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# North Richland Hills FY25' Pumper Specifications

## INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to provide a complete apparatus equipped as hereinafter and as specified. With a view to obtaining the best results and the most acceptable apparatus for service in the Department, these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction for all features. The manufacturer shall provide loose equipment only when specified by the customer. The current NFPA (Standard for Automotive Fire Apparatus) at time of contract, unless otherwise specified as requested by the customer in these specifications, shall prevail.

The apparatus must meet all NFPA, DOT, ICC, AE, SAE, UL, TRA, FMVSS and local state Motor Vehicle Requirements.

It is required that the apparatus be manufactured to current NFPA edition standards, all NFPA equipment (LOOSE EQUIPMENT) not specified in the specifications will not be provided by the contractor.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction that have been in business and construction for a minimum of twenty-five (25) years.

The bidder of the apparatus herein specified; shall be wholly owned (100%) and managed by a Company, Corporation, and/or Parent Company that is wholly based, and permanently resides in the United States of America.

The Company, Corporation, and/or Parent Company and all assets belonging to such; shall be wholly owned and managed (100%) by the entities specified above.

The bidder shall state the location of the manufacturing facility where the apparatus is to be built and the location of the parent company if a subsidiary of a manufacturer.

The bidder shall provide satisfactory evidence of their ability to construct the apparatus specified in the bidders manufacturing facilities.

The bidder's representation shall state the length of time representing the manufacturer of specified apparatus.

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

Due to the importance of keeping this vital piece of firefighting apparatus in service with a minimum of downtime, the manufacturer shall maintain a network of service centers with factory-training personnel.

The bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus being furnished under this contract which conform. Computer runoff sheets are not acceptable as "Contractor's Specifications". Item compliance shall be indicated in the "Yes/No" column of each item by all Bidders. Note: Each bidder shall submit their bid in the same sequence as these specifications to allow the department to easily compare.

These specifications shall indicate size, type, model and make of all component parts and equipment.

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## **QUALITY AND WORKMANSHIP**

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

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

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

Welding shall be employed in the assembly of the apparatus in a manner that will not prevent the ready removal of any component part for service or repair, with apparatus bodies of bolt together design not being acceptable.

All steel welding shall follow American Welding Society requirements for AWS D1.1:2012 Structural Welding Code for welding steel structural assemblies. All aluminum welding shall follow American Welding Society requirements for AWS D1.2/D1.2M:2003 Structural Welding Code for any type of structure made from aluminum structural alloys. All sheet metal welding shall follow American Welding Society AWS D9.1M/D9.1:2006 Structural Welding code for Arc/Braze requirements of non-structural materials. All pressure pipe welding shall follow American Society of Mechanical Engineers ASME IX/ ASME B31:2010 requirements to the qualification of procedures in welding and brazing, in accordance with the ASME Boiler and Pressure Vessel Code and the ASME B31 Code for Pressure Piping. Flux core arc welding to use alloy rods, type 7000, American Welding Society AWS standards A5.20-E70T1.

## **DELIVERY**

The bidder shall provide the number of calendar days from the date the bid is awarded to the delivery of the completed unit.

A qualified delivery engineer representing the contractor shall deliver the apparatus and instruct the Fire Department personnel in the proper operation, care and maintenance of the equipment delivered.

To ensure proper break-in of all components while still under warranty, the apparatus shall be delivered under its own power. The unit will remain insured by the apparatus manufacturer until the department accepts the unit.

## **PERFORMANCE TESTS AND REQUIREMENTS**

A road test shall be conducted with the apparatus fully loaded to its estimated in-service weight and shall be capable of the following performance while on dry paved roads that are in good condition and for a continuous run of ten (10) miles or more, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. The successful bidder shall furnish a Weight Certificate showing weights on front axle, rear axles and total weight for the completed apparatus at time of delivery.

- A. The apparatus shall be capable of accelerating to 35 MPH (55 km/hr) from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed RPM of the engine.
- B. The apparatus, fully loaded, shall be capable of obtaining a minimum top speed of 50 MPH (80 km/hr) on a level dry concrete highway with the engine not exceeding its governed RPM (fully loaded).
- C. The service brakes shall be capable of stopping a fully loaded vehicle in 35ft (10.7 m) at 20 mph (32.2 km/hr) on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.
- D. The apparatus, when fully loaded, shall have not less than 25 percent or more than 50 percent of the weight on the

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front axle, and not less than 50 percent nor more than 75 percent on the rear axle.

- E. From a steady pace of 15 mph, the vehicle will accelerate to a true speed of 35 mph within 15 seconds. This will be accomplished without moving gear selector.
- F. The apparatus will be able to maintain a speed of at least 20 mph on any grade up to and including 6 percent.
- G. The contractor shall have the Underwriter's Laboratories, LLC conduct the tests of the apparatus as in accordance with standard practices required by the Underwriter Laboratories, LLC (Guide for the Certification of Fire Department Pumper latest edition). A copy of all tests shall accompany the Apparatus. (For apparatus sold within Canadian ULC S515 latest revision shall prevail).
- H. The contractor shall furnish copies of the Pump Manufacturer's Certification of hydrostatic test, the Engine Manufacturer current certified brake horsepower curve, and the Manufacturer's record of pumper construction details when delivered.
- I. All fluid levels and applicable pressures will be brought to proper levels and noted prior to final delivery.

## **INFORMATION REQUIRED**

The manufacturer shall supply at time of delivery, a complete operation and maintenance manual covering the completed apparatus as delivered.

