will be turned on for use with a discreet wire based pump controller.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

ENGINE FAN DRIVE

The engine cooling system fan shall be direct drive belt driven on the engine.

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

ELECTRONIC COOLANT LEVEL INDICATOR

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

COOLANT HOSES

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the right hand side. The dry type filter shall ensure dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the right hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

ENGINE EXHAUST SYSTEM

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

ENGINE EXHAUST SYSTEM (continued)

The system shall utilize 0.065 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

TRANSMISSION

The drive train shall include an Allison Gen IV-E model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:

1st	Lowest gear ratio available on first gear 2:50 to 2:90
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1
Rev	5.03:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

TRANSMISSION FEATURE PROGRAMMING

The EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a Pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

An eight (8) pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission control module.

Function ID	Description	Wire assignment
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122/123
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

TRANSMISSION SHIFT SELECTOR

No need manual shift selector.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

TRANSMISSION COOLING SYSTEM

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

TRANSMISSION WARRANTY

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.

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

MIDSHIP PUMP / GEARBOX

A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid-ship split shaft pump as specified by the apparatus manufacturer.

The midship pump/gearbox provisions shall be for a Waterous CXSC20 pump.

The ratio for the midship pump shall be 2.27:1.

The Waterous pump gearbox shall have a "C" (medium length) drop length.

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 80.00 inches.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

FUEL LINES

Steel fuel lines.

FUEL COOLER

An aluminum cross flow air to fuel cooler shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall be located behind the rear axle.

FUEL TANK

The fuel tank shall have a capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

FUEL TANK FILL PORT

The fuel tank fill ports shall be offset with the right fill port located in the middle position and the left fill port located in the rearward position on the fuel tank.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-18. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 18,000 pounds.

FRONT AXLE WARRANTY

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Need 3" lift added to front axle.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

FRONT SHOCK ABSORBERS (conintued)

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and "road sensing" shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or "road sensing" designed shocks shall not be considered.

FRONT SUSPENSION

The front suspension shall include four (4), 54.00 inch long and 4.00 inch wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 18,000 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, two (2) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 50 degrees to the left and right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85.

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.

REAR AXLE

The rear axle shall be a Meritor model RS-24-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a rated capacity of 24,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.50 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided. The rear suspension capacity shall be rated from 21,000 to 31,500 pounds. Need 3" lift on rear axle.

TIRES

The front tires shall be Goodyear 315/80R-22.5 20PR "L" tubeless radial G287 MSA regional tread. The front tire stamped load capacity shall be 18,180 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 130 pounds per square inch. The front tire US Fire Service Intermittent Usage load capacity shall be 18,180 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch.

The rear tires shall be Goodyear 12R-22.5 16PR "H" tubeless radial G622 RSD mixed service tread. The rear tire stamped load capacity shall be 27,120 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The rear tire US Fire Service Intermittent Usage load capacity shall be 29,020 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

REAR AXLE RATIO

The rear axle ratio shall be 5.13:1.

TIRE PRESSURE INDICATOR

There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front tire valve stem and a pop up style tire pressure indicator at the rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

WHEELS

The front wheels shall be Accuride hub piloted, 22.50 inch X 9.00 inch steel wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

The rear wheels shall be Accuride hub piloted, heavy duty, 22.50 inch X 8.25 inch steel wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

WHEEL PAINT

Each of the steel wheels shall be pretreated in a zinc phosphate bath, coated with an acrylic cathode electro deposited white primer base coat (E-Coat). The E-Coat shall exceed 336 hours under industry standard ASTM salt spray testing.

The wheels shall then be finish painted the same as the primary/lower color of the cab by the chassis manufacturer. With silver trim (See Fire Chief).

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An

BRAKE SYSTEM (continued)

inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator anti-lock braking system (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

A momentary rocker style switch shall be provided and properly labeled "mud/snow". When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light and the light on the rocker switch shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

The Electronic Stability Control (ESC) unit is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicle's motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicle's lateral acceleration. The Controller Area Network (CAN) bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

BRAKES

The front brakes shall be Meritor 16.5" x 6" S-cam drum type.

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted on the left hand dash to the right of the steering column within easy reach of the driver.

BRAKE SLACK ADJUSTERS

The front brakes shall include Meritor automatic slack adjusters shall be installed on the chassis which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral 100 watt heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.

BRAKE CHAMBERS

The front brakes shall be provided with MGM type 30 brake chambers.

The rear axle shall include TSE 30/30 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 30 brake chamber shall offer a 30.00 square inch effective area.

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be mounted to the right frame rail.

MOISTURE EJECTORS

Manual pet-cock type drain valves shall be installed on all reservoirs of the air supply system. Air dryer shall be installed.

AIR SUPPLY LINES

A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

WHEELBASE

The chassis wheelbase shall be 176.00 inches.

The chassis rear overhang shall be 51.00 inches.

FRAME

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

Proposals calculating the frame strength using the "box method" shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The head bolts shall be flanged type with distorted threads, held in place by flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

FRAME (continued)

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

FRAME WARRANTY

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

REAR TOW DEVICE

Two (2) heavy duty painted tow eyes shall be installed extending rearward from the frame at the rear of the chassis. The tow eyes shall be fabricated from 0.75 inch thick #1020 ASTM-36 hot rolled steel. The inside diameter of the tow eye shall be 2.00 inches and shall have a chamfered edge. The tow eyes shall be bolted one (1) on each side to the outside of the chassis frame with grade 8 bolts. The tow eyes shall be painted to match the chassis frame.

FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

FRONT BUMPER

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide. Steel bumper to be painted.

The front bumper shall be extended approximately 24.00 inches ahead of the cab.

CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT CONTROL RECEPTACLE

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self locking window rubber.

GLASS FRONT DOOR

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS FRONT DOOR (continued)

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

To be tinted Texas legal.

GLASS REAR DOOR RH

The rear right hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

The window located in the right hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

To be tinted Texas legal.

GLASS REAR DOOR LH

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

The window located in the left hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

To be tinted Texas legal.

GLASS SIDE MID RH

The cab shall include a window on the officer's side behind the front and ahead of the crew doors which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

To be tinted Texas legal.

GLASS SIDE MID LH

The cab shall include a window on the driver's side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

To be tinted Texas legal.

CLIMATE CONTROL

The cab shall include a 57,600 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

The heating and defrosting controls shall be located on the front overhead climate control unit.

CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

The underside of the cab tunnel surrounding the engine 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 .75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft² 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 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.

INTERIOR TRIM FLOOR

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM VINYL

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

REAR WALL INTERIOR TRIM

The rear wall of the cab shall be trimmed with vinyl.

HEADER TRIM

The cab interior shall include the header above the driver and officer positions which shall be constructed of vacuum formed ABS panel.

TRIM DASH

The main center dash area shall be constructed of durable vacuum formed ABS composite.

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel and the lower control panels to the left and right of the steering column.

The right hand dash trim shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door and a Mobile Data Terminal (MDT) provision. The glove compartment size shall be 13.50 inches wide X 6.25 inches high X 5.50 inches deep. The MDT provision shall be provided above the glove compartment.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

UNDER CAB ACCESS DOOR

The cab shall include an access door in the left crew step riser constructed of DA finish aluminum with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

INTERIOR DOOR TRIM

The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall be then painted.

DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

The interior of each door shall include high visibility reflective tape. A white reflective tape that measures 1.00 inch in width shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

INTERIOR GRAB HANDLE "A" PILLAR

A rubber covered 11.00 inch grab handle shall be provided on the inside of the cab on the hinge post at the driver and officer doors. The handle shall assist personnel in exiting and entering the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

INTERIOR TRIM VINYL COLOR

The cab interior vinyl trim surfaces shall be red in color.

