



ADDENDUM #1

Notice for Bids - Fire Truck

The City of Olivia is accepting bids for furnishing the City with one complete fire truck and equipment in accordance with the plans and specifications on file with the City of Olivia. Sealed bids will be received by the City of Olivia at 1009 Lincoln Avenue West, Olivia, MN 56277 until 10:00 AM on the 24th day of April, 2013 at which time and place all submitted bids will be opened and considered.

The outside of the sealed envelope must be properly marked "Bid for Fire Apparatus". Bid specifications and any applicable addendums can be directly downloaded from the City's website on its public safety web page (www.olivia.mn.us/public-safety). For more information or to receive bid specifications by mail or email, please contact City Administrator Dan Coughlin (320) 523-2361 / danc@olivia.mn.us

Bid Addendum Information

The following changes are, by the issuance of this addendum, made part of the original documents for the project referenced above, as if originally contained therein:

Page 2, **LIABILITY**, shall be amended as follows:

The successful bidder shall assume all liability for the use of his patented process, device or article forming a part of the apparatus. An insurance binder in the amount of one million dollars (\$1,000,000) will be included in the bidders proposal book.

Pages 4-5, **FINANCIAL STABILITY SPECIFICATIONS**, shall be amended as follows:

PERFORMANCE AND PAYMENT BONDS

The successful bidder shall provide the City separate performance and payment bonds each in an amount of at least 110% of the bid price by a surety company or corporation

certified by the Minnesota Commissioner of Commerce and authorized to act as a surety in the State of Minnesota as provided in Minn. Stat., 60A.23, subd. 5 and 574.15. The bonds must be in a form acceptable to the City, including but not limited to having two witnesses to each signature, the addresses of contractor and surety on both payment and performance bonds.

Pages 5-6, **TILT TESTING FACILITIES AND REQUIREMENTS**, shall be amended to the following:

The apparatus, prior to acceptance, will be required to meet the stability test of the applicable NFPA Automotive Fire Apparatus Standard. Calculations and related testing must be made by a qualified engineer, and a certified copy of the results demonstrating the apparatus meets or exceeds NFPA standards must be provided to the City prior to acceptance.

Page 13, **LOAD MANAGER 2**, shall be amended to:

The apparatus shall be equipped with a Kussmaul model 091-79 Automatic Load Shedding System for performing continuous electrical load management. The Load Manager shall have the following features:

Monitor 12-volt system and detect low voltage.

Capability to control two (2) loads.

Automatic reset when voltage rises.

Adjustable voltage setpoint.

The load manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a enclosure to enhance EMI/RFI protection. Bidder shall provide for all electrical loads in excess of the NFPA minimum electrical requirements that exceed the alternator output.

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NOTICE FOR BIDS

~~Sealed bids will be accepted for furnishing one complete fire truck and equipment in accordance with the plans and specifications on file with the City of Olivia. Bids will be received by the City of Olivia at 1009 Lincoln Avenue West, Olivia, MN 56277 until 10:00 AM on the 3rd day of April, 2013 at which time and place all submitted bids will be opened and considered.~~

The outside of the sealed envelope must be properly marked "Bid for Fire Apparatus".

For more information or to receive bid specifications, contact:

City Administrator Dan Coughlin (320) 523-2361.

INTENT OF SPECIFICATIONS - It is the intent of these specifications to cover the furnishing and delivery to the Fire Department of a complete apparatus equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus, these specifications cover minimum requirements as to the type of construction and tests to which the apparatus 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 of all features. The apparatus shall conform to the requirements of the current (at time of bid) NFPA Standard 1901, unless otherwise noted herein, with the exception of Minor Equipment. The only minor equipment supplied will be stated in these specifications.

Each bidder shall furnish complete "Proposal Specifications", printed on their own stationery. Copies or reproduction of these "advertised specifications" can only be used as an attachment to the proposal specifications, for comparison/compliance purposes. **No Exceptions will be allowed to this requirement.**

QUALIFICATIONS OF THE BIDDERS - Bids will only be considered from manufacturers with an established reputation in the field of fire apparatus construction. Manufacturer must be a current member of the Fire Apparatus Manufacturers Association (FAMA). Bids from non-established builders will not be considered. To be considered established, the bidder must have delivered a minimum of twelve similar units in each of the preceding ten calendar years. Each bidder shall, upon request, be prepared to provide a customer list to verify this requirement. **No Exceptions will be allowed to this requirement.**

Each bidder shall furnish satisfactory evidence of his ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. Units with the apparatus body and chassis not constructed entirely in the United States will be automatically rejected, with no further explanation given. **No exceptions will be allowed to these requirements.**

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SERVICE REQUIREMENTS - Each bidder shall show that he is in a position to render prompt service and to furnish replacement parts.

BID SECURITY - Each bidder shall furnish a bid bond in an amount equal to 10% of the bid price. The surety company must be listed in the United States Treasury Department Circular #570. The surety company must be licensed in the state of Minnesota.

MISCELLANEOUS PROVISIONS – The successful bidder shall understand that any litigation arising from or in connection with any dispute between the manufacturer, dealer, and City of Olivia shall be venued in Minnesota. The parties agree that any contract or purchase agreement bears a rational relationship to the State of Minnesota, and they consent to the personal jurisdiction of Minnesota and further consent and stipulate to venue in the above described court.

PROPOSAL DRAWING - Each bidder shall submit a detailed scaled drawing of the apparatus as proposed. The drawing shall include left side view, rear view, and right side body view. The drawing shall be minimum 20” x 30” in size (D Size). **There will be no exception to this requirement.**

~~**LIABILITY** - The successful bidder shall assume all liability for the use of his patented process, device or article forming a part of the apparatus. An insurance binder in the amount of twenty-five million dollars (\$25,000,000) will be included in the bidders proposal book. **There will be no exception to this requirement.**~~

CONTRACT AGREEMENT - These specifications, together with any other documents required herein, shall be included in the contract executed by the Purchaser and the successful bidder. Bid date will be stated in calendar days after execution of contract. Each bidder shall submit a copy of his proposed contract form. Said contract form shall be subject to approval or modification until acceptable by both parties. **There will be no exception to this requirement.**

CONTRACT AWARD – Contract will be awarded to the most “responsible bidder”, provided that bid is in the best interest of the purchaser. The apparatus total price, delivery date, compliance to specifications, apparatus design, workmanship, materials, owning and operating costs, length of incorporation of manufacturer and distributor, location of factory, parts and service capabilities, and past experience, will be analyzed to determine the most “responsible bidder.”

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TERMS OF PAYMENT - The chassis shall be paid for upon completion and shipment to the apparatus manufacturer. The remaining balance shall be paid upon acceptance by the Fire Department, which shall be upon delivery and completion of operation demonstration.

DELIVERY AND DEMONSTRATION - The successful bidder shall, at his expense, deliver the apparatus to the Fire Department. A factory trained and authorized delivery instructor shall then demonstrate to the Fire Department personnel suggested operation and preventative maintenance of the apparatus.

BID PROPOSAL - Each bidders proposal shall clearly state the make and model, total price, and terms of payment. All bids must remain firm for a period of thirty (30) days.

EXCEPTIONS - It is the intent of these specifications to obtain maximum efficiency of the apparatus and equipment delivered, with emphasis on crew safety, ease of operation, resistance to corrosion, and availability of service and parts. Certain major components and features have been requested in support of this, and exceptions taken in these areas will not be acceptable. Each bidder shall list all exceptions or substitutions proposed, however minor, on a separate page titled "EXCEPTIONS", and shall furnish adequate supportive data to allow the Fire Department to determine acceptability.

On each page of the specifications is a "Bidder Complies" column with the words "YES" indicating the bidder is fully compliant with the specification, and "NO" indicating the bidder is not fully compliant and an exception is taken. To assist the purchaser in the proper evaluation of bids, each bidder shall check the appropriate word, yes or no, to indicate whether or not the bid meets specifications in the adjoining paragraph. A completed copy of this must be included with all bids. All exceptions must be indicated. Not noting an exception when there is variance between the bidders' submitted proposal and these advertised specifications will result in immediate rejection of the bid. **No Exception shall be allowed to this requirement.**

GENERAL CONSTRUCTION - The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles, so that all applicable specified equipment, including filled water tank, a full complement of personnel, and equipment will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the National Fire Protection Association and the Society of Automotive Engineers. Special consideration will be given to accessibility of various components that require periodic maintenance, ease of operations, and symmetrical proportions. A computer generated weight and balance sheet shall be included with all bids. Bids not submitted with required weight and balance sheet shall be automatically rejected, with no further explanation given. **There will be No Exception to this requirement.**

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WARRANTY - The successful bidder shall warrant the apparatus to be free from defects in materials and workmanship for a period of one (1) year. Component parts, if found to be defective, shall be repaired or replaced without costs other than transportation charges. This warranty shall be exclusive of the chassis, fire pump, and other trade accessories which are normally warranted by their respective manufacturers. Other warranties may be required as specified in the accompanying specifications. Each bidder must submit a copy of his proposed warranty in compliance with these requirements.

PLANT INSPECTION TRIPS – two (2) inspection trips to the manufacturers’ plant facility shall be provided for up to four (4) Department personnel. All applicable expenses including meals, lodging and transportation shall be the responsibility of the bidder. The department will determine the timing of the plant visits. If the manufacturing plant facility is in excess of 250 miles from the City of Olivia, MN, air transportation shall be provided.

OVERALL HEIGHT

An overall height restriction has not been specified for this apparatus.

OVERALL LENGTH

An overall length restriction has not been specified for this apparatus.

OVERALL WIDTH

An overall width restriction has not been specified for this apparatus.

WHEELBASE

A wheelbase restriction has not been specified for this apparatus.

ANGLE OF APPROACH

The angle of approach for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

ANGLE OF DEPARTURE

The angle of departure for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

FINANCIAL STABILITY SPECIFICATIONS

~~Ensuring the financial stability of the proposed body builder is a paramount consideration to this department. Financial strength directly relates to the body builders ability to successfully produce an apparatus without jeopardizing fire department funds. In addition, financial strength~~

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~~is vital to this department to insure a body builder will be able to provide warranty service along with replacement parts and service for the life of the apparatus. Failure to be able to provide these lifelong services may cause future increases in maintenance expenses and create undue burden on the department's budget and tax base. This is a situation that this department is unwilling to risk. The body builder, therefore, shall meet certain minimum financial ratios in order to qualify for a bid award. The financial ratios presented shall be that of the consolidated entity; not the consolidated entity's parent company; for the body builder.~~

~~The financial ratios required to be met shall be derived from the most recent audited financial statements of the body builder proposed. **NO EXCEPTIONS.**~~

~~ANY EXCEPTION taken to this requirement shall immediately render the bid non-responsive and the bidder dismissed from further consideration. Under no circumstance shall a bid be considered where the bidder submits a letter of explanation taking exception to this requirement in lieu of providing the required documentation, nor shall consideration be given to bidders that refuse to submit the required information on the basis that the body builder proposed is a private company. **NO EXCEPTIONS.**~~

~~The three (3) critical financial indicators to be met are as follows:~~

~~**Debt-to-Equity Ratio:** The debt-to-equity ratio of the entity must not exceed a 2.0 rating. A debt-to-equity ratio is defined as that of total liabilities divided by total owner's equity. In layman's terms, a low debt-to-equity ratio means the company itself owns a greater share of its assets, as opposed to banks, creditors and other financial institutions. Conversely, companies with high debt-to-equity ratios are those that are generally financing their growth by carrying additional debt. The cost of this debt-financing may outweigh the return that the company generates on the debt through business activities and become too much for the company to manage. This can lead to bankruptcy, which is of grave concern to this purchaser.~~

~~**Debt Coverage Ratio:** The debt coverage ratio of the entity must exceed a 100.0 rating. A debt coverage ratio is defined as annual net income divided by the current portion of long-term debt. A high debt coverage ratio means the company can easily meet its payment obligations with its banks and other creditors. A low debt coverage ratio clearly infers the company may struggle to meet these obligations, which could ultimately delay or cancel production of apparatus.~~

~~**Equity Ratio:** The equity ratio of the body builder must exceed a .30 rating. An equity ratio is defined as total owners equity divided by total assets. The equity ratio is another good indicator of the level of leverage (or financing) used by a company. The equity ratio measures the proportion of the total assets that are financed by owners and not creditors. A high equity ratio provides the company with flexibility in financing growth and other needs.~~

~~All financial indicators required by this section must be verified by Dun and Bradstreet, the nationally-recognized, independent financial analysis company. Bids furnished without the required financial information shall render the bid non-responsive and the bidder dismissed from further consideration. **NO EXCEPTIONS.**~~

~~TILT TESTING FACILITIES AND REQUIREMENTS~~

~~The apparatus, prior to acceptance, will be required to meet the stability test of the applicable NFPA Automotive Fire Apparatus Standard. The final and completed vehicle shall be tilt-tested~~

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~~to the applicable standards and photographed to ensure that this procedure and certification can be verified. Each bidder shall have the facilities to perform these tests at the manufacturing site. The bidder shall own the facilities to perform the above test, and shall not contract with an outside agency to have these tests performed on this apparatus.~~

BUMPER TO BUMPER WARRANTY

The manufacturer shall provide a one (1) year bumper-to-bumper warranty. The manufacturer shall supply details of their warranty information with their bid submission.