A Fire Apparatus Safety Guide published by Fire Apparatus Manufacturer's Association shall be provided with the apparatus upon delivery. This manual includes essential safety information for fire fighters, fire chiefs, apparatus mechanics, and fire department safety officers. The guide is applicable to municipal, wildland, and airport firefighting apparatus manufactured on either custom or commercial chassis.

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

The manufacture shall supply the final certification of GVWR and GAWR on a nameplate affixed to the vehicle.

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

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

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

## **LIABILITY**

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

## **GENERAL CONSTRUCTION**

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles, so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the current NFPA, Standard for Automotive Fire Apparatus, documentation at time of contract signing.

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

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

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

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

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

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

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

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

## **EXCEPTIONS TO SPECIFICATIONS**

The following specifications shall be strictly adhered to. Exceptions shall be allowed if they are equal to or superior to that as specified and providing, they are listed and entirely explained on a separate page entitled "Exceptions to Specifications". The exceptions list to refer to specification page number and paragraph.

Proposals taking total exception to specifications or total exception to certain parts of the specifications such as Electrical Systems, Chassis, Body or Pump, will not be accepted.

Prototype units will not be acceptable. Apparatus shall be inspected upon completion for compliance with specifications.

Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.

If the bidder takes an exception, on the exception page, the bidder must state an option price to bring their specifications into full compliance with the Department specifications.

Failure to provide this information shall be cause to reject the proposal as being non-responsive.-

Copied or run off sheets of these specifications shall be unacceptable, and the bid will be rejected no exceptions.

## **WARRANTY**

Warranties applicable to the chassis and body (excluding vendor supplied components {engine, transmission, axles, etc.} which carry their own specific warranties) will be addressed by a single point warranty service provider approved by the manufacturer to perform service as necessary.

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## PURCHASER'S RIGHTS

The Purchaser reserves the right to accept or reject any or all bids as it deemed in their best interests.

## ENGINE AVAILABILITY

If an L9 engine is **NOT** available or cannot be provided for that specific quote or build slot at time of production, the engine will **automatically be upgraded and charged for an X12 (or the X10 engine) with all costs associated with the upgrade being passed on to the end user. No exceptions.**

If a pre-2027 emission engine is **NOT** available at the time of build (starting production on January 1, 2026) the order will **automatically be upgraded and charged for either the 2027 engine compliant Cummins X-10 or X-15, with all associated costs being passed on to the end user. No exceptions.**

## BID/PROPOSAL DRAWINGS

For purposes of evaluation, the bidder shall provide a drawing illustrating, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus and other specified equipment, shall be required to be included with the bidder's proposal package.

The drawings shall be large "D" size (minimum 24.00 inches x 36.00 inches).

Smaller size drawings, "similar to" drawings or general sales drawings, shall not be acceptable.

Failure to provide a bid evaluation drawing in accordance with these specifications shall be cause for rejection of the bid proposal.

## PRE-CONSTRUCTION DRAWINGS

After the award of the bid, the contractor shall provide detailed colored engineering drawings including, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus for use during the pre-construction conference.

The drawings shall include, but shall not be limited to the right, left, top, front and rear views of the apparatus.

**In addition, a detailed engineering drawing of the pump operator's panel shall be provided prior to manufacturing for fire department approval.**

## SINGLE SOURCE MANUFACTURER

Bids shall only be accepted from a single source apparatus manufacturer.

The definition of single source manufacturer is a company that designs and manufactures their products utilizing an approach that includes complete product integration, including the apparatus chassis, cab, and body modules being constructed, assembled, and tested on company premises only.

Warranties qualified to the chassis and body design construction (excluding vender component warranties such as engine, axles, transmission, and pumps, etc.) will be from a single source manufacturer and not separated between manufacturers (i.e., body and chassis). The bidder shall provide evidence of maintaining compliance to this requirement.

## TAG-ON ORDERS-COOPERATIVE PURCHASING

Other fire departments, metropolitan regions, or municipalities may purchase apparatus and equipment from same manufacture similar to the Apparatus and Equipment that is the subject of this Contract held by the same manufacture. The following terms shall apply to any such tag-on orders:

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(a) Changes - Tag-on orders utilizing the same specification as the Apparatus and Equipment that is the subject of this Contract in order to provide favorable pricing and lead-times to other buyers due to having such specification fully engineered. Limited changes will be permitted. Such changes will be captured in the pre-construction meeting and the price of any tag-on unit adjusted accordingly.

(b) Term – Tag-on orders may be placed for a term of one year after the Effective Date of this Contract.

(c) Escalation - Manufacture reserves the right to adjust the price of any tag-on order if material costs escalate during the term of this Contract, changes in regulations become effective (for example EPA, NFPA or other), or the tag-on order would cross a model year.

(d) Acceptance – Manufacture holding the contract reserves the right to accept or reject any tag-on orders under this Contract.

## **FINITE ELEMENT ANALYSIS AND TESTING**

Finite Element Analysis (FEA) shall be provided by the manufacturer.

Prototype bodies have been subjected to rigorous testing over varied terrains simulating different environmental conditions.

The purpose of such complex engineering methods of analysis shall be to ensure the longevity of the design by analyzing stress levels throughout the body and incorporating the structural supports wherever necessary.

There shall have been a minimum of three (3) different load cases (per DOT, FHWA, and TTMA recommended practice) applied and analyzed to properly display the different areas and levels of stresses that will be present under the various operating conditions of the apparatus.

In addition to the FEA analysis, the core product design shall be strain gauged instrumental to ensure validation of FEA results and “Real World” drive/apparatus driving conditions.

Analysis shall also have been conducted on the mounting system for the apparatus body and pump house. EXCEPTIONS TO THIS STATEMENT MAY BE CAUSE FOR IMMEDIATE REJECTION AND/OR BE CONSIDERED NON-COMPLIANT.