INTERIOR TRIM SUNVISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be red in color.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with red texture finish.

DASH PANEL GROUP

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 center dash panel shall include six (6) switch positions in the upper left portion of the panel.

The left dash panel shall include thirteen (13) switches. There shall be six (6) switches across the top of the panel and seven (7) across the bottom of the panel. Five (5) of the top row of switches shall be rocker type and the left one (1) shall be the headlight switch. Five (5) of the lower row of switches shall be rocker type and the left two (2) shall be the windshield wiper/washer control switch and instrument lamp dimmer switch.

The right dash panel shall include three (3) rocker switch positions in the upper right hand portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear.

SEAT BELT WARNING

A Class One seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall activate an indicator light in the instrument panel, a digital seat position indicator with a seat position legend in the switch panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt was fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

SEAT COLOR

All seats supplied with the chassis shall be red in color. All seats shall include red seat belts.

SEAT BACK LOGO

No seat back logo.

SEAT DRIVER

The driver's seat shall be an H.O. Bostrom Sierra model seat with air suspension. The four-way seat shall feature 3.00 inch vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock.

The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 37.00 inches measured with the seat suspension height adjusted to the upper limit of its travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK DRIVER

The driver's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.

SEAT MOUNTING DRIVER

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

SEAT OFFICER

The officer's seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK OFFICER

The officer seat back shall include a Ziamatic brand Rol-Loc® mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The bracket shall be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four (4) PVC coated clamping arms which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap which shall include a 30.00 inch nylon lanyard which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the right side of the seat.

The basic bracket and clamp arms shall be made of strong, yet light-weight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall allow donning of the SCBA in a fast and easy manner.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT REAR FACING OUTER LOCATION

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapped and padded seat, and cushion.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK REAR FACING OUTER

The rear facing outboard seat back shall include a Ziamatic brand Rol-Loc® mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The bracket shall be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four (4) PVC coated clamping arms which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the front of the seat.

The basic bracket and clamp arms shall be made of strong, yet light-weight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall allow donning of the SCBA in a fast and easy manner.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT MOUNTING REAR FACING OUTER

The rear facing outer seat shall be mounted facing the rear of the cab.

SEAT FORWARD FACING CENTER LOCATION

The crew area shall include three (3) forward facing center crew seats with both located at the center of the rear wall.

SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK FORWARD FACING CENTER

The forward facing center seat backs shall include a Ziamatic brand Rol-Loc® mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The bracket shall be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four (4) PVC coated clamping arms which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap which shall include a 30.00 inch nylon lanyard which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the right side of the seat.

The basic bracket and clamp arms shall be made of strong, yet light-weight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall allow donning of the SCBA in a fast and easy manner.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include an enclosed seat frame which is located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of 5052-H32 Marine Grade 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the seat frame storage area, one (1) on each side of the seat frame. Each access point shall be covered by a hinged door which measures 15.00 inches in width X 10.63 inches in height.

CAB FRONT UNDERSEAT STORAGE ACCESS

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

SEAT COMPARTMENT DOOR FINISH

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

WINDSHIELD WIPER SYSTEM

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of a fiber reinforced plastic composite with a black matt finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

DOOR LOCKS

Each cab entry door shall include a manually operated door lock. The each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

GRAB HANDLES

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

Retrac Aerodynamic style single vision mirror heads model 613265 shall be provided and installed on the front cab doors.

The mirrors shall be mounted via 1.00 diameter tubular stainless steel arms to provide a rigid mounting to reduce vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 12 gauge polished aluminum.

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) installed on each side of the cab exterior above the wheel well.

The cab shall include custom "SPARTAN FORCE" nameplates on the front left and right side doors.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a ¼ turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

IGNITION (continued)

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the "ON" position.

The starter button shall only operate when both the master battery and ignition switches are in the "ON" position.

BATTERY

The single start electrical system shall include (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

BATTERY TRAY

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

BATTERY BOX COVER

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.

HEADLIGHTS

The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch halogen amber arrow shaped turn signals which shall be installed outboard of the warning lights. The turn signal light heads shall be mounted in chrome plastic bezels and shall be located above the headlamps.

SIDE TURN/MARKER LIGHTS

The sides of the cab shall include (2) incandescent round side marker lights which shall be provided just behind the front cab radius corners.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

HEADLIGHT AND MARKER LIGHT ACTIVATION

The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the battery master switch is in the "On" position and the parking brake is released.

GROUND LIGHTS

Each door shall include an incandescent NFPA compliant ground light mounted to the under side of the cab step below each door. Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the respective door as well as rocker switched.

STEP LIGHTS

The middle step located at each door shall include a 4.00 inch round incandescent light which shall activate with the opening of the respective door.

ENGINE COMPARTMENT LIGHT

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

INTERIOR OVERHEAD LIGHTS

The cab shall include a two-section Weldon incandescent dome lamp with a red and clear lens located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 9.50 inches in length X 5.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portions can be activated by individual switches on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled "Master" for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the "ON" position shall automatically power up when the master switch is activated.

INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include dual modules containing headlight bulbs in the left and right inboard positions. These lights shall not be wired.

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring. The instrument panel shall contain the following gauges:

One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical level of engine oil pressure. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of coolant temperature. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm.

The instrument panel shall include a light bar that will contain the following LED indicator lights:

RED LAMPS
Low Primary Air Pressure (located in gauge)
Low Secondary Air Pressure (located in gauge)
Stop Engine-indicates critical engine fault
Air Filter Restricted-indicates excessive engine air intake restriction
Park Brake-indicates parking brake is set
Seat Belt Indicator-indicates when a seat is occupied and corresponding seat belt remains unfastened
Volts-indicates high or low system voltage (located in gauge)
Low Oil Pressure-indicates low engine oil pressure (located in gauge)
High Coolant Temperature-indicates excessive engine coolant temperature (located in gauge)

INSTRUMENTATION (continued)

DEF Level Bar-DEF level is at critically low level (located in gauge)

AMBER LAMPS
MIL-indicates an engine emission control system fault
Check Engine-indicates engine fault
Check Trans-indicates transmission fault
High Transmission Temperature-indicates excessive transmission oil temperature
ABS-indicates anti-lock brake system fault
Wait to Start-indicates active engine air preheat cycle
HEST-indicates a high exhaust system temperature
Water in Fuel-indicates presence of water in fuel filter
DPF-indicates a restriction of the diesel particulate filter
Regen Inhibit-indicates regeneration has been postponed due to user interaction
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
SRS-indicates a problem in the RollTek supplemental restraint system
Low Fuel-indicates low fuel, (located in gauge)
DEF-indicates a low level of DEF fluid (located in gauge)
DEF Level Bar-DEF level is at a low level (located in gauge)

GREEN LAMPS
Left and Right turn signal indicators
ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system
High Idle-indicates engine high idle is active.
Cruise Control-indicates cruise control is active
OK to Pump-indicates the pump engage conditions have been met
Pump Engaged-indicates the pump is currently in use
Auxiliary Brake-indicates secondary braking device is active
DEF Level Bar-indicates useable levels of DEF: 25%, 50%, 75%, 100% (located in gauge)

BLUE LAMPS
High Beam Indicator

OSCILLATING AUDIBLE ALARMS FROM GAUGE PACKAGE
Air Filter
Extended Left and Right Turn remaining on
Cab Ajar
Door Ajar
Low Oil Level

CONSTANT AUDIBLE ALARMS FROM GAUGE PACKAGE
High Trans Temp
High or Low Voltage
Seatbelt
Check Engine
Check Transmission
Stop Engine
Low Air Pressure
Fuel Low
Water in Fuel
ESC

INSTRUMENTATION (continued)

High Coolant Temperature
Low Engine Oil Pressure
Low Coolant Level
Low DEF Level

BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

WARRANTY

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twelve (12) months, 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. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

OPERATION MANUAL

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.