ALUMINUM BODY WARRANTY - TEN YEAR

The manufacturer shall provide a ten (10) year structural and corrosion perforation warranty for the fabricated aluminum body. The manufacturer shall supply details of their warranty information with their bid submission.

GALVANIZED STEEL SUBFRAME WARRANTY

The manufacturer shall provide a lifetime warranty for the galvanized steel subframe of the apparatus body. The manufacturer shall supply details of their warranty information with their bid submission.

PAINT WARRANTY FIVE YEAR

The manufacturer shall provide a five (5) year paint warranty for all portions of the apparatus that they have painted. The manufacturer shall supply details of their warranty information with their bid submission.

PUMP WARRANTY

The fire pump manufacturer shall provide a five (5) year warranty. The manufacturer shall supply details of their warranty information with their bid submission.

STAINLESS STEEL PLUMBING WARRANTY

The manufacturer shall provide a ten (10) year warranty on the stainless steel plumbing components and installation. The manufacturer shall supply details of their warranty information with their bid submission.

COMPLETE PRINTED MANUAL

The manufacturer shall provide with the vehicle upon delivery, one (1) complete delivery manual. This manual shall be in a notebook type binder, with reference tabs for each section of the vehicle. A companion compact disk (CD) with all of the printed material in an electronic format (Adobe Acrobat PDF) shall be provided.

Within each section shall be:

- Individual component manufacturer instruction and parts manuals
- Warranty forms for the body

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- Warranty forms for all major components
- Warranty instructions and format to be used in compliance with warranty obligations
- Wiring diagrams
- Installation instruction and drawings for major parts
- Visual graphics and electronic photos for the installation of major parts
- Necessary normal routine service forms, publications and components of the body portion
- of the apparatus
- Technical publications for training and instruction on major body components
- Warning and safety related notices for personnel protection
- Cab and chassis manuals on parts, service and maintenance shall be provided

The manufacturer shall supply details of their manual information with their bid submission.

"ON-LINE" SERVICE MANUAL SUPPORT

As part of the standard delivery manual, the manufacturer shall give a password-protected link to the end user, allowing access to the manufacturers' database on service parts. The internet-based system shall allow the end user to access the major component supplier's service parts listing such as Hale, Waterous, Akron, etc. This shall be accomplished with simplistic point and click features on the manufacturer line item within the "stripper" or "line sheet". This will include, automatic updates, printable schematics, and manufacturer's web links and is available in a commercially available format of Adobe Acrobat Reader to access these documents. The manufacturer shall submit with the bid proposal, a sample set of on line Adobe formatted material that has been printed from the manufacturer's website. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at prebuild" submission is not an acceptable response for the bid document.

Parts Listings within Manuals

The manuals will include cross-reference part numbers from the apparatus manufacturers' part number to the vendor parts. Example: Brand X Fire Apparatus, Hydraulic Ladder Rack, Part #WW-MN-0302 cross-referenced to Ziamatic Corporation Part 098-MN2345. This will allow for reference between individual parts and complete installation assemblies as completed by the body builder. The manuals will list all components of the vehicle that includes a vendor part utilized in a complete installation via the manufacturers "line item sheet" or "stripper" utilized to manufacture the completed vehicle. These are "As Built" and proposals with "typical" or "generic" manuals will be rejected.

Illustrative Schematics within Manuals

The manufacturer shall include installation diagrams and drawings of all major sub assemblies. This will include components such as hydraulic ladder rack assemblies, pump panels, tanks, fire pumps, etc. The drawings shall be linked via an Internet based service program, in an electronic format from the manufacturers "stripper" (line item listing) of the manufacturing document. The manufacturer shall submit, with the bid proposal, a sample schematic. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at prebuild" submission is not an acceptable response for the bid document.

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Digital Images within Manuals

In addition to two and three-dimensional installation drawings, the manufacturer shall make accessible, via an internet based link, the actual photos of the installed components listed within the "stripper" or line sheet. This will include, but not limited to Wiring terminals, main body distribution strips, fire pump shifting, auxiliary components, etc. The manufacturer shall submit a sample of these with the bid submission. Failure to submit the digital images with the bid will result in rejection of the proposal. Reference to "on delivery" or "at prebuild" submission is not an acceptable response for the bid document.

Installation Instructions within Manuals

The manufacturers "work instructions" or "installation instructions" shall be included with the service manuals. These documents shall be accessible via a web-based link to the individual vehicle manufactured. The work instructions shall give systematic instructions of the installation process. The manufacturer shall submit, with the bid proposal, a sample set of instructions. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at prebuild" submission is not an acceptable response for the bid document.

Automatic Updates of Manuals and Parts Listings

The online manuals will include automatic updates that are accessible via the web link. When clicking on the part within the manufacturers stripper or line sheet, it will allow the end user to access the component manufacturer website for updated information. This will allow for latest parts and service components from the individual part manufacturer or vendor.

Electrical Schematics

To maintain the vehicles electrical systems, the manufacturer shall provide to the purchaser the instructional manuals, complete electrical information and schematics on the vehicle. The electrical information shall be provided as follows:

Wiring Systems 12 and 120 Volt:

- Graphic symbols for electrical diagrams.
- Wire labeling, imprinting codes and index.
- Computer generated electrical schematics indicating the circuit number, wire size, switches, circuit breaker and terminals on the vehicle.

The manufacturer shall submit, with the bid proposal, a sample set of diagrams. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at prebuild" submission is not an acceptable response for the bid document.

INTERNATIONAL CHASSIS

An International 4-door chassis per the attached specifications shall be furnished per the following specifications:

Model year to be 2014 or newer

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- International 4X4 Four Door
- Cab to axle: 120"
- Engine to be 330 HP Diesel with high idle switch and auxiliary engine brake
- Transmission to be 3000 EVS with fire pumper vocational code
- Need 1:00 and 9:00 PTO ports on the transmission
- Minimum chassis GVW rating is 46,000#
- Front axle to be 16,000# capacity driving Type
- Rear Axle to be 30,000# capacity, single speed
- Unit to be geared for an approximate top speed of 68 mph
- Front suspension to be 16,000# capacity
- Front shock absorbers are required
- Rear suspension to be 30,000# capacity
- Service brakes to be air
- ABS Brake system is required
- Front wheels to be polished aluminum disc type
- Front tires to be radial highway tread
- Rear wheels to be polished aluminum disc type
- Rear tires to be radial mud and snow tread
- Frame is to be heavy duty reinforced
- Fuel tank shall be a minimum 50 gallon capacity mounted below cab under door
- Integral power steering
- Heavy duty cooling system
- Exhaust is to be single horizontal muffler and tail pipe, exiting just ahead of the rear wheels
- Two or three 12 volt deep cycle batteries mounted below door, not to extend beyond back of cab
- Master battery switch to be floor mounted near the drivers' door
- Minimum 270 amp alternator

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Instruments to include the standard manufacturers gauge package and warning lights, tachometer, voltmeter and hour meter

Paint color to be FIRE ENGINE RED

Cab seating to include a vinyl air ride driver seat, a vinyl SCBA bucket style passenger seat, and three (3) rear SCBA seats

Heater to be high output type

Integral air conditioning

Windshield wipers to be electric with washers

Bumper finish to be chrome

Mirrors to be heated & power operated west coast type with auxiliary convex mirrors

Two front tow hooks are required

Tilt hood w/ chrome grille

Air dryer with automatic moisture ejector

Cab entry handles

Tinted glass

AM/FM/Weatherband radio and speakers

Seat and shoulder belts to be red or orange in color

SEAT BELT SENSORS W/WARNING LIGHT – full system

VEHICLE DATA RECORDER

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS

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 standards.

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for the protected circuit. 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 protected 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

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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 joined 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 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.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in a 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 every three-inches (3") 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.

The electrical system shall include the following:

- 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.
- The electrical wiring shall be harnessed or be placed in a protective loom.
- 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.
- 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.
- A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- 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 switches in an accessible location. Individual rocker 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

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equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. The warning light switches shall be of the rocker type. 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 applied, a "blocking right of way" system shall automatically activate per requirements of the applicable NFPA standards. All "clear" warning lights shall be automatically turned off upon application of the parking brake.

NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM

The apparatus shall be electrically tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of the applicable NFPA standards. 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 failed test.

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 is permitted during this test. However, if an alarm sounds due to excessive battery discharge, as detected by the system requirements in the NFPA standards, or a system voltage of less than 11.7 volts dc for more than 120 seconds is present, the test has failed.

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 system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the

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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.

WEATHER RESISTANT ELECTRICAL JUNCTION BOX

The electrical junction or terminal boxes shall be weather resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required. The main body junction panel shall be located in the pump compartment.

LOAD MANAGER 2

The apparatus shall be equipped with a Kussmaul model 091-79 Automatic Load Shedding System for performing continuous electrical load management. The Load Manager shall have the following features:

- Monitor 12-volt system and detect low voltage.
- Capability to control two (2) loads.
- Automatic reset when voltage rises.
- Adjustable voltage setpoint.

The load manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a enclosure to enhance EMI/RFI protection. ~~Rosenbauer~~ shall provide for all electrical loads in excess of the NFPA minimum electrical requirements that exceed the alternator output.

HIGH IDLE SYSTEM

There shall be a high idle system furnished and installed on the apparatus. The high idle system shall have an on/off switch located in the chassis on the switch console. The system shall have an interlock that will disable the solenoid if the parking brake is not completely set.

ELECTRICAL CONSOLE WITH EMERGENCY LIGHT SWITCH PANEL – THERMAL COATED

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An electrical console shall be constructed of .125" black thermoplastic coated smooth aluminum material, and mounted in the cab of the truck chassis. Console shall be designed and installed between the driver and passenger seats. The top face of the console shall be designed as the switch panel for all emergency light switches. The switch panel shall be hinged for easy access to the switch connections.

All emergency light switches shall be lighted, rocker style. Switches shall be internally lit when the switch circuit is in the on position. A plug-in identification label is to be provided and installed adjacent to each rocker switch with backlighting provided behind the label.

SWITCHES

A rocker style internally lighted switch shall be provided and wired through a heavy-duty relay to activate power to the emergency lights. The emergency lights shall be activated by a single "MASTER SWITCH" on the electrical console.

BATTERY CHARGER AND AIR COMPRESSOR

One (1) Kussmaul Pump Plus 1200 model #091-187-12-R-B1 battery charger and air compressor system shall be installed. The 120 volt compressor system shall be designed to maintain the air pressure in the chassis brake system whenever the pressure drops below a predetermined level.

The battery charger shall be supplied from the 120 volt shore power receptacle and be a fully automatic high output charging system. The unit shall be mounted in a clean dry area and will be accessible for service and/or maintenance.

BATTERY CHARGER DISPLAY

One (1) Kussmaul model 091-94 universal single battery bank voltage display shall be supplied with the charger.

AUTO-EJECT

A Kussmaul "Super Auto-Eject" 20-amp automatic disconnect device shall be provided and installed on the 110 volt shoreline connection complete with weatherproof cover and matching plug. The Auto-Eject shall be activated by the chassis starter switch to disconnect the plug. The Super Auto-Eject shall be completely sealed to prevent contamination of the mechanism by inclement weather and road conditions. The Super Auto-Eject shall have an internal switch to open and close the AC circuit after the mating connector is inserted and before the connector is removed.

SHORE POWER PLUG

The shore power plug shall be located at the left front cab door.

AIR HORNS

Two (2) Stuttertone chrome plated air horns shall be mounted on the side of the hood of the commercial chassis. 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.

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ELECTRIC TRAFFIC HORN AND AIR HORN SELECTOR SWITCH

One (1) selector switch shall be provided on the cab's dash that will allow the chassis steering wheel horn button to activate either the electric traffic horn or air horn system.

ENGINE COMPARTMENT LIGHT

One (1) 12 volt LED light with switch shall be mounted in the engine enclosure.

PUMP ENCLOSURE LIGHTS

One (1) LED work light shall be provided in the pump enclosure. The control switch shall be mounted on the light head.

BACK-UP ALARM

One (1) automatic electric back-up alarm shall be wired to the back-up light circuit, and mounted under the rear of the apparatus body.