## **SUPPLIED INFORMATION & EXTRAS**

The apparatus manufacturer shall supply two (2) hard copies of apparatus manuals with all manufactured apparatus.

The manuals shall include, but not be limited to: all component warranties, users' manuals and information for supplied products, apparatus engineering information including drawings and build prints, and whatever other pertinent information the manufacturer can supply to its customer regarding the said apparatus.

Included in the delivery of the unit, the manufacturer shall also include spare hardware and extra fasteners, paint for touch-up, information regarding washing and care procedures, as well as other recommendations for care and maintenance of the general apparatus.

The manufacturer shall also supply a manufacturer's record of apparatus construction details, including the following information:

- Owner name and address
- Apparatus manufacturer, model, and serial number
- Chassis make, model, and serial number

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- GAWR of front and rear axles
- Front tire size and total rated capacity in pounds
- Rear tire size and total rated capacity in pounds
- Chassis weight distribution in kilograms with water (if applicable) and manufacturer mounted equipment (front and rear)
- Engine make, model, serial number, rated horsepower, related speed and no load governed speed
- Type of fuel and fuel tank capacity
- Electrical system voltage and alternator output in amps
- Battery make and model, capacity in CCA
- Paint numbers
- Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full (if applicable) but without personnel, equipment, and hose)
- Written load analysis and results of the electrical system performance tests
- Transmission make, model, and type
- Pump to drive through the transmission (yes or no)
- Engine to pump gear ratio and transmission gear ratio used
- Pump make and model, rated capacity in gallons per minute, serial number, and number of stages
- Pump manufacturer's certification of suction capability
- Pump manufacturer's certification of hydrostatic test
- Pump manufacturer's certification of inspection and test for the fire pump
- Copy of the apparatus manufacturer's approval for stationary pumping applications
- Pump transmission make, model and serial number
- Priming device type
- Type of pump pressure control system
- The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed
- Certification of the water tank capacity

## **ELECTRICAL SCHEMATICS**

The apparatus manufacturer shall supply one (1) set(s) of electronic as-built wiring schematics, to include all line voltage schematics with each apparatus. The schematics shall be loaded onto the on-board USB storage provided with the chassis.

## **WARNING AND INFORMATION LABELS**

All warning and informational labels (non-vendor specific) shall be provided in compliance with current NFPA (Standard for Automotive Fire Apparatus) at time of contract, and installed in the appropriate locations to alert the operator of potential hazards and operating instructions.

## **ON-LINE CUSTOMER INTERACTION**

The manufacture shall provide the capability for online access through the manufacture's website. The customer shall be able to view digital photos of their apparatus in the specified phases of construction. The following phases will be captured and displayed on the manufacture's website:

- Chassis when available at manufacturing facility
  1. Body – Prior to Paint
  2. Body – Painted
  3. Pump and Plumbing
  4. Assembly – 80% Complete

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Due to the complex nature of fire apparatus and the importance of communication between the manufacture and customer, this line item is considered a critical requirement.

## **LIABILITY INSURANCE COVERAGE**

In order to protect the department and its personnel, the bidder shall show proof that it has no less than \$10 million in liability insurance in force. A certificate of coverage shall be included in the bid package. Failure to carry liability insurance of at least this amount or failure to include proof of coverage shall be cause to reject the bidder's proposal.

## **GENERAL WARRANTY**

The manufacturer shall provide a two (2) year warranty from the date of delivery.

In the case of a commercial chassis being used, the warranty on the chassis, engine, transmission, tires, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for the same are to be made directly with the manufacturer by the customer.

## **PLUMBING WARRANTY**

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

## **APPARATUS TEST BY THIRD PARTY TEST COMPANY**

The following Apparatus shall comply with all NFPA, Standard for Automotive Fire Apparatus, applicable regulations in effect as of the contract signing date. There shall be multiple tests performed by the contractor and the third party testing company when the apparatus has been completed. The manufacturer shall furnish the completed Test Certificate(s) to the purchaser at time of delivery. The tests conducted on the apparatus shall include, but not be limited to:

## **PUMP & PLUMBING PERFORMANCE TEST**

The apparatus pump and plumbing system shall be tested and certified.

## **12 VOLT ELECTRICAL TEST**

The apparatus low voltage electrical system shall be tested and certified.

## **FACTORY PRE-CONSTRUCTION CONFERENCE**

The factory authorized Distributor shall be required, prior to manufacturing, to have a pre-construction conference at the manufacturing facility with a factory representative present and with Four (4) individual(s) from the North Richland Hills Fire Rescue to finalize all construction details.

The factories authorized distributor shall, at his expense, provide transportation, lodging, and meals. Any distance greater than 200 miles shall be by commercial air travel.

## **FINAL INSPECTION CONFERENCE**

The factory authorized Distributor shall be required, during manufacturing, to have a final completion inspection conference at the site of the manufacturing facility with Four (4) individuals from the North Richland Hills Fire Rescue to inspect the apparatus after construction.

The factories authorized distributor shall, at his expense, provide transportation, lodging, and meals. Any distance



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greater than 200 miles shall be by commercial air travel.

## **PUMP & APPARATUS TRAINING**

The successful bidder shall provide a factory-trained technician to instruct the following training:

A minimum four (4) hour structured training course for the fire apparatus mechanics of the department, covering the repair and maintenance of all components of the apparatus called for in the specifications.

The successful bidder shall provide a structured training course to be repeated for each of the three (3) shift(s) of personnel assigned to operate the apparatus, covering nomenclature of components, proper operation of the apparatus, daily operational maintenance checks, and other information necessary for a firefighter/driver/engineer to properly operate and maintain the apparatus.