ENGINE AND TRANSMISSION OPERATION MANUALS

There shall be one (1) printed hard copy set of the engine operation manual and one (1) printed hard copy set of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.

FLUID DATA PLAQUE

A fluid data plaque containing required information shall be provided based on the applicable components for this apparatus, meeting current NFPA Standards as follows:

FLUID DATA PLAQUE (continued)

a. Engine oil
b. Engine coolant
c. Chassis transmission fluid
d. Drive axle lubrication fluid
e. Power steering fluid
f. Pump transmission lubrication fluid
g. Other NFPA applicable fluid levels or data as required.

Location shall be in the driver's compartment or on driver's door.

DIMENSIONS DATA PLAQUE & "NO HELMET" LABEL

The cab dash area shall have a highly visible plaque indicating the maximum overall height, length, and GVWR of the vehicle in the destination areas unit of measure (SAE or METRIC).

A label stating "DO NOT WEAR HELMET WHILE SEATED" shall be installed in the cab within the view of all occupants.

"NO RIDE" LABEL

A "NO RIDE" label shall be located on the vehicle at the rear step area or other applicable areas. The label shall warn personnel that riding in or on these areas while the vehicle is in motion is prohibited.

PERSONNEL PAYLOAD CAPACITY

A label shall be installed in cab to denote that five (5) personnel may be carried. For engineering purposes, an allowance of 1250# shall be provided for personnel.

NFPA COMPLIANCE STATEMENT

The apparatus shall comply with the 2009 edition of the NFPA #1901 standards and section contained therein - except in the items noted throughout the specification.

The apparatus manufacturer (and/or dealer) shall not be held liable for items (chassis or otherwise) required to meet NFPA compliance that are not available at time of apparatus order. Any items not provided on the apparatus, that become available after the date of order shall be either be changed at cost to the Fire Department, or remain on the list of NFPA exceptions / deviations.

NFPA LIST OF DEVIATIONS

At time of delivery the apparatus shall be accompanied by a list of deviations that state where the apparatus does not comply with NFPA (1901, 2009 edition). The purchaser shall be required at that time to sign off on the list of deviations.

AIR HORNS

Two (2) 24" chrome plated air horns shall be recessed mounted in the front bumper surface, one each side.

An air protection valve shall be provided in the air horn piping that will not allow the chassis air brake system to drop below 90 psi.

A left side floor mounted foot switch shall be installed to activate air horn system.

A right side floor mounted foot switch shall be installed to activate the air horn system.

REAR AXLE MUD FLAPS

The rear tires shall have a set of black mud flaps mounted behind the rear chassis wheels.

REAR TOW EYE PLATES

Two (2) rear tow eyes plates constructed of 3/4" steel plate shall be fastened directly to the rear chassis frame rails. The tow plates shall be equipped with 3" inside diameter holes (eye).

HEAVY DUTY FRONT BUMPER ASSEMBLY

A heavy duty extended front bumper shall be constructed on the extended factory frame rails at the front of the apparatus. The front bumper assembly / extension shall be 24" long.

The extended front bumper shall have a full hood protector constructed of steel pipe and expanded steel. The center shall have a step through, open area, for access to the hose wells on each side of the frame rail. There shall be a flexible cable style step for entry into this area.

The gravel shield shall be constructed of 3/16" aluminum tread plate. A hose well shall be constructed on each side of the frame rail (capacity TBD). The center area between the frame rails shall be winch installation, with a d/p door in the gravelshield for winch access.

The front bumper shall be constructed of heavy duty steel and mounted to the frame rails. The bumper, and all steel assemblies shall be painted black. Aluminum shall be left natural.

FRONT MOUNTED ELECTRIC WINCH

A 15,000 pound capacity (7.5-ton) winch manufactured by the Warn Winch Company shall be provided. The 12-volt electric winch system shall be installed on the front of the apparatus.
The winch shall have forward and reverse gears.

The unit shall have three stage planetary gearing and a rotating ring gear clutch that will permit free-spooling for quick unwinding of cable.

The winch shall be controlled with a push button device attached to a twelve foot (12') control cable and weatherproof receptacle.

FRONT MOUNTED ELECTRIC WINCH (continued)

The winch shall have 125 feet of 3/8" diameter galvanized aircraft cable, with slip hook installed. A 4 way roller shall be installed to guide the cable.

SEMI HIDDEN WARN WINCH MOUNTING

A Warn Semi Hidden Winch mounting shall be used to mount the winch. The winch shall be recessed behind the bumper, and the bumper shall be extended 12". A gravel shield shall be utilized.

SIDE MOUNT FIRE PUMP ENCLOSURE CONSTRUCTION

The side mounted pump enclosure, pump panels, and cross the frame pump operator's area shall be constructed in a single removable module. The pump module shall be a separate component from the body unit. The pump module shall provide for normal chassis flexing, movement of the enclosure, and allow quick removal. The support structure shall be constructed of aluminum extrusions, including aluminum tubing, channel, and angles of #6061 T-6 extrusions.

The fire pump shall be mounted on steel angles, within the pump module, and this assembly shall then be attached to the aluminum extrusion structure. This will permit a solid mounting of the pump assembly to the chassis frame rails and the pump module then bolted to the steel sub-frame. The pump module shall be capable of being removed as a single system, including the pump, plumbing, piping, valves, pump enclosure, and all wiring. The wiring system shall quickly plug into the wiring harness to the cab.

The side mounted pump panel shall be accessible from the drivers side of the apparatus, located aft of the chassis cab. All aluminum diamond plate material used in running boards shall comply with NFPA standards. Railings and grab handles shall be provided as required and specified in these specifications.

The side mounted pump controls shall be grouped into a full width panel, with intake and discharge controls ergonomically separated across the panel (right to left).

The operators side access panel shall be secured with stainless steel fasteners for quick and easy removal from the apparatus. Openings in the panels for intake and discharge controls shall be smooth and free of rough edges.

A minimum of two (2) clear halogen lights with clear lenses shall be mounted under a light shield above the side mount operators pump panel. The lights shall be switched with the pump panel light switch. Two (2) clear halogen lights with clear lenses shall be installed with a light hood under the officers access side mid ship pump panel. The lights shall be switched with the pump panel light switch.

Two (2) 4" diameter convenience work lights shall be provided in the mid ship pump enclosure. The control switch shall be near lights or on the pump panel.

The pump enclosure shall be equipped with hinged panels and door assembly on the officers side for servicing of valves or plumbing. The door shall be hinged at side of opening. The panel/door shall be provided with a positive latching system for easy and quick opening. The door shall not contain any bleeders or drains, which shall be located on a separate panel below the door.

SIDE MOUNT FIRE PUMP ENCLOSURE CONSTRUCTION (continued)

All intakes and discharges shall be controlled from the operators side control area, as well as primer, pressure controls, tank controls, and other vital instruments. No controls shall be mounted on the officers access side or rear of the vehicle, other than drains or bleeders. The quarter turn ball valves shall be controlled on pump panel with a Class 1 pull type remote control valve control.

Pump panel controls and instruments shall all be labeled with permanent type labels. The labels and nameplates shall be color coordinated per NFPA standards.

PUMP AREA STORAGE

There shall be a dunnage area located at the top of the pump module area. The dunnage area shall be constructed of .125" diamond plate aluminum and shall be open on the top.

SIDE PUMP PANELS

The pump panels shall be constructed of aluminum with a black Zolatone finish, and installed on the driver's (operators) and officer's side of the pump enclosure. The pump panels shall have a clearcoat finish especially made for Zolatone covering to facilitate cleaning, and enhance cosmetic appearance.