HAND LIGHTS

All NFPA required portable hand lights will be supplied and installed by the Customer before the apparatus is placed into service.

MARKER LIGHTS

LED marker lights shall be installed on the vehicle in conformance to the Department of Transportation requirements.

LICENSE PLATE BRACKET

One (1) license plate mounting provisions shall be provided at the rear bumper and be illuminated by a LED light.

GROUND LIGHTS

Each door shall include a Whelen 3SC0CDCR LED NFPA compliant ground light mounted to the underside 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 being activated when the parking brake is set.

PUMP PANEL GROUND LIGHTS

Two (2) LED ground 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 of the

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apparatus.

REAR STEP GROUND LIGHTS

Two (2) LED ground lights shall be installed under rear step of the apparatus. The ground lights shall automatically activate when the parking brake is applied.

REAR TAILBOARD LIGHTS

Two (2) LED step lights with clear lens shall be installed to illuminate the step surfaces at the rear of the apparatus body.

The step/walkway light switch shall be installed and wired to the parking brake.

DECK LIGHTS - REAR

The deck lights shall be installed at the rear of the hose bed.

One (1) Unity Model #AG floodlight, with a 35 watt bulb, shall be installed. The light shall have a "on-off" switch.

DOOR OPEN LIGHT

One (1) red flashing, warning light shall be provided and installed in the driver's compartment to indicate an open passenger or apparatus compartment door. The warning light shall also be attached to folding equipment racks and light towers as specified. The light shall be a flashing Whelen OS red LED light and shall be properly marked and identified.

TAIL LIGHTS

Two (2) Whelen LED tail/brake lights shall be provided. The rectangular 4"x6" light shall be red.

TURN SIGNALS

Two (2) Whelen turn signals shall be provided. The rectangular LED light shall be 4"x 6" in dimension.

BACKUP LIGHTS

Two (2) Whelen LED backup lights shall be installed on the rear of the apparatus body. The dimensions shall be 4" x 6" and the lens color shall be clear.

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.

SPEAKER

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One (1) Whelen Model #SA315P, speaker, with a non-corrosive nylon composite housing, shall be installed. The speaker shall be wired to the electric siren located in the cab.

LIGHTBAR

One (1) Whelen Justice JE2NFPA light bar shall be installed. The LED lightbar shall be 56" in length. The lightbar shall have four (4) red corner linear LED's and four (4) front red LED's. The light bar shall have a five (5) year warranty on the LED modules. The light bar shall be installed on the apparatus cab roof.

LOWER FRONT WARNING LIGHTS

One (1) pair of Whelen model LINZ6 LED warning lights shall be installed, one each side one the front of the chassis cab. The dimensions of the lights shall be 2" x 4".

There shall be chrome bezels supplied and installed on the warning lights.

INTERSECTION WARNING LIGHTS

One (1) pair of Whelen model LINZ6 LED warning lights shall be installed one each side of the chassis cab. The dimensions of the lights shall be 2" x 4".

There shall be chrome bezels supplied and installed on the warning lights.

LOWER REAR SIDE WARNING LIGHTS

One (1) pair of Whelen model LINZ6 LED warning lights shall be installed, one each side of the apparatus body, towards the rear of the body. The dimensions of the lights shall be 2" x 4".

There shall be chrome bezels supplied and installed on the warning lights.

UPPER REAR WARNING LIGHTS

One (1) pair of Whelen model #RB6T Rota-Beam warning lights shall be installed, one each side on the upper rear of the apparatus body. The unit shall have dual rotators with total dimensions of 7" high x 8" deep and shall have red lenses.

REAR WARNING LIGHT MOUNTING

The upper rear lights shall be mounted on cast aluminum stanchions attached to the apparatus body, one on each side.

LOWER REAR WARNING LIGHTS

One (1) pair of Whelen model LINZ6 LED warning lights shall be installed, one each side on the lower rear of the apparatus body. The dimensions of the lights shall be 2" x 4".

There shall be chrome bezels supplied and installed on the warning lights.

FLUID DATA PLAQUE

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One (1) fluid data plaque containing required information shall be provided based on the applicable components for this apparatus, compliant with NFPA Standards:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Drive axle lubricant
- Power steering fluid
- Pump transmission lubrication fluid
- Other NFPA applicable fluid levels or data as required

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

DATA LABEL

HEIGHT LENGTH & WEIGHT

A highly visible label indicating the overall height, length, and weight of the vehicle shall be installed in the cab dash area.

CAB SEATING POSITION LIMITS

The label shall also include the seating positions for firefighters. A weight allowance of 250 pounds for each shall be factored into the gross vehicle weight rating of the chassis.

NO RIDE LABEL

One (1) "NO RIDERS" label shall be applied 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.

HELMET WARNING TAG

One (1) label shall be installed in the cab, visible from each seating position. The label shall read "CAUTION: DO NOT WEAR HELMET WHILE SEATED." Helmets must be properly stowed while the vehicle is in motion according to the current edition of NFPA 1901.

REAR TOWING PROVISIONS

There shall be two tow eyes furnished under the rear of the body and attached directly to each chassis frame rail. There shall be a reinforcement spreader bar connecting the two tow eyes.

Tow eyes are to be constructed of 3/8" plate steel with a 4" I.D. hole, large enough for passing through a tow chain end hook.

The tow plates shall be painted black.

BUMPER EXTENSION

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The chassis frame shall be extended 28" with reinforced steel angle and structural channel by the body builder. The extension shall be designed to support the bumper and other equipment to be installed.

FRONT BUMPER GRAVELSHIELD

A 28" front to rear filler panel constructed from NFPA compliant, slip resistant aluminum tread plate shall be provided on the front chassis frame extension. The extension shall be covered on the top and sides, up to the level of front bumper and shall be reinforced to support one (1) firefighter (approximately 250 pounds) and the equipment specified to be installed.

TIRE PRESSURE INDICATOR

There shall be a tire pressure indicator at each tire's valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

EXHAUST SYSTEM

The chassis exhaust shall be modified and redirected to the right side of the apparatus and will exit ahead of the rear wheel.

EXHAUST HEAT SHIELD

A heat shield shall be installed under the body in the areas where the exhaust system is routed.

REAR MUD FLAPS

One (1) pair of black mud flaps shall be installed behind the rear wheels.

CAB STEP ENCLOSURE

The left side of the International 4-door chassis shall be equipped with a modular step/fuel tank enclosure constructed from slip resistant aluminum tread plate to conform with applicable NFPA standards. The step/enclosure is to completely cover the fuel tank, and is to include a radius cut-out allowing access to the fuel tank fill. The entire step/enclosure is to be of a one piece design, bolted in place for ease of removal.

Heavy channel steel underbody supports shall be provided to support the right and left side cab entrance steps. Supports shall be attached directly to the chassis frame rails, and shall provide adequate support to the steps to minimize flex and distortion.

The overlay shall be provided with a storage compartment. A hinged door with latch shall be provided on the storage compartment.

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The overlay shall be provided with a storage compartment. A hinged door with latch shall be provided on the storage compartment.

SCBA BRACKET

Four (4) Zico SCBA bracket shall be provided for installation in the cab mounted SCBA seat. An NFPA approved cylinder retention strap shall be supplied.

WATEROUS CXVK SINGLE STAGE PUMP

A Waterous model CXVK fire pump shall be midship mounted, single-stage centrifugal type and shall meet the requirements of the NFPA 1901 standard. The pump must be tested by the pump manufacturer for 10 minutes hydrostatically at a pressure of 350 psig. Certification by the pump manufacturer must be provided.

Impeller

The bronze impeller shall be specifically designed for the fire service. The impeller shall be accurately balanced, both mechanically and hydraulically, for vibration free operation. The impeller shaft shall be stainless steel heat-treated and precisely ground to size and supported on both ends by oil or grease lubricated ball bearings.

The wear rings shall be replaceable, bronze, reverse-flow, labyrinth-type. The fire pump shall have deep groove ball bearings located outside the pump to give rugged support and proper alignment to the impeller shaft. Bearings shall be oil or grease lubricated. All pump bearings shall be completely separated from the water being pumped.

Pump Mounting

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

The midship mounted fire pump shall be mounted with steel angles and channel from the frame using grade 8 bolts, to both the frame and pump to permit removal of the pump for service. The pump shall be equipped with bolt flanges or Victaulic couplings on the suction and discharge side of the pump to provide for removal of fire pump without disturbing piping.

Drive Line

Fire pump shall be driven by a heavy duty 10 bolt PTO capable of enough torque to operate the fire pump at rated capacity for continuous duty. The PTO shall be of a "Hot Shift" style.

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

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1250 GPM FIRE PUMP SPECIFICATIONS

The centrifugal type fire pump shall be a Waterous model CXK with a rated capacity of 1250 GPM. The pump shall meet NFPA 1901 requirements.

The pump shall be certified to meet the following deliveries:

- 1250 GPM @ 150 PSI
- 1250 GPM @ 165 PSI
- 875 GPM @ 200 PSI
- 625 GPM @ 250 PSI

LEFT SIDE -- 6" UNGATED INTAKE

One (1) 6" ungated suction intake shall be installed on the left side pump panel to supply the fire pump from an external water supply. The threads shall be 6" NST. The intake shall be provided with a removable screen.

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

RIGHT SIDE -- 6" UNGATED INTAKE

One (1) 6" ungated suction intake shall be installed on the right side pump panel to supply the fire pump from an external water supply. The intake shall be provided with a removable screen.

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

FIRE PUMP MECHANICAL SHAFT SEAL

The Waterous fire pump shall be equipped with self-adjusting, maintenance free, 'mechanical shaft seal' which is designed to be functional in the unlikely event of a seal failure.

IMPELLER HUBS

The Waterous fire pump impeller hubs shall be standard bronze type.

FIRE PUMP ANODE SYSTEM

The Waterous fire pump plumbing system shall be provided with an anode system to reduce corrosion within the piping. The anode system shall consist of replaceable zinc intake screens installed in the suction barrels and bolt-in or screw-in type replaceable anodes that are easily replaced. These items are designed to sacrifice the zinc element to galvanic corrosion. Without this protection, galvanic corrosion may damage the iron pump body and fittings.

PTO PUMP SHIFT SPECIFICATIONS -- PUMP AND ROLL

An electric powered PTO pump shift shall be installed in the cab driver's area where not subject to accidental engagement. The pump shift system shall permit "pump and roll" operations, as well as stationary pumping operations.

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The following indicator lights shall be included with pump shift.

1. A green indicator light, labeled "PUMP ENGAGED" shall indicate pump shift has successfully been completed.
2. A green indicator light, labeled "OK TO PUMP" shall indicate the chassis transmission is in proper gear and parking brake is engaged.
3. Pump shift and interlocks shall comply with applicable sections of the NFPA standards.
4. The pump shift shall have an instruction label and nameplate to indicate proper pump shift instructions.

PRIMER – AUTOMATIC

An automatic fire pump priming system shall be provided and installed. The system shall be oil-less type and environmentally safe. Once engaged, the system shall be fully automatic and not require any action from the pump operator/engineer when pump draft is lost. This feature provides an additional safety margin by maintaining pump flow from the available water source automatically during drafting operations. When air is introduced during a drafting operation from conditions such as whirlpools or turbulence from porta-tank refill operations, the priming system shall automatically engage to remove the air and stabilize water flow and pump pressure. For additional safety, the entire system shall operate at less than 70dBA of ambient noise.

The priming system shall engage automatically whenever the pump discharge falls below five (5) psi and shall remain engaged until a pump prime has been achieved. The priming system shall automatically disengage when a positive pump discharge pressure has been established. The electrical current draw from the chassis batteries shall not exceed four (4) amps at any given time of operation and allow for unlimited run time without causing an overheat condition for of any of the system components.

A single engagement switch shall be provided on the pump control panel that will allow the operator to engage the automatic pump priming system. There shall be a light provided on the pump control panel to indicate when the system is engaged. The pump shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds with the pump dry, through 20 feet of suction hose of appropriate size. The priming system shall comply to applicable sections of NFPA standards.

PRESSURE GOVERNOR AND ENGINE-PUMP MONITORING

One (1) Fire Research InControl series TGA300 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high

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- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

The program features shall be accessed via push buttons located on the front of the control panel. There shall be an USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

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PUMP ANODES

There shall be sacrificial, zinc anodes in the pump steamer ports which shall protect the pump and piping from electrolysis. These anodes shall also act as screens.

PUMP PLUMBING SYSTEM

The fire pump plumbing system shall be of rigid stainless steel pipe or flexible piping with stainless steel fittings. Mechanical grooved couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service. Flexible hose couplings shall be threaded stainless steel or mechanical grooved coupling connections.