It is intended that this training is organized in such a manner that both the mechanics and fire personnel receive the full benefit of the structured training. The firefighter/operator training shall be conducted within one week after the vehicle is fully accepted and readied for service by the "Purchaser" or at a time mutually agreed upon by the "Purchaser" and "Supplier". A qualified factory representative shall be provided for a minimum of one (1) consecutive day(s) of instruction.

## **MAXIMUM OVERALL LENGTH REQUIREMENT**

The apparatus specified shall be constructed with no restrictions to the maximum overall length.

## **MAXIMUM OVERALL HEIGHT REQUIREMENT**

The apparatus specified shall be constructed with no restrictions to the maximum overall height.

## **MAXIMUM OVERALL WIDTH OF NINETY-NINE (99) INCHES**

The apparatus specified shall be constructed as detailed and shall NOT exceed a Maximum Overall Width of Ninety-nine (99.00) inches.

This dimension shall include the primary construction of the apparatus body and chassis cab. Any peripheral items shall not be incorporated into this measurement.

The items included, but not limited to, are: Rub Rails, Fenderettes, Mirrors, Lights, Handrails, Front Bumpers, Cab Steps, Overlays, Etc.

## **MAXIMUM WHEELBASE REQUIREMENT**

The apparatus specified shall be constructed with no restrictions to the maximum wheelbase.

## **ALTITUDE PERFORMANCE REQUIREMENT**

The apparatus specified shall be constructed with no altitude performance requirements.

## **MODEL**

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

## **COUNTRY OF SERVICE**

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

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The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. The chassis manufacturer is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from the chassis manufacturer or their OEM needed to be in compliance with those regulations.

## **CAB AND CHASSIS LABELING LANGUAGE**

The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in English. All applicable caution, warning, and safety notice labels shall be Innovative Controls brand. Where applicable to the location within the specific layout and label package of the cab and chassis, the labels shall include decorative chrome bezels. Designs shall include bezels that fit individual labels or packaged configurations of labels in certain common locations.

## **APPARATUS TYPE**

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 750 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

## **VEHICLE TYPE**

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

## **VEHICLE ANGLE OF APPROACH PACKAGE**

The angle of approach of the apparatus shall be a minimum of 8.00 degrees.

NFPA1901 Angle of Approach definition:

“To determine the angle of approach, place a thin steel strip against the front of the tires where they touch the ground or stretch a tight string from one front tire to the other at the front where they touch the ground. Determine the lowest point (component or equipment) on the vehicle forward of the front tire that would make the smallest angle of approach. Hang a plumb bob from the lowest point and mark the point on the ground where the point of the plumb bob touches. Measure the vertical distance from the ground to the point where the plumb bob was hung (distance  $V$ ). Measure the horizontal distance from the plumb bob point to the steel strip or string running from front tire to front tire (distance  $H$ ). Divide the vertical distance by the horizontal distance. The ratio of  $V/H$  is the tangent of the angle of approach. If the ratio is known, the angle of approach can be determined from a table of trigonometric functions of angles or from a math calculator. The standard requires a minimum angle of approach of 8.00 degrees: since the tangent of 8.00 degrees is 0.1405, if  $V$  divided by  $H$  is 0.1405 or larger, the angle of approach is 8.00 degrees or greater.”

## **AXLE CONFIGURATION**

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

## **GROSS AXLE WEIGHT RATINGS FRONT**

The front gross axle weight rating (GAWR) of the chassis shall be 23,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

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## **GROSS AXLE WEIGHT RATINGS REAR**

The rear gross axle weight rating (GAWR) of the chassis shall be 26,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

## **PUMP PROVISION**

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location. Chassis driveline pump provisions shall include an interlock feature for automatic setting of the park brake when the vehicle is shifted into pump mode while the transmission is in neutral and the transmission output speed translates to less than 1 mph. When the conditions are met the driver side parking brake valve shall activate. Once shifted to road mode the condition for electric automatic brake engagement is no longer present and the driver's parking brake control valve shall function normally.

## **WATER & FOAM TANK CAPACITY**

The chassis shall include a carrying capacity of 750 gallons (2839 liters) to 1250 gallons (4732 liters). The water and/or foam tank(s) shall be supplied and installed by the apparatus manufacturer.

## **CAB STYLE**

The cab shall be a custom, fully enclosed, LFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to ten (10) seating positions.

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

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

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

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

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 144.60 inches with 67.50 inches from the centerline of the front of the axle to the back of the cab.

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

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The cab shall offer an interior height of 57.50 inches from the front floor to the headliner and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 65.38 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

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

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

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 32.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.75 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.80 inches.

## **OCCUPANT PROTECTION**

An IMMI 4Front® occupant protection system shall be installed in the vehicle's cab. The system shall inflate three (3) air bags in the following locations:

- Steering wheel air bag to protect the head and neck of the driver
- Knee bolster air bag to protect the driver's legs
- Knee bolster air bag to protect the officer's legs

The air bags shall use a combination of high-pressure stored argon and oxygen with a pyrotechnic charge for initiation to inflate the bags remain inflated for several seconds.

The system shall be connected to the crash detection sensor that will also activate the driver and first officer integrated belt pretensioners if it detects a frontal crash.

A RollTek™ rollover occupant protection system shall be installed in the apparatus cab. The system shall include an integrated roll sensor (IRS) master module and a slave sensor in applicable configurations.

The IRS shall be a microprocessor-controlled solid-state sensing device that utilizes vehicle-specific calibrations to detect rollovers. The IRS shall be equipped with pyrotechnic loops for connection to the protective countermeasures which shall include seat integrated side roll airbags (SRA), integrated seat belt pretensioners, and air seat pull-downs (S4S), in applicable occupant seat positions.