FIRE PUMP SPECIFICATIONS

A Waterous CXVC 1000 GPM single stage centrifugal pump shall be designed to mount on the chassis frame rails and shall be split-drive shaft driven. The pump casing shall be of high-tensile, close-grained gray iron. Pump body shall be horizontally split in two (2) sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing the mounting or piping.

IMPELLER
A matched bronze impeller specifically designed for the fire service will be provided. It will be accurately balanced both mechanically and hydraulically, for vibration-free operation. The impeller shall have flame- plated hubs provided.

IMPELLER SHAFT
Stainless steel heat-treated and precisely ground to size. It shall be supported on both ends by oil or grease lubricated ball bearings.

WEAR RINGS
Replaceable wear rings, bronze, reverse-flow, labyrinth-type shall be provided.

BEARINGS
Three (3) deep groove ball bearings shall be located outside the pump to give rugged support and proper alignment to the impeller shaft. The bearings shall be oil or grease lubricated. All bearings shall be completely separated from the water being pumped.

FLINGER RINGS
Located on the impeller shaft between stuffing boxes and bearing housing shall be provided.

FIRE PUMP SPECIFICATIONS (continued)

PUMP TRANSMISSION
The housing shall be constructed of high tensile aluminum and be of three (3) piece, horizontally split design. The transmission driveline shafts shall be made from alloy steel forging, hardened and ground to size. The drive and driven sprockets shall be made of steel and shall be carbonized and hardened. The drive chain shall be Morse HV involute form chain. The lubrication system shall be an impeller shaft driven oil pump to deliver oil to an integral spray header, to completely pressure lubricate the drive chain.

PUMP PANEL GREASE FITTING
A pump bearing grease fitting shall be provided in the pump enclosure. Fitting shall have a protective dust cap and shall be properly labeled.

PUMP MOUNTING
The pump shall be bolted to steel angles in pump module, using grade 8 bolts.

DRIVELINE
Hollow-tube drivelines and universals shall be properly matched to the engine and transmission output torque ratings.

FIRE PUMP SHIFT

The Waterous fire pump shall be equipped with an air operated pump shift assembly. The Waterous air shift control valve shall be mounted in the cab. The fire pump-shift system shall be equipped with a means to prevent unintentional movement of the control device from its set position. The system shall include a nameplate indicating the chassis transmission shift selector position to be used for pumping and located so that it can be easily read from the driver's position. The system shall have required indicator and interlock systems shall be installed as required by Waterous Pump and applicable NFPA standards.

The system shall include all required NFPA #1901 interlocks and pump shift and OK TO PUMP indicator lights in the cab and pump panel. The fire pump system shall be equipped with an interlock system shall be provided to ensure that the pump drive system components are properly engaged in the pumping mode of operation so that the pumping system can be safely operated from the pump operator's position.

PRIMING SYSTEM

A Waterous model #VPOS electrically driven, positive displacement, rotary vane type priming pump shall be installed. The primer shall be oil-free and include a "T" style actuation handle.

PUMP TEST

The apparatus shall be tested and rated per the requirements of NFPA 1901 utilizing an independent third party. The apparatus shall be provided with all documentation of the independent certification at the time of delivery.

PUMP RATING - 1000 GPM

The pump shall be certified to meet the following performance from draft, through one (1) 20 foot length of 6 inch suction hose with a 10 foot lift at a maximum elevation of 2000 feet above sea level:

1000 GPM @ 150 PSI
1000 GPM @ 165 PSI
700 GPM @ 200 PSI
500 GPM @ 250 PSI

PUMP TEST LABEL

A fire pump test label shall be provided at the pump operator's position that provides the rated discharge and pressure together with the speed of the engine as determined by the certification test. The no-load governed speed of the engine as stated by the engine manufacturer shall also be provided. The label shall be provided with all information at the factory and be attached to the apparatus prior to delivery.

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FIRE PUMP ANODE SYSTEM

The fire pump plumbing system shall be provided with anode system to reduce corrosion within the piping. The unit shall be a bolt-in or screw-in type and easily replaceable.

WATEROUS RELIEF VALVE

The fire pump system shall be equipped with a Waterous adjustable 4.0" relief valve. The relief valve shall be positive and quick acting and have instantaneous "ON/OFF" control.

The control for adjusting pressure shall be elliptical shaped for positive grip. An easily removable pilot valve strainer shall be provided and shall be accessible from the pump operator's panel. Two (2) indicator lights shall be furnished to show position of the relief valve - "OPEN" or "CLOSED".

ENGINE THROTTLE AND MONITORING DISPLAY

Fire Research ThrottleXcel model ELA100-A engine throttle and monitoring display shall be installed. The case shall be waterproof and have dimensions not to exceed 6-3/4" high by 4-5/8" wide by 1-3/4" deep. The engine throttle control knob shall be 2" in diameter with a serrated grip, have a red idle push button in the center, and no mechanical stops. Inputs for engine information shall be from a J1939 data bus, other inputs shall be 12 volts DC or from independent sensors. The engine RPM shall be set to idle when the pump engaged interlock signal is recognized regardless of the throttle control knob position. Optical technology shall be used to detect the direction and speed that the control knob rotated for RPM control. The following continuous displays shall be provided:

Engine RPM; shown with four daylight bright LED digits more than 1/2" high, updated in 10 RPM incr.

Engine oil pressure; shown on an LED bar graph display in 10 psi increments

Engine coolant temperature; shown on an LED bar graph display in 10 degree increments

Battery voltage; shown on an LED bar graph display in 1/2 volt increments

Time and date; shown on a dot matrix message display

Interlock; OK TO PUMP LED is green to indicate throttle ready.

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. Operator selections and inputs shall be via push buttons on the front panel. The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. The program shall have calibration and self-diagnostic capabilities. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

Low Oil Pressure

High Engine Coolant Temperature

High Transmission Temperature

Low Battery Voltage (Engine Off)

Low Battery Voltage (Engine Running)

High Battery Voltage

High Engine RPM

INTAKE DUMP VALVE

The suction side of the fire pump shall be equipped with a stainless steel intake dump valve. The dump valve shall have a minimum of 2-1/2" diameter discharge and shall terminate with a 2-1/2" male NST thread. The outlet of the valve shall be labeled "intake relief valve discharge, do not cap".

FIRE PUMP COOLING BYPASS LINE

The fire pump shall be equipped with a cooling line from the pump to the water tank. This re-circulation line shall be controlled by a pump panel control valve with nameplate label noting it as the "fire pump cooler".

CHASSIS ENGINE HEAT EXCHANGER COOLING SYSTEM

The apparatus shall be equipped with a heat exchanger for supplementary chassis engine cooling during fire pump operations. A manually opened valve, mounted at the operator's panel, shall direct water from the fire pump to the heat exchanger that is mounted in the engine radiator cooling hose. The system shall provide cooling water from the fire pump to circulate around the engine radiator coolant without mixing or coming in direct contact with the engine coolant.

A nameplate label shall be installed on the pump panel noting "engine cooling system" with "on-off" opening directions noted.

FIRE PUMP MASTER DRAIN

The fire pump plumbing system and fire pump shall be piped to a single pump panel mounted Class 1 master pump drain assembly. The master drain valve shall be a bronze master drain with a rubber disc seal and a handwheel control on the pump panel. The master drain shall also provide for low point drainage of the fire pump and auxiliary devices.

LOW POINT DRAINS

The plumbing system shall be equipped with low point manually operated drain valves to allow total draining of the fire pump and piping system. These valves shall be accessible from the side of the vehicle and labeled on exact location.

INTAKE AND DISCHARGE LINE BLEEDER VALVES

Quarter turn bleeder valves shall be installed on all gated intake lines and all discharge lines over 2" in size. Front discharges, pre-connect hose lines, and deck gun/monitor lines shall be equipped with automatic drain valves.