The fire pump and plumbing shall be hydrostatically tested in compliance to applicable sections of NFPA standards. The test results shall be included in the delivery documentation.

FIRE PUMP MASTER DRAIN

The fire pump plumbing system and fire pump shall be piped to a single push-pull type master pump drain assembly.

ADDITIONAL LOW POINT DRAINS

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

STAINLESS STEEL INTAKE MANIFOLD

The suction manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The suction manifold assembly shall have radiused sweep elbows to minimize water turbulence into the suction volute. The suction manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The stainless steel manifold assembly shall have a ten (10) year warranty.

STAINLESS STEEL DISCHARGE MANIFOLD

The discharge manifold assembly shall be fabricated with minimum of Schedule #10 Type 304 stainless steel. All threaded fittings shall be a minimum of Schedule #40 stainless steel. The discharge manifold assembly shall have radiused sweep elbows to minimize water turbulence. The manifold shall be welded and pressure tested prior to installation. The stainless steel manifold inlet shall be attached to the pump discharge and have additional brackets as required to support the discharge manifold, valves and related components.

The stainless steel manifold assembly shall have a ten (10) year warranty.

FIRE PUMP & PLUMBING SYSTEM PAINTING

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The fire pump and plumbing system shall be painted by the fire apparatus manufacturer. The fire pump and the plumbing shall be painted metallic silver.

HOSE THREADS

The hose threads shall be National Standard Thread (NST) on all base threads on the apparatus intakes and discharges.

WATER TANK TO PUMP LINE

One (1) 3" water tank to fire pump line shall be provided with a full flow quarter turn ball valve, 3" 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 applicable requirements of NFPA standards.

REMOTE TANK TO PUMP CONTROL SWITCH

The location of the auxiliary controller shall be in the chassis's switch panel for the operation of the tank to pump supply line.

The specified valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball.

The Akron valve shall be equipped with a KZCO KZ Valve Model EH-5 12 volt electric actuator. The valve control shall be push button or rocker type switch with indicator light provided. When the valve is open, the indicator light shall illuminate. When the valve is closed the indicator light shall be off. The valve control switch shall be labeled appropriately.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

FIRE PUMP TO WATER TANK FILL LINE

One (1) 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. The valve control handle shall have a nameplate located near the valve control.

The specified valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

The specified intake valve shall be equipped with one (1) manually operated swing type manual control located adjacent the intake. The valve shall be equipped with a color coded engraved type name plate.

MIDSHIP FIRE PUMP DRIVESHAFTS AND INSTALLATION

The midship PTO fire pump shall be installed and shall include installation of the fire pump, modification and/or fabrication of new drivelines and all pump-mounting brackets. The PTO drive shaft(s) shall be spin balanced prior to final installation.

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INTAKE RELIEF/DUMP VALVE

One (1) TFT A18 series, 2-1/2" intake relief/dump valve preset at 125 psi shall be permanently installed on the suction side of the fire pump. The valve shall have an adjustment range of 75 psi to 250 psi, and shall be designed to automatically self-restore to a non-relieving position when excessive pressure is no longer present.

Discharge side of the intake relief valve shall be plumbed away from the pump operator.

OVERHEAT PROTECTION MANAGER

The Waterous fire pump shall be equipped with an overheat protection manager which monitors the temperature of the water inside the pump and relieves water when the temperature inside the pump exceeds 140 degrees Fahrenheit.

The Waterous Model #OPM shall also have an warning light on the pump panel to provide additional protection in the event the temperature inside the pump continues to rise with the overheat protection valve open. The warning light and test button shall be mounted to a heavy polished casting that is mounted to the pump operator's panel.

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. The unit shall be installed by the chassis manufacturer and connected to the plumbing system by the fire apparatus manufacturer.

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

UNDERWRITERS LABORATORIES FIRE PUMP TEST

The pump shall undergo an Underwriters Laboratories Incorporated test per applicable sections of NFPA standards, prior to delivery of the completed apparatus.

The UL acceptance certificate shall be furnished with the apparatus on delivery.

FIRE PUMP TEST LABEL

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a

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pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards. Pump shall be free from objectionable pulsation and vibration.

If applicable, the fire pump shall be tested and rated as follows:

- 100% of rated capacity at 150 pounds net pressure.
- 70% of rated capacity at 200 pounds net pressure.
- 50% of rated capacity at 250 pounds net pressure.
- 100% or rated capacity at 165 pounds net pressure.

LEFT SIDE -- 2-1/2" GATED INTAKE

One (1) 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 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a 3/4" drain and bleeder valve. A nameplate label and removable screen shall be installed.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The specified intake valve shall be equipped with one (1) manually operated swing type manual control located adjacent the intake. The valve shall be equipped with a color coded engraved type name plate.

RIGHT SIDE -- 2-1/2" GATED INTAKE

One (1) 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 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a 3/4" drain and bleeder valve. A nameplate and removable screen shall be installed.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The specified intake valve shall be equipped with one (1) manually operated swing type manual control located adjacent the intake. The valve shall be equipped with a color coded engraved type name plate.

FRONT BUMPER -- 1-1/2" CROSSLAY DISCHARGES

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Two (2) 1-3/4" front bumper crosslays installed at the bumper deck area. The discharges shall be supplied by 2" quarter turn full flow ball valves at the pump panel. The discharges shall terminate with a swivel with 2" NPT female x 1-1/2" male NST hose threads. The swivel shall be mounted in the base of hose bed and plumbing shall not hang below the bumper level.

The plumbing shall be high pressure flexible hose with abrasion resistant support mountings. Auxiliary low point drains shall be provided on the discharge lines.

Each crosslay hosebed shall be constructed of smooth aluminum with a minimum capacity of 200 feet of fire department supplied 1-3/4" diameter double jacket hose and nozzle.

The hosebed grating shall be equipped with drain holes. A full width removable aluminum hosebed partition shall be installed in the center of the bed.

FRONT BUMPER COMPARTMENT

One (1) recessed full width compartment constructed from smooth aluminum shall be installed in the front bumper extension. Water drain holes shall be drilled in the bottom.

COMPARTMENT MATTING

One (1) bumper compartment floor shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking units, 12 x 12 square by 3/4" thick. This material shall be resistant to temperature, ultra-violet radiation, mechanical impacts, chemical actions and corrosion free.

BUMPER COMPARTMENT DOOR

The front bumper compartment shall be equipped with a raised aluminum treadplate door for the full width of the compartment.

One (1) 27" long Whelen Fluorent™ Plus Model F27PC LED light(s) shall be installed to illuminate the front bumper compartment(s) and contain two (2) LEDs per inch producing approximately 270 lumens. The light shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The light shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The light shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The light shall activate automatically when the compartment door is opened. The light switch shall activate the "Do Not Move Apparatus" warning light in the cab indicating that the bumper compartment door is not secure.

A Class 1 automatic type 3/4" bleeder valve shall be installed on discharges larger than 1-1/2" in size.

The specified valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control.

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The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

LEFT SIDE PUMP PANEL -- 2-1/2" DISCHARGE

Two (2) 2-1/2" discharge shall be installed on the left side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

Two (2) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

Two (2) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE PUMP PANEL -- 2-1/2" DISCHARGE

Two (2) 2-1/2" discharge shall be installed on the right side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

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A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

Two (2) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

Two (2) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

REAR LEFT SIDE -- 2-1/2" DISCHARGE

One (1) 2-1/2" discharge shall be installed on the left side rear panel of the apparatus body and shall be controlled by a quarter turn ball valve on the pump panel. The discharge shall have 2-1/2" NPT x 2-1/2" NST male hose threads. The outlet shall be equipped with an engraved nameplate label shall be installed adjacent the valve control handle.

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

One (1) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

One (1) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate

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valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

REAR RIGHT SIDE -- 2-1/2" DISCHARGE

One (1) 2-1/2" discharge shall be installed on the right side rear panel of the apparatus body and shall be controlled by a quarter turn ball valve on the pump panel. The discharge shall have 2-1/2" NPT x 2-1/2" NST male hose threads. The outlet shall be equipped with an engraved nameplate label shall be installed adjacent the valve control handle.

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

One (1) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

One (1) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

FRONT BUMPER MONITOR DISCHARGE

One (1) 2" discharge shall be piped to the front center bumper area with 2" NPT male threads. The quarter turn ball valve shall be controlled in the chassis cab. The monitor shall be supplied by a flexible high pressure hose mounted with adequate support brackets and abrasion resistant mountings.

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Low point drains shall be installed where necessary. A color coded nameplate label shall be provided.

A Class 1 automatic type 3/4" bleeder valve shall be installed on discharges larger than 1-1/2" in size.

ELECTRICALLY REMOTE CONTROLLED MONITOR

One (1) TFT Model Y2-E84A bumper monitor shall be provided. The lightweight monitor shall have a vaned waterway. The monitor shall be equipped with a 12 volt electric motor. The monitor is designed to mount on a front bumper of an apparatus.

The monitor shall have a 2" NPT female inlet with a 1-1/2" NST male outlet. The unit shall be painted red urethane enamel with hard anodized trim.

One (1) TFT Y4E-JS joystick control for front monitor shall be installed.

REMOTE ELECTRIC NOZZLE TIP

Task Force Tips Ultimatic 125, model # B-TOS-ERP adjustable nozzle with electrically operated pattern control shall be provided. The nozzle design shall allow for straight stream through dense wide fog patterns and be able to be flushed without shutting down.

The electric drive unit shall develop over 400 pounds of torque, be enclosed in a waterproof cast aluminum housing and include a manual override device in the event the power source fails. The unit shall be compatible with 12 or 24 volt power systems and require no more than a 3 amp power draw and include a 6" connection cable with plug.

Nozzle stream shaper actuator shall have position encoder for smooth transition between straight stream and fog pattern with fine stream adjustment. Nozzle stream shaper shall stop and pause at full fog position. A second electrical actuation of the stream shaper shall move the shaper to the flush position for removing debris from the nozzle.

For corrosion resistance and durability the nozzle shall be constructed from hardcoat anodized aluminum alloy, a protective rubber bumper with fog teeth, laser engraved serial number, reflective labeling and five year warranty.

The nozzle shall have a 1-1/2" female NH swivel rocker lug coupling and a user adjustable flow range of 15-120 GPM at 100 PSI. A waterproof six-pin electrical connection for use with TFT remote control monitors shall be included. The nozzle shall be designed to accept the TFT FJ-U or FJ-UMX FoamJet low expansion air aspirating attachments.

One (1) 2-1/2" diameter discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located in the chassis cab.

3" MONITOR DISCHARGE

One (1) 3" discharge shall be piped to the area over the pump enclosure with 3" NPT male

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threads provided. The pipe shall be equipped with Victaulic couplings (if necessary) and shall be properly secured to prevent movement when a monitor or deck gun is attached. The quarter turn ball valve shall be controlled on pump panel.

A color coded nameplate label shall be provided adjacent the valve control handle.

Note: Exact outlet placement will be determined by the generator and cord reel locations.

A 3/4" quarter turn bleeder valves shall be installed.

MONITOR

One (1) Task Force Tips Crossfire model # XFC-32 portable lightweight monitor package consisting of monitor top, Master Stream 1250 series nozzle, and base shall be supplied.

Note: Installation to include an XXF-APL TFT mounting adapter, installed.

The package shall be configured as follows:

PORTABLE DECK GUN MONITOR TOP

Task Force Tips Crossfire, model # XFT-NJ portable monitor shall be provided. This top only portion with quick release swivel joint shall be designed for use on truck mounted risers and TFT Safe-Tak or Stow-A-Way 800 series portable bases. The monitor shall include safety devices that include a locking button which locks the quick release lever when monitor is pressurized, and a 1/4 turn rotational lever lock that secures the horizontal rotation and provides a visual indication that the monitor rotation is locked.

The monitor shall have a 3-1/4" waterway for delivery of up to 1250 GPM with low friction loss. Vertical elevation shall be controlled through use of a handwheel controlled stainless steel worm gear which allows full travel to the safety stop point of 35 degrees above horizontal with seven rotations of the wheel. When positioned on a truck mounted riser the monitor shall be able to be used below the 35 degree stop point through release of the spring loaded safety pin.

An automatic drain to remove remaining water and avoid freezing shall be included. Integral stainless steel stream straightener and pressure gauge shall be included. The monitor shall be configured with a Crossfire inlet and 2-1/2" male NH outlet.

MONITOR STORAGE BRACKET

Task Force Tips model # XF-B storage bracket and mounting screws shall be supplied. The bracket shall be constructed from stainless steel include a quick release retention strap and be designed for horizontal or vertical installation. The bracket is designed for storage of the Task Force Tips Crossfire SAFE-TAK and STOWAWAY 800 series portable monitor base with or without monitor top attached.