The IRS shall continuously monitor the truck's acceleration and angle, and upon detection of an imminent roll-over, shall activate protective countermeasures in a pre-programmed sequence. In addition, the IRS shall also act as a data recorder to record crash events for post-crash evaluation.

## **CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

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

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

## **FRONT GRILLE**

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

## **CAB UNDERCOAT**

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

## **CAB SIDE DRIP RAIL**

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

## **CAB PAINT EXTERIOR**

The cab exterior shall be painted a single color per customers specified paint color.

## **CAB PAINT PROCESS/MANUFACTURER**

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

All metal surfaces on the cab shall be mechanically etched by sanding disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once all imperfections on the exterior surfaces are removed and sanded smooth, body fillers shall be applied to the cab on all surfaces that require a critically aesthetic finish and sanded smooth.

The entire cab shall then be coated with a high quality base primer that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be sanding the cab to a smooth finish followed by sealing the seams with an automotive seam sealer. The minimum thickness of the primer coat after sanding shall be 2.50 mils with a maximum thickness of 5.00 mils.

The cab shall then be painted the specific color(s) designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on an emergency scene. The paint shall have a minimum thickness of 1.00 mils with a maximum of 4 mils, followed by a clear top coat with a minimum of 2.5 mils and a maximum of 3.5 mils. The entire cab shall then be baked to speed the curing process of the coatings.

## **CAB PAINT PRIMARY/LOWER COLOR**

The lower paint color shall be Sikkens FLNA 33188 Red.

## **CAB PAINT WARRANTY**

Purchaser shall receive a Paint and Finish (Exterior Clear coated) Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

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## **CAB INTERIOR/COMPONENT COATING**

All visible cab structure surfaces and painted interior components shall be manually selected at each interior component's sub category.

## **CAB PAINT INTERIOR**

The visible interior cab structure surfaces shall feature a dark red spray on bedliner coating which shall mold to each surface of the cab interior. The bedliner shall be environmentally friendly and chemically resistant.

## **CAB ENTRY DOORS**

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

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

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

## **CAB ENTRY DOOR TYPE**

All cab entry doors shall be barrier clear design resulting in exposed lower cab steps. The doors shall provide approximately 32.00 inches of clearance from the ground to the bottom of the door so cab doors may be opened un-hindered by most obstacles encountered, such as guard rails along interstate highways.

Entry doors shall include Pollak mechanical plunger style switches for electrical component activation.

## **CAB INSULATION**

The cab ceiling and walls shall include a nonwoven polyester fiber insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

## **LH MID EMS COMPARTMENT**

The cab shall include a compartment located in the middle of the wall above the left side wheel well. This compartment shall measure 17.00 inches wide X 41.00 inches high X 23.00 inches deep.

## **LH MID EMS EXTERIOR ACCESS**

The cab shall include a hinged box pan door featuring a full length stainless steel piano style hinge and a bright aluminum tread plate inner panel located in the middle of the wall above the left side wheel well. The compartment shall have a minimum clear door opening of 15.00 inches wide X 40.00 inches high.

## **LH MID EMS COMPARTMENT INTERIOR**

The cab compartment located in the middle of the wall above the left side wheel well shall include solid aluminum walls with no interior access. This compartment shall be finished to customer specification.

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## **LH MID EMS COMPARTMENT INTERIOR SHELVING**

The left hand mid EMS compartment located in crew area of the cab shall include one (1) aluminum shelf which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00 inch lip around the edges. The shelf shall be finished the same as the interior of the compartment.

## **LH MID EMS COMPARTMENT DOOR HARDWARE**

The left side EMS compartment door shall include a locking semi-gloss black power coated Eberhard slam latch installed in the lower latch side of the door. There shall be a switch to activate the open compartment warning light in the cab in the event the door is left ajar. The door hinge shall be painted black.

## **RH MID EMS COMPARTMENT**

The cab shall include a compartment located in the middle of the wall above the right side wheel well. This compartment shall measure 17.00 inches wide X 41.00 inches high X 23.00 inches deep.

## **RH MID EMS EXTERIOR ACCESS**

The cab shall include a hinged box pan door featuring a full length stainless steel piano style hinge and a bright aluminum tread plate inner panel located in the middle of the wall above the right side wheel well. The compartment shall have a minimum clear door opening of 15.00 inches wide X 40.00 inches high.

## **RH MID EMS COMPARTMENT INTERIOR**

The cab compartment located in the middle of the wall above the right side wheel well shall include solid aluminum walls with no interior access. This compartment shall be finished to customer specification.

## **RH MID EMS COMPARTMENT INTERIOR SHELVING**

The right hand mid EMS compartment located in crew area of the cab shall include one (1) aluminum shelf which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00 inch lip around the edges. The shelf shall be finished the same as the interior of the compartment.

## **RH MID EMS COMPARTMENT DOOR HARDWARE**

The right side EMS compartment door shall include a locking semi-gloss black powder coat Eberhard slam latch installed in the lower latch side of the door. There shall be a switch to activate the open compartment warning light in the cab in the event the door is left ajar. The door hinge shall be painted black.

## **MID EMS COMPARTMENT LIGHTING**

The interior portion of each of the mid EMS compartments shall include compartment door activated LED lighting to illuminate all usable surfaces within each compartment.

## **MID EMS COMPARTMENT EXTERIOR FINISH**

The EMS compartment exterior shall feature a dark red spray on bedliner coating.

## **MID EMS COMPARTMENT INTERIOR FINISH**

The interior of the mid EMS compartment shall be painted with a multi-tone dark red texture finish.