FIRE PUMP PLUMBING SYSTEM

The fire pump plumbing system shall be built completely of stainless steel piping. No galvanized piping is used in any of the plumbing system. Victaulic couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service.

Tank connections, front discharges, and other piping shall use high-pressure flexible piping with a 1200 PSI burst pressure rating. Flexible hose couplings shall be threaded stainless steel or Victaulic connections.

The fire pump and plumbing system shall not be painted. The piping and valves shall remain natural color and the fire pump shall be painted black.

INTAKE AND DISCHARGE VALVES

All valves used in the plumbing installation shall be Akron quarter turn full flow type.

HOSE THREADS

The hose threads shall be National Standard (NST) on all base threads on the apparatus intakes and discharges, unless otherwise specified. (NST and NH are the same thread)

6" UNGATED INTAKE

Two 6" ungated suction intakes shall be installed, one each side of the pump module, to supply the fire pump from an external water supply. The threads shall be 6" NST male of brass, chrome plated brass, or stainless steel material. The intake shall be provided with a removable screen.

RIGHT SIDE PANEL 2-1/2" GATED INTAKE

A 2-1/2" gated suction intake shall be installed on right side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2.5" NST female thread of brass, chrome plated brass, or stainless steel material.

The intake shall be provided with a removable screen and a 2-1/2" NST rocker plug with retaining cable or chain installed. The intake shall be equipped with a ¾" quarter turn Class 1 drain and bleeder valve, controlled at the base of the pump panel.

LEFT SIDE PANEL 2-1/2" GATED INTAKE

A 2-1/2" gated suction intake shall be installed on left side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2.5" NST female thread of brass, chrome plated brass, or stainless steel material.

The intake shall be provided with a removable screen and a 2-1/2" NST rocker plug with retaining cable or chain installed. The intake shall be equipped with a ¾" quarter turn Class 1 drain and bleeder valve, controlled at the base of the pump panel.

WATER TANK TO PUMP LINE

A 3" water tank to fire pump line shall be provided with a full flow quarter turn ball valve, 4" piping, and with flex hose and stainless steel hose clamps.

The tank to pump line shall be equipped with a check valve to prevent pressurization of the water tank.

The line shall be flow tested during the fire pump testing and shall meet requirements of NFPA #1901 standards.

PUMP DISCHARGE DESCRIPTION

All 2.5" or larger discharge outlets shall be capable of providing the NFPA discharge capacity. Each 2.5" or larger discharge shall be controlled from the pump operator location. Each discharge will have an associated pressure gauge.

All 2.5" or larger pump panel discharges shall be equipped with an integral, 30 degree, male "droop snoot" outlet.

All discharges shall have chrome plated, vented caps with retaining chains.

FIRE PUMP TO WATER TANK FILL LINE

A 2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 2" piping and flex hose to tank.

FORWARD LEFT SIDE 2-1/2" DISCHARGE (#1)

A 2-1/2" discharge shall be provided at the forward left side pump panel area. The discharge shall have 2-1/2" NST male threads.

A Class 1 quarter turn 3/4" bleeder valve shall be installed.

FORWARD RIGHT SIDE 2-1/2" DISCHARGE (#3)

A 2-1/2" discharge shall be provided at the forward right side pump panel area. The discharge shall have 2-1/2" NST male threads.

A Class 1 quarter turn 3/4" bleeder valve shall be installed.

2-1/2" REAR BODY LEFT SIDE DISCHARGE

A 2-1/2" discharge shall be provided and piped to the rear left side of the body with 2-1/2" NST male threads. The plumbing shall be stainless steel with Victaulic couplings or flexible high pressure hose mounted with adequate support brackets and abrasion resistant mountings.

PRECONNECT DISCHARGE #1

A pre-connect hose discharge shall be installed in the front of the hosebed pulling to the rear of the apparatus, with quarter turn 2" diameter ball valve. The valve shall be controlled by a Class 1 twist-to-lock pull rod type control on the pump panel. The outlet shall be a 2" NPT female x 1-1/2" male threads. A Class I automatic 3/4" bleeder valve shall be provided.

PRECONNECT DISCHARGE #2

A pre-connect hose discharge shall be installed in the front of the hosebed pulling to the rear of the apparatus, with quarter turn 2" diameter ball valve. The valve shall be controlled by a Class 1 twist-to-lock pull rod type control on the pump panel. The outlet shall be a 2" NPT female x 1-1/2" male threads. A Class I automatic 3/4" bleeder valve shall be provided.

MONITOR DISCHARGE

A 3" discharge shall be piped to the rear officer's side of the body with 3" NPT male threads.

A Class 1 3/4" automatic drain valve shall be installed on the line.

FOAM SYSTEM

A Hypro/FoamPro, Model 1600 shall be a fully automatic electronic direct injection foam proportioning system furnished and installed on the apparatus. The system shall be capable of Class A foam concentrate. The proportioning operation shall be based on an accurate direct measurement of water flows with no water flow restriction.

The proportioning system shall meet NFPA standards for foam proportioning systems and the design shall have passed testing against SAE automotive reliability standards appropriate for the application. The foam system shall be installed in accordance with the manufacturer recommendations. The system shall be equipped with a control module. It shall be installed on the pump operators panel and enable the pump operator to perform the following functions:

Activate the foam system
Change foam concentrate proportioning rates from .1% to 1%.
Flash a low concentrate warning light when the foam concentrate tank runs low of concentrate and in two minutes if foam concentrate is not added to tank shut the foam concentrate pump down.

The foam system shall have a 12 Volt, 1/3 hp electric motor driven positive displacement piston type foam concentrate pump with a rated capacity of .01 to 1.7 GPM @ 200 PSI, with operating pressures up to 400 PSI. The system will draw a maximum of 30 amps @ 12 VDC or 15 amps @ 24 VDC.

Foam discharge outlet(s): TBD

CLASS 1 INTELLI-TANK LED FOAM TANK GAUGE ON PUMP PANEL

A Class 1 Intelli-Tank LED foam tank level gauge shall be installed on the pump panel to monitor the foam tank level.

LINE PRESSURE GAUGES

Each discharge shall have one (1) 2.5" diameter Class 1 discharge pressure gauge (0-400 PSI) shall be provided adjacent to each discharge control handle.

The line gauge shall be fully filled with pulse and vibration dampening interlube to lubricate the internal mechanisms. This shall prevent lens condensation and will insure proper operation to minus 40

LINE PRESSURE GAUGES (continued)

degrees F. The case shall be temperature compensated with an internal breathing diaphragm to permit filled cases and to allow a rigid lens with a distortion free viewing area.

A bright metal bezel shall be supplied for resistance to corrosion and to protect the lens and case from damage. The face of the gauge shall be white, with black letters.

PUMP ENCLOSURE LIGHTS

Two (2) convenience work lights shall be provided in the pump enclosure. The control switch shall be near lights or on the pump panel.

PUMP PANEL LIGHTS

Pump panel lights with clear lenses shall be installed under a light hood on the pump panel. A total of four (4) lights shall be provided, two (2) each side.

MASTER PUMP DISCHARGE AND INTAKE GAUGES

A set of 4-1/2" diameter Class 1 master gauges (discharge gauge and intake gauge 30-0-400 PSI) with engraved, color coded; metal label shall be installed on the pump instrument panel.

The master and line gauges shall be fully filled with pulse and vibration dampening interlube to lubricate the internal mechanisms. This shall prevent lens condensation and will insure proper operation to minus 40 degrees F. The case shall be temperature compensated with an internal breathing diaphragm to permit filled cases and to allow a rigid lens with a distortion free viewing area.