MASTER STREAM NOZZLE

Task Force Tips Master Stream 1250, # M-R1250S-NJ automatic master stream nozzle shall be provided. The nozzle shall be designed for use on monitors, ladder pipes, deluge guns and aerial

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platforms. For corrosion resistance the nozzle shall be constructed for lightweight hardcoat anodized aluminum.

The nozzle shall have a flow capability of 150 to 1250 GPM at a constant pressure rating of 100 PSI. A UV resistant rubber bumper with integral teeth designed to produce a finger free fog pattern shall be included. A halo ring shall be included to assist with stream shape control. The nozzle shall be suitable for foam solution application and designed to accept the Task Force Tips FJ-LX-M low expansion air aspirating attachment. The nozzle shall be configured with a 2-1/2" female NH swivel rocker lug coupling.

SAFE-TAK PORTABLE MONITOR BASE

Task Force Tips Safe-Tak 1250, model # XFH-2NJ portable monitor base shall be provided. The monitor shall include a Safe-Tak, spring loaded butterfly valve designed to rapidly reduce the water flow by 90 percent in the event that contact with the ground is lost. The device shall include an integral carrying handle, four folding stainless steel legs with replaceable tungsten carbide spikes and an anchoring strap (attached to a protective cap) designed to be stored inside the waterway. The butterfly valve shall have a reset handle located near the inlet to allow the water flow to be reestablished once the base is properly stabilized.

The base shall be constructed from hardcoat anodized aluminum and have a red powder coat interior and exterior finish. The inlet shall be configured with two (2) 2-1/2" female NH swivel rocker lug couplings with two-way clapper valve.

The specified valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball. One (1) Akron valve equipped with a manually operated pull rod, with quarter turn locking feature and a manual slow close device shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

ELECTRIC REWIND HOSE REEL

One (1) Hannay painted steel hose reel with leak proof ball bearing swing joint, adjustable friction brake, electric rewind shall be installed. The reel shall be plumbed with wire reinforced, high-pressure hose coupled. The reel shall be bolted to a mounting system for easy service or removal.

The hose reel is to be mounted in right side cab step compartment area.

The hose reel shall be installed within an aluminum tread plate enclosure for protection against cold weather. Access to the hose and nozzle shall be through a hinged door.

A push button hose reel rewind switch shall be installed to control the electric rewind hose reel. The exact location shall be determined at construction.

One (1) 1" discharge shall be provided and piped from the fire pump to the hose reel with flexible high pressure hose. The quarter turn ball valve shall be controlled on pump panel. A

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color coded engraved nameplate label shall be provided near the valve control handle.

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

The specified hose reel shall be piped to the normal pressure side of the fire pump.

One (1) Akron 8000 Series one-inch (1") valve with a stainless ball shall be supplied.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

100' foot length(s) of 1" water hose with pin lug couplings and 800 PSI working pressure shall be provided and mounted on the specified hose reel.

One (1) Task Force Tips Ultimatic 125, model #B-BGH automatic nozzle with shutoff shall be provided. The nozzle design shall allow for straight stream through dense wide fog patterns and be able to be flushed without shutting down. For corrosion resistance and durability the nozzle shall be constructed from hardcoat anodized aluminum alloy, have a six (6) position detent flow control stainless steel slide valve, a protective rubber bumper with fog teeth, stainless steel inlet debris screen, laser engraved serial number, reflective labeling and five year warranty. An integral pistol grip handle shall be positioned directly below the valve handle.

The nozzle shall have a 1" female NH inlet, which allows the nozzle to swivel when tightened, a flow range of 10-125 GPM at 100 PSI and be designed to accept the Task Force Tips FJ-U low expansion or FJ-UMX FoamJet multi expansion foam attachments.

The specified booster reel nozzle shall be mounted adjacent the hose reel area in secure clip or clamp type mountings.

One (1) stainless steel four sided captive type roller assembly shall be provided. The location of the captive rollers shall be determined.

BOOSTER REEL AIR BLOWOUT

One (1) air blow out shall be provided for the booster reel. The air supply must be supplied from the chassis air system and be connected to a quarter turn valve located on the pump operators panel.

HOSE REEL PAINTING

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The hose reel(s) shall be painted silver grey.

FOAM PRO FOAM SYSTEM

One (1) FoamPro part number S105-2001 electronic foam proportioning system shall be provided. The system shall be capable of using both Class A and most Class B foam concentrates. The foam proportioning operation shall be designed for direct measurement of water flows, and shall remain consistent within the specified flows and pressures. The system shall be capable of accurately delivering foam solution as required by applicable sections of the NFPA standards.

The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. There shall be a microprocessor incorporated within the electronic controls that shall receive input from the system's flowmeter, while also monitoring the foam concentrate pump output. The microprocessor shall compare the values to ensure that the desired amount of foam concentrate is injected onto the discharge side of the fire pump.

Paddlewheel-type flowmeter(s) shall be installed in the discharges specified to be "foam capable". When the use of more than one (1) flowmeter is required, an electronic interface module will be provided to total these flows and send the flow total to the microprocessor in the computer control module.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 3%, in 0.1% increments
- Show current flow-per-minute of water
- Show total volume of water discharged during and after foam operations are completed
- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a "low concentrate" warning when the foam concentrate tank (s) become low
- Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) become empty

A 12 volt electric motor driven positive displacement foam concentrate pump shall be provided and installed in an accessible location. The pump capacity range shall be 0.1 to 2.6 GPM (9.5L/min) at 150 PSI with a maximum operating pressure up to 400 PSI (27.6 BAR). The system shall draw a maximum of 40 amps at 12 volts. An electronic driver for the pump motor shall be mounted to the base of the pump and shall receive signals from the computer control display, and regulate the 1/2 horsepower (.40 Kw) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate, preset by the pump operator is injected into the water stream.

A full flow check valve shall be provided to prevent foam contamination of the fire pump and water tank or water contamination of the foam tank.

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Components of the complete proportioning system as described above shall include:

- Operator control and display
- Paddlewheel flowmeter(s)
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam injection check valve
- Main waterway check valve

The foam system shall be installed and calibrated to manufacturer's requirements. In addition the system shall be tested and certified by the apparatus manufacturer to meet applicable NFPA standards.

The foam system design shall be tested and pass environmental testing in accordance to SAE standards. The system shall be third party tested to certify compliance with RFI/EMI emissions per MIL-STD-416E.

An installation and operation manual shall be provided for the unit. The system shall have a one (1) year limited warranty by the foam system manufacturer.

CONTROL CONNECTION CABLE FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with a twelve (12) foot control cable from the controller to the foam pump assembly.

PUMP PANEL CONTROL FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with pump panel mounted control assembly.

INSTRUCTION AND RATING LABEL -- FOAM SYSTEM

A FoamPro part number 6032-0020 instruction and system rating label shall be provided. The label shall display information for a FoamPro 2001 Series foam system and shall meet applicable sections of the NFPA standards.

SCHEMATIC LABEL -- FOAM SYSTEM

A FoamPro foam system schematic label shall be installed on the pump panel near foam controls. The label shall be a diagram of the FoamPro 2001 foam system layout and shall meet applicable sections of the NFPA standards.

NOTE: Foam to discharge through both crosslays, the front bumper monitor, and the booster reel.

1" FOAM TANK CONTROL -- CLASS A

One (1) Class A foam tank shall be plumbed with 1" valve and corrosion resistant hose from the foam tank to the foam inlet of the foam system. The manually opened valve shall be provided behind the pump panel with a label.

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INTEGRAL CLASS A FOAM TANK -- 20 GALLON

One (1) twenty (20) gallon Class A foam tank shall be installed within the water tank. The non-corrosive foam tank shall meet applicable sections of NFPA standards. The foam concentrate tank shall be provided with sufficient wash partitions so that the maximum dimension perpendicular to the plane of any partition shall not exceed 36 inches. The swash partition(s) shall extend from wall to wall and cover at least 75 percent of the area of the plane of the partition.

The foam concentrate tank shall be provided with a fill tower or expansion compartment having a minimum area of 12 square inches and having a volume of not less than 2 percent of the total tank volume. The fill tower opening shall be protected by a completely sealed air-tight cover. The cover shall be attached to the fill tower by mechanical means. The fill opening shall be designed to incorporate a 1/4 inch removable screen and shall be located so that foam concentrate from a five (5) gallon container can be dumped directly to the bottom of the tank to minimize aeration without the use of funnels or other special devices.

The foam tank 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 pressure/vacuum vent shall not allow atmospheric air to enter the foam tank except during operation or to compensate for thermal fluctuations. The vent shall be protected to prevent foam concentrate from escaping or directly contacting the vent at any time. The vent shall be of sufficient size to prevent tank damage during filling or foam withdrawal.

A color coded label or visible permanent marking that reads "FOAM TANK FILL" shall be placed at or near any foam concentrate tank fills opening. A label shall be placed at or near any foam concentrate tank fill opening that specifies the type of foam concentrate the system is designed to use. Any restrictions on the types of foam concentrate that can be used with the system shall also be stated, and a warning message that reads "WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM."

The foam concentrate tank outlet connection shall be designed and located to prevent aeration of the foam concentrate and shall allow withdrawal of 80 percent of the foam concentrate tank storage capacity under all operating conditions with the vehicle level.

The foam tank(s) shall be fabricated by United Plastic Fabricating.

FOAM TANK DRAIN -- UNDER TANK

The foam tank shall have one (1) 1" gate valve drain provision installed.

FOAM TANK GAUGE

The apparatus shall be equipped with one (1) Class1 "Intelli-Tank" foam tank level gauge and shall be installed on the pump panel. The tank level gauge shall indicate the liquid level on an easy to read LED display and show increments of 1/8 of a tank.

Each tank level gauge system shall include:

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- A pressure transducer mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
- Super bright LED 4-light display with a visual indication at nine accurate levels.

Weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.

REMOTE FOAM ACTIVATION SWITCH AND LIGHT

There shall be a switch and indicator light mounted in the cab to energize the foam pump remotely for pump and roll operations.

FOAM SYSTEM DESIGN AND PERFORMANCE REQUIREMENTS

The proportioning system shall be capable of proportioning foam concentrate in accordance with the foam concentrate manufacturer's recommendations for the type of foam concentrate used in the system over the system's design range of flow and pressures. The foam proportioning system water flow characteristics and the range of proportioning ratio shall be specified as noted herein. The latest foam system shall be in compliance with applicable NFPA standards as it relates to this specified system

Plumbing and Strainer

The foam concentrate supply line shall be non-collapsible. A means shall be provided to prevent water back flow into the foam proportioning system and the foam concentrate storage tank.

A strainer or filter shall be provided on the foam concentrate supply side of the foam proportioner to prevent any debris that might affect the operation of the foam proportioning system from entering the system. The strainer assembly shall consist of a removable straining element, housing, and retainer. The strainer assembly shall allow full flow capacity of the foam supply line.

Flushing

A foam concentrate system flush line shall be provided as required by the foam system manufacturer. A means shall be provided in the flush line to prevent water backflow into the foam concentrate tank or water tank during the flushing operation.

Foam System Controls

The foam proportioning system operating controls shall be located at or near the pump operator's position and shall be clearly identified. Foam proportioning system shall be provided with accessible controls to completely flush the system with water according to the manufacturer's instructions.

Labels and Instructions

An instruction plate shall be provided for the foam proportioning system that include, at a minimum, piping schematic of the system and basic operating instructions. Labels that are marked clearly with the identification and function shall be provided for each control, gauge, and

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indicator related to the foam proportioning system.

A label shall be provided on the pump operator's panel that identifies the type of foam concentrate that the foam proportioning system is designed to use. It shall also state the minimum/maximum foam proportioning rate at the minimum/maximum foam proportioning rated system flow and pressure.

Two (2) copies of an operations and maintenance manual shall be provided. They shall include a complete diagram of the system together with operating instructions and details outlining all recommended maintenance procedures.

Foam System Testing

The accuracy of the foam proportioning system shall be certified by the foam equipment manufacturer and also tested by the installer prior to delivery of the apparatus in compliance to NFPA standards.

SIDE MOUNT PUMP ENCLOSURE

The side mount pump enclosure shall be removable and supported from the chassis frame rails. This enclosure will allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

All pump suction and discharge controls are to be mounted on the driver side pump operator's panel so as to permit operation of the pump from a central location. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards.

The "master" gauges shall be suitably enclosed and mounted on a full pump compartment width "hinged" gauge panel constructed of the same material as the pump operators control panel, allowing access to the backside of all gauges and gauge lines. The individual gauges shall be mounted inline with the control handle or adjacent to the control handle. Panel is to include a stainless steel piano hinge, flush mounted chrome plated trigger latch, and stainless steel cable end stops. Electrical wiring and all gauge lines shall be properly tie wrapped to prevent kinking or cutting of the lines when the panel is opened.