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## LEFT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be two (2) clear LED strip lights installed to illuminate the exterior rear compartment on the left side of the cab. The strip lights shall be sized appropriately to illuminate all usable surfaces in the compartment.

## LH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the left hand exterior compartment shall feature medium gray spray on bedliner coating.

## RIGHT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be two (2) clear LED strip lights installed to illuminate the exterior rear compartment on the right side of the cab. The strip lights shall be sized appropriately to illuminate all usable surfaces in the compartment.

## RH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the right hand exterior compartment shall have a DA sanded finish.

## CAB STRUCTURAL WARRANTY

Purchaser shall receive a Cab Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0602. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## CAB TEST INFORMATION

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

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

## ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

## VEHICLE DISPLAY

The multiplex electrical system shall include (2) Weldon Vista IV displays which shall be located one (1) on the right side of the dash in the switch panel and one (1) on the left side of the dash in the switch panel. The Vista IV displays shall feature full color LCD display screens which include a message bar displaying the time of day and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be eight (8) push button virtual controls, four (4) on each side of the display for the on-board diagnostics. The display screens shall be video ready for back-up cameras, thermal cameras, and DVD.

The Vista IV displays shall offer varying fonts and background colors. The displays shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.



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## **MULTIPLEX DISPLAY SPECIAL LAYOUT**

The Vista display and control screen shall be configured specifically for a virtual button on the control screen to override the park brake interlocked deactivation of the wiper system. This will reset when the park brake is cycled.

The Vista display and control screen shall also be configured specifically for the vista dimmer control screen to have two dimmer settings. The dimmer settings shall be labeled "DAY" (Normal) and "NIGHT". This shall omit the additional default settings "MAX" and "DIM".

## **LOAD MANAGEMENT SYSTEM**

The apparatus load management shall be performed by the included multiplex system. The multiplex system shall also feature the priority of sequences and shall shed electrical loads based on the priority list specifically programmed.

## **DATA RECORDING SYSTEM**

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:

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

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

## **ACCESSORY POWER**

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

An OEM body connections bracket shall be installed on the chassis near the left hand battery box. The bracket shall include one (1) set each of 200 amp master power switched and 300 amp battery direct fused power and ground studs.

## **AUXILIARY ACCESSORY POWER**

An auxiliary six (6) position Blue Sea Systems 5025 blade type fuse panel shall be installed behind the switch panel. The fuse panel shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

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## **ADDITIONAL ACCESSORY POWER**

An additional six (6) position Blue Sea Systems 5025 blade type fuse panel shall be installed on the side wall of the engine tunnel behind the officer's seat. The fuse panel shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

## **EXTRA ACCESSORY POWER**

An extra six (6) position Blue Sea Systems 5025 blade type fuse panel shall be installed on the side wall of the engine tunnel behind the driver's seat. The fuse panel shall be protected by a 40 amp fuse. The panel shall be wired for a battery direct load.

## **ANCILLARY ACCESSORY POWER**

One (1) ancillary six (6) position Blue Sea Systems 5025 blade type fuse panel shall be provided and installed behind the forward facing center seat on the center rear wall of the cab. The fuse panel shall be protected by a 40 amp fuse and be wired battery direct.

## **EXTERIOR ELECTRICAL TERMINAL COATING**

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

## **ELECTRICAL SYSTEM WARRANTY**

Purchaser shall receive an Electrical System Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0202. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **CAB ENGINE TUNNEL**

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

## **DIESEL PARTICULATE FILTER CONTROLS**

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

## **ENGINE PROGRAMMING HIGH IDLE SPEED**

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

## **ENGINE HIGH IDLE CONTROL**

The vehicle shall be equipped with an automatic high-idle speed control which shall be pre-set to operate the engine at a specified RPM to increase alternator output if the system voltage drops to 12.5 volts. This device shall automatically operate only when the engine is running, the transmission is in neutral, and with the parking brake set. The automatic high idle will stay engaged for a minimum of ten (10) minutes and until the system, voltage has reached 13.0 volts. Application of the service brake will override the automatic high idle and reset timer. The vehicle shall be equipped with a high-idle speed virtual button on the vehicle display and control screen to activate/deactivate manual control only. It shall be pre-set so when activated, it will operate the engine at the specified RPM to increase alternator output. This device shall operate only when the engine is running, the transmission is in neutral, and with the parking brake set. When automatically engaged the high idle shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake pedal

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is released, or when the transmission is placed in neutral. Virtual control screen shall not override automatic high idle between voltage parameters during timed cycle. Display shall indicate when high idle is disabled, enabled, or active.

## **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

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

## **AUXILIARY ENGINE BRAKE**

A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

## **AUXILIARY ENGINE BRAKE CONTROL**

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

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

The compression brake shall be controlled via an off/low/medium/high virtual button on the vehicle display and control screen. The system shall remember and default to the last engine brake control setting when the vehicle is shut off and re-started.

## **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

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

## **FLUID FILLS**

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

## **ENGINE DRAIN PLUG**

The engine shall include an original equipment manufacturer installed oil drain plug.

## **ENGINE WARRANTY**

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

## **REMOTE THROTTLE HARNESS**

An apparatus interface wiring harness for the engine and transmission pump interlocks shall be supplied with the chassis. The harness shall include a connector for connection to a chassis pump panel harness supplied by the body builder and shall terminate in the left frame rail behind the cab for connection by the body builder. The harness shall

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include circuits deemed for a pump panel and shall contain circuits for a hand throttle, and a multiplexed gauge. Separate circuits shall also be included for a pump control switch, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, clean power, customer ignition, air horn solenoid switch, high idle switch and high idle indicator light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set.