To prevent internal freezing and to keep contaminants from entering the gauge, the stem and Bourdon tube shall be filled with low temperature material and be sealed from the water system using an isolation Sub-Z diaphragm located in the stem. A bright metal bezel shall be supplied for resistance to corrosion and to protect the lens and case from damage. The face of the gauge shall be white, with black letters.

TEST TAPS FOR GAUGES

Test taps for pump intake and pump pressure shall be provided on the pump panel and be properly labeled.

INTELLI-TANK LED WATER TANK LEVEL GAUGE ON PUMP PANEL

A Class 1 Intelli-Tank LED water tank level gauge shall be installed on the pump panel to monitor the water tank level.

HIGH PRESSURE PUMP SYSTEM

A high pressure pump system shall be supplied with the apparatus, and plumbed independently of the stationary pumping system.

HIGH PRESSURE PUMP SYSTEM (continued)

The pump shall be a FMC triplex plunger high pressure pump, generating approximately 75 GPM at 1200PSI. The pump shall have a cast fluid cylinder pressure rating of 3,000 PSI. The pump shall be driven off of a transmission PTO.

The pump system shall supply four (4) high pressure discharges. Two (2) high pressure discharges shall be located at the front bumper of the apparatus.

The additional two (2) high pressure discharges shall be located in the dunnage area of the pump module. The discharge shall be equipped with a hose reel equipped with 200' of high pressure hose.

WATER TANK SPECIFICATIONS

The sides and top shall be constructed of a minimum of 1/2" black UV stabilized copolymer polypropylene. The bottom shall be constructed of a minimum of 3/4" black UV stabilized copolymer polypropylene.

The tank shall undergo extensive testing prior to installation in the truck. The process shall include an electronic spark and water fill test.

The tank shall have a combination vent and manual fill tower. The tank overflow shall be 4" diameter and shall dump behind the rear wheels to permit maximum traction. The tower shall have a hinged cover and screen.

There shall be two (2) standard tank openings; one for the tank to pump suction line and one for a tank fill line.

Baffles, both longitudinal and latitudinal shall be interlocking and welded to minimize water surge during travel. Openings in the baffles shall allow water flow during filling or pumping operations. The tank shall be mounted on hard rubber cushions to isolate the tank from road shock and vibration. The tank shall be completely removable from the apparatus body structure.

The water tank shall have an integral foam tank installed. The foam concentrate tank shall be provided with baffles if needed.

The foam concentrate tank shall be provided with a fill tower or expansion compartment having a minimum area of 12 square inches. The fill tower opening shall be protected by a completely sealed air-tight cover.

The fill tower shall be equipped with a pressure/vacuum vent that enables the tank to compensate for changes in pressure or vacuum when filling or withdrawing foam concentrate from the tank. The vent shall be protected to prevent foam concentrate from escaping or directly contacting the vent at any time.

650 GALLON WATER TANK

There shall be a 650 gallon water tank supplied. The tank shall have a 4" water overflow and the construction shall be of co-polymer polypropylene, in the shape of a "T".

WATER TANK DRAIN VALVE

The water tank shall have a 1-1/2" diameter drain valve, controlled under apparatus.

30 GALLON FOAM TANK

There shall be a 30 gallon foam tank supplied. The tank shall be an integral part of the water tank and shall be of polypropylene construction.

FOAM TANK DRAIN VALVE AND PLUG

The foam tank shall have a 1" diameter gate type drain valve and the valve shall have a plug installed.

BODY MOUNTING SYSTEM

The entire body module assembly shall be mounted to the chassis frame rails with vibration and Vibra-Torq torsion isolator assemblies. The body substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Two (2) assemblies shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be painted for corrosion resistance. Each body mount bracket shall be mounted to the side chassis frame flange with two 5/8"-UNC Grade 5 HHCS.

The rear assemblies shall have a two-part rubber vibration isolator. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All body to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature body structural failures. NO EXCEPTIONS.

APPARATUS BODY CONSTRUCTION

The apparatus body shall be constructed entirely of aluminum. The complete body frame work shall be completely constructed from #6061-T6 and #6063-T6 aluminum extrusions. To form the frame work, these extrusions are beveled and electrically seam welded at each joint using #5356 aluminum alloy welding wire.

The front body corner sections shall be a 3-1/2" x 3-1/2" hollow aluminum #6063-T6 alloy extruded corner sections with .150 wall thickness and shall be welded as an integral part of the frame work. These corner extrusions shall have outside radius.

The rear corner sections shall be a 2" x 4" hollow aluminum #6063-T6 alloy extruded corner sections with .150 wall thickness and shall be welded as an integral part of the frame work.

APPARATUS BODY CONSTRUCTION (continued)

The horizontal frame member extrusions shall be 2" x 4" aluminum #6063-T6 alloy with .150" wall thickness.

The frame cross member extrusions shall be 2" x 4" aluminum #6061-T6 alloy with 1/4" outer wall thickness, and a 3/8" center wall thickness. These cross members shall extend the full width of the body to support the compartments. The cross members shall be welded to a solid aluminum #6061-T6 alloy frame sill extrusion that is 3/4" x 3" and is shaped in contour with the chassis frame rails.

The wheel well frame shall be constructed from 2" x 4" aluminum #6063-T6 alloy extrusions slotted the full length to permit an internal fit of .125" aluminum diamond plate. All of the smooth aluminum plate used in body construction shall be aluminum #3003-H14 alloy.

All horizontal surfaces and the rear body surface shall be .125" aluminum diamond plate. All body compartments shall be constructed from .125" formed aluminum 3003-H14 alloy smooth plate. All compartment floors shall be constructed of aluminum plate welded in place. All compartment seams shall be sealed by using a permanent pliable silicone caulking. The compartments shall be louvered for adequate ventilation.

All aluminum extrusions shall be slotted the full length to allow the fitting of 1/8" aluminum diamond plate. All aluminum diamond plate used in body construction shall be aluminum #3003-H14 alloy.

Aluminum drip rail shall be located over the compartment doors. This drip rail shall have an anodized finish.

The apparatus body frame work shall have no nuts, bolts or other type fastener, but shall be welded, sanded and deburred for the removal of all sharp edges.

WHEEL WELL PANELS

The exterior panels of the wheel well enclosures shall be constructed of .125" aluminum diamond plate. The wheel well trim will be painted.

REAR BODY FENDERS AND LINERS

The rear body single axle wheel well openings shall be equipped with radiused, welded aluminum fenders and bolted polyliners. The wheel well trim will be painted.

FOUR SCBA CYLINDER WHEEL WELL COMPARTMENTS

Four (4) single tube SCBA compartments shall be provided with brushed finished Cast Products aluminum doors installed in the rear wheel well area. A total of four (4) compartments shall be provided, one (1) pair driver's side and one (1) pair officer's side.

LABEL, DIESEL FUEL ONLY

There shall be a metallic label at each fuel fill location that designates "Diesel Fuel Only" requirements. It shall be black with white or equivalent contrasting letters a minimum of .5" high.

ANODIZED ALUMINUM RUB RAILS

The body side rub rail assemblies shall be constructed of anodized aluminum extrusion channels.

NFPA compliant reflective material shall be attached to the entire length of the rub rail to improve side profile visibility.

FRONT PROTECTIVE PANELS

The body shall be equipped with a protective aluminum diamond plate panels which shall be installed on the left and right front compartment vertical surfaces of the apparatus body.

ROLL UP DOOR CONSTRUCTION

The roll-up compartment doors shall be anodized satin finish aluminum manufactured by R-O-M Corporation.

The doors shall be front roll type with a minimum header at the top of the compartment opening. The compartment doors shall be counter-balanced for easy opening and closing. The doors shall be designed to be easily removable and repairable, in a minimal amount of time. The door mounting system that connects the curtain slats to the operator drum shall allow for easy tension adjustment without tools. Each roll-up door shall have a four inch diameter counterbalance operator drum to assist in lifting the door. The compartment door track shall be one-piece aluminum with attaching and finishing flange.