The following controls and equipment as specified in the specifications, shall be provided on the pump panel or within the pump enclosure:

- Primer.
- Pump and plumbing area service lights.
- Pressure control device and throttle control.
- Fire pump and engine instruments.
- Pump intakes and discharge controls.
- Master intake and discharge gauges.
- Tank fill control.
- Tank suction control.
- Water tank level gauge.

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- Pump panel lights

OPEN DUNNAGE COMPARTMENT -- OVER PUMP ENCLOSURE

One (1) open compartment shall be located on the top of the pump module. The compartment will be constructed as large as space permits with removable slip resistance floor material or decking in the base of the compartment.

LEFT SIDE RUNNING BOARD -- SIDE MOUNT PANEL

The left side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

RIGHT SIDE RUNNING BOARD -- SIDE MOUNT PANEL

The right side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

PUMP ENCLOSURE ACCESS DOOR -- RIGHT SIDE UPPER

A pump panel access door shall be provided on the upper right side of the side mount pump enclosure. The access door shall be approximately 18" high and as wide as possible. The door shall be constructed of 14 gauge #304 brushed stainless steel with push button type latches.

PUMP PANELS -- SIDE MOUNT

The pump operator's panel, along with the lower left hand and right hand pump panels shall be constructed of 14 gauge #304 brushed stainless steel and be fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing for easy access to gauges.

LEFT SIDE PUMP PANEL -- BOLTED

The pump panel installed on the left hand side of the pump enclosure shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

HINGED PUMP PANEL -- RIGHT SIDE

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The pump panel installed on the on the right hand side of the pump enclosure shall be hinged with push-button latches.

PUMP COMPARTMENT HEATER SYSTEM

The interior of the pump enclosure shall be equipped with a minimum of 30,000 BTU hot water heater system. The unit shall be piped to the chassis radiator system with standard heater hose. The hose shall be properly clamped and secured in place, and be properly protected from engine exhaust or mechanical damage.

The heater unit shall be equipped with a 12-volt blower fan with control located on the pump operator's panel.

PUMP ENCLOSURE HEAT PAN

A removable casing constructed of galvanized steel, completely enclosing the underside of the pump compartment and heated by the engine exhaust shall be provided. The heat pan assembly shall include individual panels that can be easily removed from there mounting locations. The two outer slide-out panels shall be bolted in place.

BODY AND PUMP HOUSE FLEX JOINT RUBBER GASKET

A flexible rubber gasket shall be installed between the pump compartment and the apparatus body. This gasket will be designed to seal the pump compartment to the apparatus body as tightly as practical. This gasket is necessary for winter operation in extremely cold climates.

LABELS

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

COLOR CODED PUMP PANEL LABELING AND NAMEPLATES

Discharge and intake valve controls shall be color coded in compliance to guidelines of applicable sections of NFPA standards.

Innovative Controls permanent type nameplates and instruction panels shall be installed on the pump panel for safe operation of the pumping equipment and controls.

MIDSHIP PUMP PANEL LIGHTS -- LEFT SIDE

Three (3) Weldon #2631 or equal LED lights with clear lenses shall be installed under an instrument panel light hood on the left side pump panel. The lights shall be controlled by a

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switch located on the operators' instrument panel.

MIDSHIP PUMP PANEL LIGHTS -- RIGHT SIDE

Two (2) Weldon #2631 or equal LED lights with clear lenses shall be installed under an instrument panel light hood on the right side pump panel. The lights shall be controlled by a switch located on the operator's instrument panel.

PUMP PANEL LIGHTS

One (1) pump panel light shall be illuminated at the time the fire pump is engaged into operation. The remaining lights shall be controlled by a switch located on the operator's instrument panel.

MASTER DISCHARGE AND INTAKE GAUGES

Two (2) 4" diameter Noshok discharge pressure and intake gauges (30"-0-600 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

The master gauges shall have clear scratch resistant molded crystals with captive O-ring seals shall be used to ensure distortion free viewing and to seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from -40°F to +160°F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy. A polished chrome-plated brass bezel shall be provided to prevent corrosion and protect the lens and gauge case.

TEST TAPS

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

WATER TANK GAUGE

The apparatus shall be equipped with one (1) Class1 "Intelli-Tank" water tank level gauge system. The tank level gauge shall indicate the liquid level on an easy to read LED display and show increments of 1/8 of a tank.

Each tank level gauge system shall include:

- A pressure transducer mounted on the outside of the tank in an easily accessible area.
- A super bright LED 4-light displays with a visual indication at nine accurate levels.
- Weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.

The primary water tank level gauge shall be installed at the pump panel.

WATER TANK - 1000 GALLON

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The apparatus shall be equipped with a one-thousand (1000) gallon polypropylene water tank. The tank shall be equipped with a four-inch (4") overflow pipe (a six-inch (6") overflow pipe shall be provided if required by dump valve installation).

WATER TANK

The apparatus shall be equipped with a "T" shaped tank.

WATER TANK FILL TOWER

A fill tower measuring approximately 10" x 10" square shall be provided on the water tank up to and including 1500 gallons total capacity.

The apparatus shall be equipped with a polypropylene water tank. The tank body and end bulkheads shall be constructed of .5" thick, polypropylene, nitrogen-welded and tested inside and out. Tank construction shall conform to applicable NFPA standards. The tank shall carry a lifetime warranty.

The transverse and longitudinal .375" thick swash partitions shall be interlocked and welded to each other as well as to the walls of the tank. The partitions shall be designed and equipped with vent holes to permit air and liquid movement between compartments.

The .5" thick cover shall be recessed .375" from the top of the side walls. Hold down dowels shall extend through and be welded to both the covers and the transverse partitions, providing rigidity during fast fill operations. Drilled and tapped holes for lifting eyes shall be provided in the top area of the booster tank.

A combination vent/water fill tower shall be provided at front of the tank. The 0.5" thick polypropylene fill and overflow tower shall be equipped with a hinged lid and a removable polypropylene screen. The overflow tube shall be installed in fill tower and piped with a minimum schedule 40 PVC pipe through the tank.

The water tank sump shall be located in the forward area of the tank. There will be a schedule 40 polypropylene tank suction pipe from the front of the tank to the tank sump. The tank drain and clean out shall be located in the bottom of the tank sump. The sump shall have a minimum 3" threaded outlet on the bottom to be used for a combination clean out and drain.

The pump to tank refill connection shall be a sized to mate with tank fill discharge line. A deflector shield inside the tank will also be provided.

The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1" and a hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside

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perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

A picture frame type cradle mount with a minimum of 2" x 2" x 1/4" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4" by 6" high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank.

Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the tank for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier, offering leak protection in the event of a weld compromise.

The tank shall be equipped with Polychromatic fill towers. The water fill tower shall be blue in color. The foam tank fill towers, if applicable, shall be yellow for foam A and green for foam B and black for any additional foam fill towers.

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

The tank shall be manufactured by United Plastic Fabricating (UPF).

WATER TANK WARRANTY

UNITED PLASTIC FABRICATION INC. Warrants each UPF POLY-TANK IIE Booster/Foam tank to be free from manufacturing defects in material and workmanship for the service life of the vehicle (vehicle must be actively used in fire suppression). The UPF POLY-TANK IIE must be installed in accordance with the United Plastic Fabricating installation manual. Every UPF POLY-TANK IIE is thoroughly inspected and tested for leaks before leaving our facility. Should any problems develop with your UPF POLY-TANK IIE booster/foam tank and will not meet performance criteria during the service life of the vehicle, notify UPF in writing or call our TOLL FREE SERVICE HOT LINE 1-800-USA-POLY. Provide UPF with the serial number and a description of the problem. If the tank problem would

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render the truck out of service, UPF will dispatch a service technician WITHIN 48 HOURS (2 DAYS) to repair the tank. (This time period is for North America only). If the vehicle can remain in service, UPF will dispatch a service technician within a mutually agreed upon time period.

We will repair, or at our option, replace the tank with a new UPF POLY-Tank IIE. UPF will cover customary and reasonable costs to remove and install the UPF POLY-TANK IIE. This warranty will not cover tanks that have been improperly installed, misused or abused, and the serial number must not have, been altered, defaced or removed. UPF will not cover any unauthorized third party repairs or alterations. Any of these actions may void the warranty.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF UNITED PLASTIC FABRICATION, INC.

This warranty contains the entire warranty. It is the sole warranty and price agreements or representation, whether oral or written, are either merged herein or expressly cancelled. UNITED PLASTIC FABRICATION, INC. Neither assumes, nor authorizes any person supposing to act on its behalf, to change, nor assume for it, any warranty or liability concerning its product.

IN NO EVENT WILL UNITED PLASTIC FABRICATION, INC BE LIABLE FOR AN AMOUNT IN EXCESS OF THE PRESENT RETAIL, PURCHASE PRICE PLUS INSTALLATION AND REMOVAL COST OF THE BOOSTER TANK, FOR ANY LOSS OR DAMAGE, WHETHER DIRECT OR INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE ARISING OUT OF FAILURE OF ITS PRODUCT.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow exclusion or limitation of incidental or consequential damage, so the above limitation or exclusion may not apply to you. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

HOSEBED WIDTH

The width of the pumper body hosebed shall be 42".

HOSEBED SINGLE AXLE

The hose bed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized, radiused ribbed top surface. The slats shall be of widths approximately 3/4" high x 6" wide and shall be welded into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose.

The apparatus hose body shall be properly reinforced without the use of angles or structural shapes and free from all projections that might injure the fire hose.

The main apparatus hose body shall run the full length of the apparatus body from behind the

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pump panel area to the rear face of the body.

The upper rear interior of the hose body on the right and left sides shall be overlaid with brushed stainless steel to protect the painted surface from damage by hose couplings.

HOSE BED STORAGE CAPACITY

The hose bed shall be designed to have a storage capacity for a minimum of 55 cubic feet of fire department supplied fire hose.

The hose bed shall be designed to have storage capacity for eight (8) 50-ft lengths of 1.75” Double Jacket fire hose.

The hose bed shall be designed to have storage capacity for twenty four (24) 50-ft lengths of 2.5” Double Jacket fire hose.

ALUMINUM HOSEBED DIVIDER

One (1) adjustable hosebed divider constructed of .250" aluminum shall be installed on the apparatus.

VINYL HOSEBED COVER

The apparatus shall be equipped with a vinyl hosebed cover with a weighted rear flap.

The cover, approximately 48” wide, shall be secured utilizing a Velcro fastening system at the front and sides of the hosebed body.

HOSEBED RISERS

Hosebed risers shall be provided and installed at the front and along each side of the main hosebed for added depth to meet the hose storage requirement. Risers shall form the right and left side vertical hosebed sides. Hosebed risers shall be constructed of the same material as the body and painted to match body color.

MODULAR BODY CONSTRUCTION

MODULAR BODY

The apparatus body shall be designed and built using a computer aided drafting and three dimensional modeling program. This engineering program shall have finite element analysis capability, so the design can be studied and stress points identified. This will allow for a total design review to ensure the strongest and most durable body possible. The use of this engineering system will ensure accuracy and repeatability for service parts in the event of accidental damage. The body components shall be fabricated using CNC equipment to cut and bend the individual body parts.

BODY WIDTH

The overall width of the pumper body shall not exceed 98".

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COMPARTMENT DEPTH

The side compartments on the pumper body shall have the maximum available height and depth dimensions. These dimensions shall remain consistent for the full height and depth of the compartment. The compartment shall be 28" deep.

1/8" ALUMINUM BODY

The compartment modules shall be fabricated using .125 5052H32 aluminum sheets. The individual compartment pieces shall be cut using a CNC high definition plasma or large cutting equipment. The pieces shall incorporate a "notch and tab" design. This design will ensure that all parts fit accurately. These compartment modules shall bolt to the subframe creating a completely independent modular body.

COMPARTMENT TOPS

The compartment top shall be formed from .190 aluminum treadplate, meeting NFPA slip resistant standards and shall extend down the side 5-inches minimum.

SUB-FRAME

The apparatus shall be designed using a structural subframe, designed as an independent assembly, separate of the chassis frame. This will allow for a totally modular body, capable of being remounted to a different chassis if the need arises. Designs which do not use a modular subframe assembly will not be allowed.

This subframe shall be designed using heavy duty 7 gauge steel and 5/8" steel plates to form a subframe capable of carrying the loads designated by the Fire Department. The subframe shall be designed to carry a minimum of 500 lbs per compartment, distributed.

The subframe shall be assembled with "Huck" bolts to ensure maximum tightening and clamping force at all joints. It shall be bolted securely at the rear with a minimum of four (4) 5/8" grade 8 bolts on each side and mounted at the front using four (4) spring loaded assemblies and lateral guides to allow for maximum twist, yet keeping the body aligned on the chassis.