## **ENGINE PROGRAMMING REMOTE THROTTLE**

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

## **ENGINE PROGRAMMING IDLE SPEED**

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

## **ENGINE AIR INTAKE**

The engine air intake system shall include an ember separator. This ember separator shall be designed to protect the downstream air filter from embers using a combination of unique flat and crimped metal screens packaged in a heavy duty galvanized steel frame. This multilayered screen shall trap embers and allow them to burn out before passing through the pack.

The engine air intake system shall also include an air cleaner mounted above the radiator. This air cleaner shall utilize a replaceable dry type filter element designed to prevent dust and debris from being ingested into the engine. A service cover shall be provided on the housing, reducing the chance of contaminating the air intake system during air filter service.

The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

## **ENGINE FAN DRIVE**

The engine cooling system fan shall incorporate a thermostatically controlled, Horton fully variable type fan drive with SmartClutch J-1939 CAN controller.

The variable speed fan clutch only engages at the amount needed for proper cooling to facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail-safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure. The fan speed shall include a J-1939 CAN clutch controller to receive signal from the engine control module to activate at variable rates of speed. Variable speeds shall be set through thermostatic and engine speed signals to run as efficiently and quietly as required to maintain temperature.

## **ENGINE COOLING SYSTEM**

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

The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a

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surge tank, a charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

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

The cooling system shall include a one piece injected molded polymer fan with a three (3) piece fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and rearward oriented sight glass to observe coolant in the system. A cold fill and observation line shall be included within the frame mounted translucent recovery bottle to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements and allows for expansion and recovery of coolant into a separate integral expansion chamber.

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

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

The radiator and charge air cooler shall be removable through the bottom of the chassis.

## **ENGINE COOLING SYSTEM PROTECTION**

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

## **ENGINE COOLANT**

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

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

## **ELECTRONIC COOLANT LEVEL INDICATOR**

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

## **COOLANT HOSES**

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

## **ENGINE COOLANT OVERFLOW BOTTLE**

A remote engine coolant overflow expansion bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overflow rather than allow the fluid to drain on the ground.

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## ENGINE EXHAUST ACCESSORIES

The vehicle will include a Plymovent Magnetic Grabber exhaust extraction system collar which shall be shipped loose.

The tail pipe shall have a drop in it to allow additional clearance from the body.

## ENGINE EXHAUST WRAP

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

The exhaust flex joint shall not include the thermal exhaust wrap.

## TRANSMISSION

The drive train shall include an Allison model EVS 4000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

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

The transmission gear ratios shall be:

1st	3.51:1
2nd	1.91:1
3rd	1.43:1
4th	1.00:1
5th	0.74:1
6th	0.64:1 (if applicable)
Rev	4.80:1

## TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

## TRANSMISSION FEATURE PROGRAMMING

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

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

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V/VI-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

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

## **TRANSMISSION SHIFT SELECTOR**

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

## **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

The transmission fluid shall be monitored electronically.

## **TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE**

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

## **TRANSMISSION COOLING SYSTEM**

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

## **TRANSMISSION DRAIN PLUG**

The transmission shall include an original equipment manufacturer installed magnetic transmission fluid drain plug.

## **TRANSMISSION WARRANTY**

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

## **PTO LOCATION**

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 1:00 o'clock position.

## **DRIVELINE**

All drivelines shall be heavy duty metal tube and equipped with MSI 1810 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®. The drivelines shall include Meritor brand u-joints with thrust washers.

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## **MIDSHIP PUMP / GEARBOX**

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

## **MIDSHIP PUMP / GEARBOX MODEL**

The midship pump/gearbox provisions shall be for a Darley PSM forward pump.

## **MIDSHIP PUMP GEARBOX DROP**

The pump gearbox shall be a Darley pump type of gearbox with no "pump drop" type.

## **MIDSHIP PUMP RATIO**

The ratio for the midship pump shall be 1.34:1.

## **MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE**

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 108.50 inches.

## **PUMP SHIFT CONTROLS**

One (1) air pump shift control panel shall be located on the left hand side of the engine tunnel, integrated with the shifter pod. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA 16.10.1.3. The road mode shall be selected when the control lever is in the forward position and pump mode shall be selected when the control lever is in the rearward position.

The control lever center position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

## **PUMP SHIFT CONTROL PLUMBING**

Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points with threaded 0.25 inch NPT fittings on the solenoid for attaching the customer installed pump. The air supply shall be pressure protected from service brake system.

## **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS20121 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

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

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

## **FUEL LINES**

The fuel system supply and return lines installed from the fuel tank to the engine shall be black textile braided lines which are reinforced with braided high tensile steel wire. The fuel lines shall be connected with reusable steel fittings.



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## **FUEL SHUTOFF VALVE**

There shall be two (2) fuel shutoff valves which shall be installed, one (1) in the fuel draw line at the primary fuel filter and one (1) in the fuel outlet line at the primary fuel filter to allow the fuel filters to be changed without loss of fuel to the fuel pump.

A third fuel shutoff valve shall be installed in the fuel draw line, near the fuel tank to allow maintenance to be performed with minimal loss of fuel.

## **ELECTRIC FUEL PRIMER**

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

## **FUEL COOLER**

A fuel cooler shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall include an electrical fan and temperature-controlled relay switch.

## **FUEL TANK**

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length.

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

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

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

## **FUEL TANK MATERIAL AND FINISH**

The fuel tank shall be constructed of 12 gauge aluminized steel. The exterior of the tank shall be powder coated black and then painted to match the frame components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-cured pencil hardness of H-2H. The direct impact resistance test per ASTM D2794, results to be 5B minimum.