The door slats shall be double-wall extrusion 1.366" high by .315" thick, with the exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation. Door slats shall have an interlocking end shoes to prevent slat from moving side-to-side and binding the door. Each slat shall have an "end shoe" are swaged/dimpled into the slat, to allow easy slat replacement. In addition, the slats shall have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects. Between each slat shall be a co-extruded PVC inner seal to prevent metal-to-metal contact, repel moisture, and shall not be visible from the front of the door.

There shall be an aluminum drip rail above each compartment door with a non-abrasive or brush type seal at the top door opening area. Drip rail shall have a seal design that prevents it from scratching the door.

The door latching system shall be a full width one piece lift bar operable by one hand, with a retainer block on each end of the lift bar. A two inch wide finger pull shall be integrated into the bottom rail extrusion for easy one hand opening and closing.

Each compartment door shall be equipped with a magnetic door light actuator and "tell-tale" door-ajar system. The unit shall be integrated in lift bar handle and the retainer block to signal open door in the cab. There shall be no mechanical switches or switches mounted on the interior compartment for compartment lights.

The exterior body compartments shall be provided with roll-up compartment doors.

APPARATUS BODY COMPARTMENTS

The left side of the apparatus shall have three (3) compartments, one (1) ahead of rear wheel well, one (1) over the wheel well, and one (1) aft of the rear wheel well area.

1. L1 compartment:
   There shall be one (1) compartment located ahead of the rear wheel well that is full height. The L1 compartment shall be approximately xx" wide x xx" high, the lower portion of the compartment shall be 23"deep and the upper portion of the compartment shall be approximately 10-1/2" deep.

2. L2 compartment:
   There shall be one (1) compartment located above the rear wheel well that is approximately xx" wide x xx" high x xx" deep.

3. L3 compartment:
   There shall be one (1) compartment located behind the rear wheel well that is full height. The L3 compartment shall be approximately xx" wide x xx" high, the lower portion of the compartment shall be xx" deep and the upper portion of the compartment shall be approximately xx" deep.

The right side of the apparatus shall have two (2) compartments, one (1) ahead of rear wheel well and one (1) aft of the rear wheel well area.

1. R1 compartment:
   There shall be one (1) compartment located ahead of the rear wheel well that is half height. The R1 compartment shall be approximately xx" wide x xx" high x 24" deep.

2. R2 compartment:
   There shall be one (1) compartment located behind the rear wheel well that is half height. The R2 compartment shall be approximately xx" wide x xx" high x 24" deep.

A compartment shall be located at the rear of the apparatus and shall be extend up from the top of body crossmember to below the hose bed.

HOSE BED CONSTRUCTION

The hose bed shall be constructed of aluminum #6063-T6 extrusions that are 8-1/4" x 3/4". The extrusions shall be #204-R1 anodized to guarantee a smooth, non-abrasive finish as to ensure that no hose is damaged.

The hose bed wall shall be framed of hollow aluminum #6063-T6 extrusions that are slotted to allow interlocking aluminum sheets. The hose bed wall shall be constructed of smooth aluminum sheet that is welded into place.

HYPALON HOSE BED COVER

The apparatus shall be equipped with a hypalon hose bed cover. The cover shall be secured using a sewn in elastic cord, stainless steel lashing cords and twist snaps or button snaps depending on applicable vehicle model and options selected.

HOSE BED DIVIDERS

Four (4) adjustable hose bed dividers constructed of 3/16" aluminum shall be installed on the apparatus. Each hose bed divider shall be provided with a hand hole cut-out.

10" REAR BODY STEP

A 10" deep rear step shall be provided at the rear of the apparatus, bolted in place and easily removable for replacement. The tailboard shall be constructed of aluminum diamond plate with an NFPA compliant stepping surface.

The maximum height of the step shall be no more than 24" from the ground in compliance to NFPA #1901 standards. A label shall be provided warning personnel that riding on the rear step while the apparatus is in motion is prohibited.

REAR STEP LIGHTS

Two (2) incandescent recessed step lights shall be installed. The lights shall be installed on rear of unit to illuminate rear step, one each side.

12" HAND RAIL

A non-slip extruded aluminum hand rail, approximately 12" in length, shall be installed on the apparatus. The hand rail shall be secured to the body with chrome plated fittings. The location shall be: TBD

LEFT REAR ACCESS LADDER

The left rear top of the body shall be accessible from the ground by a bolted on railing type ladder. The ladder steps shall be constructed of non-slip aluminum extrusion welded to rails that are mounted to the body with removable brackets.

The ladder shall be approximately 10" wide, with steps spaced at 18" maximum distance. The ladder shall comply with current NFPA 1901 standards. The location shall be the driver's side rear of the apparatus.

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS

The following specifications describe the low voltage electrical system on the specified initial attack type fire apparatus. The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA #1901 standards.

The apparatus shall have multiplexing system, to provide diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The electrical system shall be pre-wired for computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics, troubleshooting, or program additions.

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS (continued)

The multi-plexed system shall use twisted-pair shielded wire shall be provided within the electrical system for noise reduction. For superior system integrity, the networked system shall meet the following minimum requirement components:

Power management center
Load shedding power management
Solid-state circuitry
Switch input capability
Responsible for lighting device activation
Self-contained diagnostic indicators
Power distribution module

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be split using Deutsche type connectors or an enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

Any electrical junction or terminal boxes shall be weather resistant and located away from water spray conditions.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in an electrical junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified at least every two feet (2') by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

The electrical circuits shall be provided with low voltage overcurrent protective devices. Such devices shall be accessible and located in required terminal connection locations or weather resistant enclosures. The overcurrent protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS (continued)

The electrical system shall include the following:

a) Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applicable to all terminal plugs located outside of the cab or body.

b) The electrical wiring shall be harnessed or be placed in a protective loom.

c) Heat shrink material and sealed connectors shall be used to protect exposed connections.

d) Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.

e) Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.

f) An adequate length of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.

g) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switching in an accessible location. Individual switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is activated, a "blocking right of way" system shall be automatically activated per requirements of NFPA #1901. All "clear" warning lights shall be automatically shed on actuation of parking brake.

NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM

The apparatus shall be electrical tested shall be completion of the vehicle and prior to prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:
   The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM (continued)

2. Alternator performance test at idle:
   The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:
   The total continuous electrical load shall be activated with the engine running up to the engine 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 this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:
   Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA REQUIRED DOCUMENTATION
The following documentation shall be provided on delivery of the apparatus:

a. Documentation of the electrical system performance tests required above.

b. A written load analysis, including:
   1. The nameplate rating of the alternator.
   2. The alternator rating under the conditions.
   3. Each specified component load.
   4. Individual intermittent loads.

CLASS 1 SMART SWITCH PANEL

A 12 volt switch panel containing eight (8) programmable Class 1 Smart Switches shall be installed in the cab. Each switch shall contain an integral indicator light that informs the user if the function is on or off.

DOT LIGHTING PACKAGE

The lighting on the body shall conform to DOT standards. LED lighting shall be used.

REAR LICENSE PLATE MOUNT WITH LIGHT

There shall be a license plate mount with light supplied at the rear of the apparatus.

TAIL LIGHTS

A Whelen three (3) position tail light housing shall be supplied on each side of the rear of the apparatus. Each cluster shall consist of the following:

One (1) M6BTT red LED stop/tail lights
One (1) M6T amber LED turn lights
One (1) M6BUW white LED back up lights
One (1) M6FCV3 chrome three (3) light housing

PUMP PANEL AREA GROUND LIGHTS

Two (2) LED lights shall be installed under the pump panel running boards. One (1) light shall be located on the driver's side and one (1) light located on the officer's side.