The subframe shall consist of formed 7 gauge cross members, spaced no more than 16-inches apart, to adequately support the water tank. There shall be 1/4" thick hard rubber channel pads covering the cross members, which will help prevent tank damage due to road shock. The tank shall be held in place by four (4) formed angle brackets, at least 3" high. These four brackets will prevent fore and aft and lateral movement of the tank. These cross members shall be attached to two (2) longitudinal 3x3 angles. These angles shall be at the ends of the cross members to allow the compartment to be attached and supported by these pieces. There shall be at least two down and out compartment supports under each compartment, ahead of and behind the rear wheels.

SUB-FRAME

After fabrication the entire subframe assembly shall be hot dip galvanized to prevent corrosion.

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The hot dip galvanized subframe shall have a lifetime warranty against failure due to corrosion.

SINGLE AXLE WHEEL WELL LINER

For ease of accessibility and maintenance, wheel well module shall be painted smooth aluminum plate.

To fully protect the wheel well area from road debris and to aid in cleaning, a full depth (minimum of 25") radius wheel well liner shall be provided. Wheel well liner shall be smooth aluminum to prevent corrosion.

FENDERETTES

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with concealed stainless steel fasteners.

ROLL UP DOOR

The apparatus body shall be equipped with roll up door(s).

ROLL UP DOOR CONSTRUCTION

The roll up door(s) shall be fabricated from aluminum extrusions and be manufactured and assembled in the United States.

The door slats shall be double-wall extrusions with dimensions of 1.366" high x .315" thick. The exterior surface shall be flat and the interior surface concave to deflect loose equipment to prevent the door from jamming. Each slat shall have interlocking end shoes to prevent the slat from moving side to side resulting in binding of the door. Each slat shall be separated by a co-extruded PVC and rubber inner seal to prevent metal to metal contact and minimize dirt and moisture from entering the compartment. The inner seal shall not be visible from the exterior to maintain a clean appearance of door. The slats shall have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects.

The track shall be a one (1) piece aluminum assembly that has an attaching flange and finishing flange incorporated into the design that facilitates installation and provides a finished look to the door without additional trim or caulking. A low profile side seal shall be utilized to maximize usable compartment space.

A drip rail designed to prevent water from dripping into the compartment shall be provided. The drip rail shall have a built in replaceable non-contacting seal to eliminate scratching of the surface of the door.

Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door and have "V" shaped double seal to prevent water and debris from entering the compartment. The door latch system shall be a full width one (1) piece lift bar that enables the user to operate with one hand.

The roll mechanism shall have a clip system that connects the curtain slats to the operator drum

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to allow for easy tension adjustment without tools. A four (4) inch diameter counterbalanced operator drum to shall be incorporated to assist in lifting the door.

ROLL UP DOOR

ROM Tall Bottom Rail adds an additional 1-1/2" clearance between the liftbar and the threshold. The same clean ROM bottom rail look is preserved while providing adequate hand clearance while wearing gloves.

EZ-PULL DOWN STRAPS

Elastic nylon straps shall be provided and installed on each roll up door . The straps shall be secured to the side wall of the interior compartment in a way that will allow the EZ-Pull strap to contract automatically and tuck inside the compartment when closed to prevent the strap from dangling and hindering closing of the door. When the door is the open position, the straps shall be installed so that they are fully extended as to not interfere with removing items from the compartment. For the ease of locating, the straps shall be bright orange in color.

Note: Straps to be utilized on all three passenger side compartment doors.

BODY CONFIGURATION

The modular aluminum apparatus body shall be 156" long

LEFT SIDE COMPARTMENTS

COMPARTMENT HEIGHT

The body compartments shall be 30" in height.

FORWARD COMPARTMENT

There shall be one (1) low compartment module located ahead of the rear wheels. The compartment module shall be equipped with a natural finish roll up door and shall be 38" wide.

The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

Two (2) 18" long OnScene Solutions Value Line Night Stik LED lights shall be installed, one on each side of the door opening. The lights shall contain 12 LEDs per light producing approximately 60 lumens (six LEDs and 30 lumens every 9"). The light stick shall be rated at 100,000 hours of service and shall be provided with a 5 year free replacement warranty. The light shall have a 5/8" LEXAN™ polycarbonate tube enclosure for severe duty applications.

The light stick shall be waterproof and be connectible via a jumper wire to add additional lights

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in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

OVERWHEEL COMPARTMENT

There shall be no compartment located above the rear wheels.

REAR COMPARTMENT

There shall be one (1) low compartment module located behind the rear wheels. The compartment module shall be equipped with a natural finish roll up door and shall be 50" wide.

An easy to reach panel with hinged door shall be provided to access the wiring components in the rear compartment.

The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

Two (2) 18" long OnScene Solutions Value Line Night Stik LED lights shall be installed, one on each side of the door opening. The lights shall contain 12 LEDs per light producing approximately 60 lumens (six LEDs and 30 lumens every 9"). The light stick shall be rated at 100,000 hours of service and shall be provided with a 5 year free replacement warranty. The light shall have a 5/8" LEXAN™ polycarbonate tube enclosure for severe duty applications.

The light stick shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT SIDE COMPARTMENTS

COMPARTMENT HEIGHT

The body compartments shall be 72" in height.

FORWARD COMPARTMENT

There shall be one (1) full height compartment module located ahead of the rear wheels. The compartment module shall be equipped with a full height natural finish roll up door and shall be 38" wide.

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The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with four (4) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

500# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in the compartment. The tray with telescoping slides and cam follower bearings shall be rated to a maximum load of 500 lbs. The tray shall have a gas shock to hold the tray extended or closed. There shall be a lock to prevent movement, when the tray is in the closed position.

The tray shall be formed of .188" smooth aluminum plate, fabricated with two (2) inch sides. Reflective material measuring 1" x 6" shall be installed on the each front corner both on the face and side of tray for firefighter safety.

Note: Tray to be floor mounted.

COMPARTMENT LIGHTS

Two (2) ROM vertically mounted roll-up compartment LED V3 door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by a magnetic "On-Off" switch located on each compartment door.

OVERWHEEL COMPARTMENT

There shall be one (1) compartment module above the rear wheels. The compartment module shall be equipped with a natural finish roll up door and shall be 68" wide.

The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

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ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with four (4) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

COMPARTMENT LIGHTS

Two (2) ROM vertically mounted roll-up compartment LED V3 door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build-up.

The compartment light will be controlled by a magnetic "On-Off" switch located on each compartment door.

REAR COMPARTMENT

There shall be one (1) full height compartment module located behind the rear wheels. The compartment module shall be equipped with a full height natural finish roll up door and shall be 50" wide.

An easy to reach panel with hinged door shall be provided to access the wiring components in the rear compartment.

The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with four (4) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

500# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in the compartment. The tray with telescoping slides and cam follower bearings shall be rated to a maximum load of 500 lbs. The tray shall have a gas shock to hold the tray extended or closed. There shall be a lock to prevent movement, when the tray is in the closed position.

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The tray shall be formed of .188" smooth aluminum plate, fabricated with two (2) inch sides. Reflective material measuring 1" x 6" shall be installed on the each front corner both on the face and side of tray for firefighter safety.

Note: Tray to be floor mounted.

COMPARTMENT LIGHTS

Two (2) ROM vertically mounted roll-up compartment LED V3 door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build-up.

The compartment light will be controlled by a magnetic "On-Off" switch located on each compartment door.

REAR CENTER COMPARTMENT

There shall be one (1) full height compartment located at the rear of the apparatus. The compartment shall be 55" high x 24" deep x 42" wide and be equipped with a natural finish roll up door. The compartment shall be partitioned off from the side compartments.

The compartment shall be equipped with the following:

A removable louvered vent shall be provided in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with four (4) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

500# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in the compartment. The tray with telescoping slides and cam follower bearings shall be rated to a maximum load of 500 lbs. The tray shall have a gas shock to hold the tray extended or closed. There shall be a lock to prevent movement, when the tray is in the closed position.

The tray shall be formed of .188" smooth aluminum plate, fabricated with two (2) inch sides.

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Reflective material measuring 1” x 6” shall be installed on the each front corner both on the face and side of tray for firefighter safety.

COMPARTMENT LIGHTS

Two (2) ROM vertically mounted roll-up compartment LED V3 door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build-up.

The compartment light will be controlled by a magnetic "On-Off" switch located on each compartment door.

LADDER MOUNTING SYSTEM

One (1) hydraulic powered end mount ladder mounting system shall be provided. The bracket assembly shall be mounted on the side of the apparatus body and shall comply with all applicable NFPA standards.

LADDER MOUNT LOCATION

The location of the ladder mounting assembly shall be located on the right hand side of the apparatus body.

MOUNTING – LADDER RACK CONTROLS

The controls for the ladder rack shall be mounted on the pump panel, on the same side as the ladder rack.

EXTERIOR FOLDING ATTIC LADDER MOUNTING

An exterior mounting shall be provided for the specified folding attic ladder.

PIKE POLE MOUNTING BRACKET

Two (2) tubes shall be provided for pike pole mounting. The tube shall have a 2” interior diameter and shall be mounted in the suction hose compartment.

HARD SUCTION MOUNTING

Two (2) hard suction hose compartment shall be provided below the upper "T" of the booster tank, on the left side. The design shall allow the hose to be individually removed from the rear of the apparatus. Each hard suction hose compartment shall have a hinged door with push to latch door catch.

The hinged door shall be constructed of smooth material, with chevron striping applied to match the rear of the apparatus body.

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PORTABLE WATER TANK MOUNTING BRACKET

There shall be one (1) fully enclosed folding tank storage carrier provided on the driver's side of the booster tank and above the lower compartments to carry a portable folding tank. The tank carrier shall hold the folding tank in the vertical position for travel, and fold down over the lower body side for loading and unloading. The folding tank carrier shall be fabricated of smooth aluminum painted to match the body side and have polished aluminum treadplate end caps. There shall be a hinged bracket that is bolted to the top of the lower compartments with rubber stops to prevent the folding tank carrier from touching the body side when in the down position. There shall be a reinforcement plate installed on the compartment top where the folding tank carrier is attached. There shall be two heavy-duty clamps provided to hold the tank in the travel position.

Note: Carrier will have capacity for a 2100 gallon folding tank. Department to provide the folding tank.

FOLDING STEP LEFT SIDE FRONT

A folding step of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The step shall be installed on the left side front compartment face.

FOLDING STEP RIGHT SIDE FRONT

A folding step of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The step shall be installed on the right side front compartment face.

HANDRAIL TOP OF BODY SIDES

Two (2) extruded aluminum non-slip handrails, approximately 12" in length, shall be provided and mounted, one (1) each side at the top of the body sides, at the front of the apparatus body.

FRONT BODY PROTECTION PANELS

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Aluminum tread plate overlays and panels shall be installed on the front of the body from the lower edge to the top of the compartment doors.

REAR BODY PROTECTION PANELS

The rear body panels of the body shall be a smooth material, to allow for the proper application and installation of a "Chevron" stripe on the rear.

REAR STEP - 12" BOLT-ON

A 12" deep step surface shall be provided at the rear of the apparatus body, bolted in place and easily removable for replacement or repair. The tailboard shall be constructed of .188" aluminum diamond plate or equal non-slip surface in compliance with NFPA #1901 standards.

The maximum height of the step assembly shall be no more than 24" from the ground when the apparatus is in the loaded condition. A label shall be provided warning personnel that riding on the rear step while the apparatus is in motion is prohibited.

FOLDING STEPS LEFT SIDE REAR

Four (4) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The steps shall be installed on the rear left side of the body.

FOLDING STEPS RIGHT SIDE REAR

Four (4) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The steps shall be installed on the rear right side of the body.

REAR INTERMEDIATE STEP

An intermediate fixed step shall be provided at the rear of the apparatus body, bolted in place and easily removable for replacement or repair. The intermediate step shall be constructed of .188"

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polished aluminum diamond plate or equal non-slip surface in compliance with NFPA #1901 standards and be approximately 8" deep x 48" wide.

HANDRAIL REAR STEP

Two (2) extruded aluminum non-slip handrails, approximately 48" in length, shall be provided and vertically mounted on the rear of the apparatus, one (1) on each side of the body.

HANDRAIL BELOW HOSEBED

One (1) extruded aluminum non-slip handrail, approximately 48" in length, shall be provided and horizontally mounted below the hosebed on the rear of the apparatus.

HANDRAIL TOP OF BODY SIDES

Two (2) extruded aluminum non-slip handrails, approximately 12" in length, shall be provided and mounted, one (1) each side at the top of the body sides, at the rear of the apparatus body.