REAR STEP GROUND LIGHTS

Two (2) LED lights shall be installed under the rear step. These lights shall automatically activate when the vehicle is in park or neutral.

SCENE LIGHTS

Two (2) Whelen model M6ZC LED 4"x 6" scene lights shall be provided. The lights shall be installed with one located on each side of the rear upper area of the body. A switch labeled REAR SCENE LIGHT'S shall be located in the cab.

Four (4) Whelen model M6ZC LED 4"x 6" 12 volt scene lights shall be provided. The lights shall be installed on the upper side area of the body. Two lights shall be located on the driver's side and two lights located on the officer's side. Two switches labeled DRIVER'S SIDE SCENE LIGHTS and OFFICERS SIDE SCENE LIGHT'S shall be located in the cab.

The rear scene lights shall activate automatically upon placing the transmission into reverse.

WHELEN PIONEER LED TELESCOPIC LIGHTS

A pair (2) of Whelen PFP2 dual panel LED scene lights shall be supplied on the apparatus. The lights shall be on a telescopic, side mount, push up pole. The lights shall each have a 12 amp, 12.8V draw.

Location: (1) each side of pump module

BACK-UP ALARM

An automatic electric back-up alarm shall be wired to the back-up light circuit, and mounted under the rear of the apparatus body.

ROLL UP DOOR COMPARTMENT LIGHTING

One (1) vertically mounted roll-up LED compartment door light shall be installed on the forward side of the door opening. The door lighting shall be manufactured by ROM and integrated into roll-up door track with light actuation upon door opening.

HAZARD WARNING LIGHT

A flashing LED light with a red lens, located in the driving compartment, shall be illuminated automatically whenever any cab door or equipment compartment door is open. An audible alarm shall also be located in the driving compartment and will activate with the hazard light.

The light shall be marked, "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

LIGHT BAR

A Whelen Freedom series LED 72" light bar shall be installed. The light bar shall have four (4) red corner LED's, eight (8) forward facing red LED's, and two (2) forward facing white LED's. The light bar lenses shall be clear.

UPPER REAR COMBINATION LIGHTS

Two (2) Whelen Model L360 LED lights shall be installed.
Lens color shall be: one (1) red and one (1) amber.
Location shall be: Upper rear corners of body.

LED FRONT GRILLE WARNING LIGHTS

Two (2) Whelen Model M6RC LED warning lights shall be installed.
Lens color shall be: Red
Location shall be: Front grille

LED FRONT GRILLE WARNING LIGHTS

Two (2) Whelen Model M6RC LED warning lights shall be installed.
Lens color shall be: Red
Location shall be: Front corner

LED FRONT GRILLE WARNING LIGHTS

Four (4) Whelen Model M6RC LED warning lights shall be installed.
Lens color shall be: Red
Location shall be: two (2) each lower side body

FRONT CORNER WARNING LIGHTS

Four (4) Whelen Model 500 LED warning lights shall be installed.
Lens color shall be: Red
Location shall be: Rubrails (2) each side, (1) ahead of the rear wheel well, (1) behind the rear wheel well

LED FRONT GRILLE WARNING LIGHTS

Two (2) Whelen Model M6RC LED warning lights shall be installed.
Lens color shall be: Red
Location shall be: One (1) each rear lower

EXPANDED METAL SIREN COVERS

A cover constructed of expanded steel and steel angle shall be provided to cover the face of the recessed Q2B siren, and the siren speaker. The covers shall be painted black.

ELECTRIC SIREN AND CONTROL

One (1) Whelen Model #295SLSA1 electronic siren shall be mounted in the cab. This unit shall feature an electronic air horn, wail, yelp, hi-lo and shall have a hard wired PA microphone.

MECHANICAL SIREN

Federal Signal Model #Q2B-NN mechanical siren (recess type) shall be provided. The siren shall be activated with foot switch on the drivers side cab floor. A siren brake switch shall be installed on the chassis dash.

FEDERAL ES100 SIREN SPEAKER

Federal Signal DynaMax Model #ES-100 watt speaker shall be included.

SIREN CONTROL

A foot switch shall be provided on the drivers side of the cab floor to activate the siren.

A foot switch shall be provided on the officer's side of the cab floor to activate the siren.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA #1901 standards, the apparatus shall be engineered to provide an allowance of 1000 pounds of fire department provided loose equipment.

LADDERS

An Alco-Lite model PRL-14, 14 foot aluminum roof ladder with folding steel roof hooks on one end and steel spikes on the other end shall be provided on the apparatus. The ladder shall meet or exceed all latest NFPA Standards.

An Alco-Lite PEL-24, 24 foot two (2) section aluminum extension ladder shall be provided on the apparatus. The ladder shall meet or exceed latest NFPA standards.

An Alco-Lite FL-10, 10 foot folding aluminum attic ladder shall be provided. The ladder shall meet or exceed all the latest NFPA Standards.

Adjustable mounting shall be provided for the specified extension ladder(s) on the right hand side of the body. Location shall be: vertically mounted on the hose bed side with adjustable brackets.

TWO LENGTHS 6.00" x 10.0' SUCTION HOSE

Two lengths of 6.00" x 10.0' suction hose shall be provided. The hose shall be constructed from flexible PVC with lightweight fittings. The overall length shall be 10 feet and be provided with a 6" NST female long handle coupling and a 6" NST male rocker lug coupling.

Two (2) vertically mounted aluminum hard suction hose racks with spring loaded hose clamps shall be provided. The rack shall be mounted to the hose bed side and shall hold two (2) 10' hoses.

PIKE POLE

One (1) 8' pike pole shall be provided. The pike pole shall be of fiberglass construction.

One (1) 10' pike pole shall be provided. The pike pole shall be of fiberglass construction.

An aluminum tube shall be provided for pike pole mounting. The tube shall have a 2-1/4" interior diameter and shall be mounted on the outside of the apparatus body.

BODY PAINTING SPECIFICATIONS

The apparatus body shall be painted to the highest of fire apparatus standards. All materials used in the painting of the body and components shall be approved by the manufacturer of the final painting material.

All flush-mounted lights, drip moldings, and other equipment shall also be removed prior to final finishing. This shall assure finish paint under all body mounted equipment. Prior to painting of the body and components, all surfaces shall be chemically cleaned and prepared. The apparatus body shall be sanded smooth on all exterior surfaces to assure removal of imperfections in the metal surface. Primers and fillers shall be applied to the metal surface to assure a quality surface for the final painting.

The apparatus body shall be painted with a polyurethane type paint manufactured by Dupont, Sikkens, PPG, or other approved manufacturer. The final painting surface must be free of defects, paint runs, scratches, orange peel, buff marks, or other normal imperfections.

INTERIOR COMPARTMENT FINISH

Seven (7) interior compartments shall have a Zolatone spatter paint finish. The color will be "Greystone" ZT-20-64-1G.

CAB PAINT

The truck cab shall remain the standard commercial chassis manufacturer's stock color. The cab will not be re-painted.

NFPA INNER DOOR STRIPING (4 DOOR)

There shall be 96 square inches of reflective material located inside each cab door. The reflective material shall be visible to traffic approaching from the rear of the apparatus.

REAR BODY AND REAR DOOR CHEVRON STRIPING

A Scotchlite reflective stripe for the full rear body shall be supplied. The chevron striping shall cover the rear body panels, along with the rear door. The chevron striping will be made up of 6" reflective red stripe that alternates with a 6" reflective yellow stripe. The stripe shall be in an inverted "V" pattern, also known as an "A" pattern.

DEALER SUPPLIED EQUIPMENT

The dealer will supply and install a Task Force Tips Crossfire monitor with an automatic fog nozzle.