EXTRUDED ALUMINUM RUB RAILS

Full body length polished aluminum rub rails shall be bolted in place on the lower right and left body sides. The side rub rails shall be a heavy extruded aluminum "C" channel.

WHEEL WELL PROVISIONS LOCATION

The wheel well provisions shall be located on the left side of the apparatus, ahead of the rear wheels.

One (1) bottle storage compartment for four (4) SCBA bottles shall be provided and located in the rear wheel well of the apparatus body.

The storage compartment shall be constructed entirely of aluminum. The door assemblies shall be provided with a gasket between door and body side, bolted in-place and removable for repair or replacement. A painted door shall be provided.

Four (4) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the right side of the apparatus, ahead of the rear wheels.

One (1) bottle storage compartment for four (4) SCBA bottles shall be provided and located in the rear wheel well of the apparatus body.

The storage compartment shall be constructed entirely of aluminum. The door assemblies shall

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be provided with a gasket between door and body side, bolted in-place and removable for repair or replacement. A painted door shall be provided.

Four (4) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

GENERATOR

One (1) 6 KW "SMART POWER" hydraulically powered generator system generator shall be furnished and installed on the apparatus. The system shall be capable of producing 6 KW single phase, 120/240 volts at 60 hertz.

The system shall be capable of supplying full power at engine high idle.

A "HOT SHIFT" PTO and hydraulic pump unit shall be provided and installed. Interconnecting hoses shall be of the size, pressure rating and length recommended by the generator manufacturer.

The tray assembly for the generator unit shall be mounted with the air exhaust properly vented.

The reservoir/filter assembly shall be a high efficiency 3-micron glass filter. The system shall use Dextron 11E or III hydraulic oil.

Data Label

A permanent data label indicating the following information shall be applied:

- Rated voltage
- Phase
- Frequency
- Amperage
- Continuous Watts
- Peak Watts

ELECTRICAL SYSTEM INSTALLATION

The line voltage electrical system shall comply with the applicable NFPA standards and also comply with the applicable sections of the National Electric Code #70 standards. Line voltage carrying equipment downstream of the power source shall be "listed" (where available) and installed in accordance with manufacturers' instructions. The electrical equipment installed shall be suitable for intended use and type locations (wet, dry, or underbody and chassis).

The grounding and bonding shall comply to applicable sections of NFPA standards. The chassis frame rail, body sheet metal, and cab sheet metal shall be properly bonded per NFPA schematic. The bonding copper conductor shall be rated at 115 % of current rating of power source.

Over-Current Protection Panel

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Manually re-settable over current devices shall be installed to protect the line voltage electrical system components. A main over current protection device shall be provided. The device shall be either incorporated in the power source or connected to the power source by a power supply assembly. The size of the main over current protection device shall not exceed 100 percent of the nameplate amperage rating on the power source specification label or the rating of the next larger available size over current protection device where so recommended by the power source manufacturer.

The conductor used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144 inches in length. If over this distance, a separate master disconnect shall be installed at the generator area.

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with NEC. Each over current protection device shall be marked to identify the function of the circuit it protects. The circuit breaker panel and instruments shall be located so that all circuit breakers are readily visible under normal operating conditions. The panel shall be readily visible and located so that there is unimpeded access to the panel board controls.

Hydraulic Components

A hydraulic system filter, fluid level gauge, and fluid temperature gauge shall be provided as integral components within the hydraulic reservoir. The reservoir shall be easily accessible to allow filter changes and fluid level checks. There shall be at least 10 inches of clear space above the reservoir to allow removal of the filter element. Interconnecting hoses and fittings shall meet the generator system manufacturer's recommendations for pressure, size, and type of hose used. Where any hydraulic hose contacts other surfaces, the hose shall be protected from chafing. The hydraulic pump shall be driven by a power take-off mounted to the chassis automatic transmission.

Control Panel

The panel shall include the following:

- Green indicator light to indicate PTO engagement. The light shall be labeled "GENERATOR ENGAGED."
- Red indicator to indicate hydraulic fluid overheating.
- Main circuit breaker panel with "main" breaker and individual line breakers.
- All breakers, outlets, switches, and receptacles shall be labeled per requirements of applicable NFPA standards.
- The generator shall be capable of producing full rated power throughout the entire RPM range of the engine.

Instruction Label

An instruction label indicating essential generator operating instructions, including power-up and power-down sequence shall be permanently attached at or near the operator's panel.

CIRCUIT BREAKER BOX

One (1) circuit breaker box for single phase voltage equipment shall be provided capable of

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holding twelve (12) breakers.

GENERATOR STARTUP

An activation switch for the hydraulic generator shall be installed in the apparatus cab.

GENERATOR MOUNTING LOCATION

The generator shall be installed over the fire pump enclosure.

CIRCUIT BREAKER BOX LOCATION

The circuit breaker box shall be installed in an outside body compartment.

The instrument panel for the generator shall be installed in a side body compartment.

LINE VOLTAGE WIRING INSTALLATION

Line voltage wiring in the apparatus shall be with Type SO or approved cable suitable for mobile applications. The flexible electrical cable shall have 600-volt insulation rated for at least 194 degrees F. All junction boxes shall conform to the National Electric Code and shall be accessible for service.

Electrical cable shall be supported within 6 inches of any junction box and at a minimum of every 24 inches of run. Supports shall be made of corrosion protected metal that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Electrical cable shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be separated by a minimum of 12 inches from exhaust piping or properly shielded and separated from fuel lines by a minimum of 6 inches distance.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

120V ELECTRIC RECEPTACLE -- STRAIGHT BLADE

Two (2) 120-volt 20 amp straight blade, 3-prong duplex receptacle with spring loaded weatherproof cover shall be provided.

One (1) electric receptacle shall be located near the left side wheel well.

One (1) electric receptacle shall be located near the right side wheel well.

240V ELECTRIC RECEPTACLE -- TWIST LOCK

One (1) 240-volt 20 amp twist lock (NEMA L6-20) receptacle with spring loaded weatherproof cover shall be provided.

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The electric receptacle shall be located inside the rear center body compartment for use with the department supplied and department installed hydraulic tool power unit. The department is responsible for verifying outlet accuracy.

POWER DISTRIBUTION STRIP

One (1) 15 amp power distribution strip with six (6) receptacles shall be provided. The strip shall be powered by the chassis shore line power.

Note: Outlet strip to be located at the rear of the center console.

ELECTRIC CABLE REEL

One (1) Hannay ECR-1600 series electric cable reel with an electric rewind shall be installed on the vehicle. The reel shall be designed for use with 120 volt, three (3) wire cable. The duty rating of the cable reel shall be for continuous usage. The reel shall be installed so that it is easily accessible for cord access and maintenance. A 12-volt motor controlled by a push button switch located in a convenient position and properly labeled shall perform the electric rewind function.

The installation of the cable reel shall meet applicable sections of the NFPA standards.

Reel Capacity

The reel shall be sized to hold 110 percent of the capacity needed for the specified cable length. The wire size shall be in accordance with the National Electric Code.

Labeling

An information label shall be installed in a location visible adjacent to any permanently connected reel with the following data:

- a) Voltage
 - Phase
 - Current type
 - Current rating
 - Total cable length

Electrical Supply Wiring To Reel

The wiring shall end in a sealed conduit box at the reel with mechanical connectors to allow removal of the reel. Appropriately, sized wire and circuit breakers shall be utilized.

The electric cable reel shall be installed in the right side dunnage area of the pump compartment.

A two hundred foot (200') length of 10/3 black electric cable shall be installed with specified plugs. The cable shall be type SEO-WA with a 20 amp, 120 volt rating.

The electric cable shall be configured so as to be hard wired directly to a junction box.

One (1) ball stop shall be attached to the electric cable to prevent total re-wind and to allow the cable to remain at a reachable position. The ball shall positively attach to the cable and be bright

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orange in color for high visibility.

JUNCTION BOX

One (1) Akron electrical junction box shall be provided. The unit shall have an integral pilot light to indicate electrical current.

The unit shall be equipped with four (4) 120 volt 20 amp NEMA (5-20) straight blade receptacles, each with a hinged, weatherproof cover.

One (1) aluminum storage bracket designed to hold an electric junction box shall be supplied.

The holder shall be mounted in the same compartment as the specified cable reel.

One (1) four-sided nylon roller unit for the electric cable shall be installed on specified reels. The roller unit shall be mounted in the specified location to permit the cable to feed directly off the reel.

TELESCOPIC LED FLOODLIGHT

Two (2) Fire Research Focus model SPA530-K20-ON side mount push up telescopic LED light shall be installed. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees.

The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 3 1/2" offset. Wiring shall extend from the pole bottom with a 4' retractile cord.

The lamphead shall have LEDs that will generate 20,000 Lumens of light. The head will draw 2.0 amps and generate 20,000 lumens. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead and mounting arm shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

The floodlights shall be installed on the pump enclosure on both sides.

The left side quartz floodlight(s) shall be circuit breaker protected. The circuit breaker(s) shall be used as an ON/OFF switch(es) for the floodlight(s). The circuit breaker(s) shall be labeled "LEFT QUARTZ".

The right side quartz floodlight(s) shall be circuit breaker protected. The circuit breaker(s) shall be used as an ON/OFF switch(es) for the floodlight(s). The circuit breaker(s) shall be labeled "RIGHT QUARTZ".

A raised pole hazard light switch for a telescoping pole shall be installed. The magnetic switch shall be mounted in an the lower steady rest bracket. A magnet shall be mounted in the extension pole. The switch contacts shall close when the pole is raised and activate the "Do Not Move Apparatus" light in the cab when the parking brake is disengaged.

BODY PAINT PROCESS

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All bright metal fittings, if unavailable in stainless steel shall be heavily chrome plated. Iron fittings shall be copper plated prior to chrome plating.

All seam shall be caulked both inside and along the exterior edges with a urethane automotive sealant to prevent moisture from entering between any body panel.

The body and all parts shall be thoroughly washed with a grease cutting solvent (PPG DX330) prior to any sanding. After the body has been sanded and the weld marks and minor imperfections are filled and sanded, the body shall be washed again with (PPG DX330) to remove any contaminants on the surface.

The first coating to be applied is a pre-treat self etching primer (PPG DX1787) (.5 to 1.0 dry film build) for maximum adhesion to the body material. The next two to four coats (depending on need) shall be an acrylic urethane primer surfacer (PPG K38). The film build shall be 4-6 mils when dry. The primer surfacer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure maximum gloss of the paint. The last step is the application of at least three coats of PPG Concept acrylic urethane two-component color (single stage). The film build being 2-3 mils dry. The single stage acrylic urethane, when mixed with component (PPG DCX61) catalyst shall provide a UV barrier to prevent fading and chalking.

All products and technicians are certified by PPG every two (2) years.

Note: Body to be painted red to match chassis.

INTERIOR COMPARTMENT FINISH

The interiors of up to six (6) body compartments shall be left a natural finish.

TOUCH-UP PAINT

One (1) two (2) ounce bottle of touch-up paint shall be furnished with the completed truck at final delivery.

SIMULATED GOLD LEAF LETTERING

The lettering shall be applied in simulated gold leaf material, shaded in black and encapsulated in clear Mylar.

A quantity of fifty (50), four (4) inch letters are to be placed on the cab and on the body as directed by fire department.

Note: Exact lettering to be determined - MAX 50 4" characters.

CAB AND BODY STRIPE

A straight Scotchlite reflective stripe, 4" minimum in width, shall be applied horizontally around the cab and body in compliance with applicable NFPA 1901 standards. The purchaser shall specify the color and location of the stripe.

COLOR OF STRIPING MATERIAL

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The color of the 3M brand striping material shall be white.

CHEVRON STRIPING

The entire rear portion of the body shall have 3M reflective red and amber striping installed. The chevron style striping shall be applied at a 45-degree upward angle pointing towards the center upper portion of the rear panel.

REFLECTIVE STRIPE

Reflective striping shall be installed on the interior of each chassis door.

PIKE POLES

All NFPA required pike poles will be supplied and installed by the Customer before the apparatus is placed into service.

DEALER SUPPLIED EQUIPMENT

The following items shall be supplied by the Dealer:

- One (1) 24' two section extension ladder ALP-200-24
- One (1) 14' roof ladder ALP-100-14
- One (1) 10' folding attic ladder ALP-080-10
- Two (2) 6" x 10' PVC suction hoses
- One (1) 6" barrel strainer
- One (1) 6' fiberglass pike pole
- One (1) 10' fiberglass pike pole
- Two (2) spanner/hydrant wrench sets w/ brackets, mounted
- One (1) pick head fiberglass handle axe w/ brackets, mounted
- One (1) flat head fiberglass handle axe w/ brackets, mounted