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

## **FUEL TANK STRAP MATERIAL**

The fuel tank straps shall be constructed of ASTM A-36 hot-dip galvanized steel. The fuel tank straps shall include a natural galvanized finish.

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## **FUEL TANK FILL PORT**

The fuel tank fill ports shall be provided with two (2) left fill ports located one (1) in the forward position and one (1) in the middle position and the right fill port located in the middle position of the fuel tank.

A 1.50 inch diameter hole shall be provided in the left and right frame rails for vent hose routing provisions. The holes shall be located adjacent to the fuel tank and 5.13 inches up from the bottom of each rail.

## **FUEL TANK SERVICEABILITY PROVISIONS**

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 8.00 feet of length shall be located above the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

## **FUEL TANK DRAIN PLUG**

A 0.5 inch NPT magnetic drain plug shall be centered in the bottom of the fuel tank.

## **FRONT AXLE**

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 23,000 pounds. This rating shall require special approvals from the wheel manufacturers.

## **FRONT WHEEL BEARING LUBRICATION**

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

## **FRONT SHOCK ABSORBERS**

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

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

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

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

## **FRONT SUSPENSION**

The front suspension shall include an eleven (11) leaf spring pack in which the longest leaf measures 53.38 inch long and 4.00 inches wide. The springs shall be shot peened for long life and include a military double wrapped front eye. The springs shall be bolted in place with M20 10.9 bolts and have replaceable polyurethane bushings in the spring eyes. The spring capacity shall be rated at 23,000 pounds.

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## **STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

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

## **ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

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

## **POWER STEERING PUMP**

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type. The power steering system shall include an oil to air passive cooler.

## **FRONT AXLE CRAMP ANGLE**

The chassis shall have a front axle cramp angle of 48-degrees to the left and 44-degrees to the right.

## **POWER STEERING GEAR**

The power steering gear shall be a TRW model TAS 85 with an assist cylinder.

## **CHASSIS ALIGNMENT**

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

## **REAR AXLE**

The rear axle shall be a Meritor model RS-25-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.63 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

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

## **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with oil.

## **WHEEL HUB PAINT**

Each of the wheel hubs shall be coated with primer and finish top coat painted the same as the lower color of the cab.

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## **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with oil.

## **VEHICLE TOP SPEED**

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

## **REAR SUSPENSION**

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type parabolic five (5) leaf spring pack suspension with 57.50 inch X 3.00 inch springs. The suspension shall also utilize two (2) torque arms with eccentric cam adjustment.

The rear suspension capacity shall be rated to 27,000 pounds.

## **REAR SHOCK ABSORBERS**

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

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

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

The heavy duty shock absorbers shall be tuned to provide higher damping forces.

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

## **TIRE INTERMITTENT SERVICE RATING**

The chassis shall be rated using Intermittent Service ratings provided to the emergency vehicle market by the tire manufacturers as the basis for determining the maximum vehicle load and speed.

## **FRONT TIRE**

The front tires shall be Michelin 385/65R22.5 "L" tubeless radial X Multi HL Z regional tread.

The front tire stamped load capacity shall be 22,000 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 130 pounds per square inch.

The Michelin Intermittent Service Rating maximum load capacity shall be 23,540 pounds per axle with a maximum speed of 68 miles per hour when properly inflated to 130 pounds per square inch.

The Michelin Intermittent Service Rating maximum speed capacity shall be 22,000 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch.

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The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

## **REAR TIRE**

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XZE regional tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 28,880 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

## **REAR AXLE RATIO**

The rear axle ratio shall be 4.30:1.

## **TIRE PRESSURE INDICATOR**

There shall be electronic chrome LED valve caps shipped loose for installation by the OEM which shall illuminate with a red LED when tire pressure drops 8psi provided. The valve caps are self-calibrating and set to the pressure of the tire upon installation.

## **FRONT WHEEL**

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch aluminum wheels. The outer face of the wheels shall feature Alcoa's Dura-Bright® finish as an integral part of the wheel surface. Alcoa Dura-Bright® wheels keep their shine without polishing. Brake dust, grime and road debris are easily removed by simply cleaning the wheels with soap and water. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

## **REAR WHEEL**

The rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with a polished outer surface and Alcoa Dura-Bright® wheel treatment as an integral part of the wheel surface. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with a polished inner and outer surface and Alcoa Dura-Bright® wheel treatment as an integral part of the wheel surface. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

## **BALANCE WHEELS AND TIRES**

All of the wheels and tires, including any spare wheels and tire assemblies, shall include Counteract brand balancing beads.

## **WHEEL TRIM**

The front wheels shall include stainless steel lug nut covers shipped loose with the chassis for installation by the apparatus builder.

The rear wheels shall include stainless steel lug nut covers shipped loose with the chassis for installation by the apparatus builder.

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The lug nut covers shall be RealWheels® brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.

## **AUXILIARY LUBRICATION PROVISIONS**

The auxiliary lubrication system shall include a 9.00 foot line extension for the lines to reach the rear of the apparatus.

## **BRAKE SYSTEM**

A rapid build-up air brake system shall be provided. The air brakes shall include, at a minimum, a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

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

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

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

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

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

## **FRONT BRAKES**

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

## **REAR BRAKES**

The rear brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

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## **PARK BRAKE**

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

## **PARK BRAKE CONTROL**

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake.

The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver. The control shall include a protective guard which shall prevent accidental activation of the parking brake and still allow proper actuation of the control.

## **AIR DRYER**

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

## **FRONT BRAKE CHAMBERS**

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

## **REAR BRAKE CHAMBERS**

The rear axle shall include TSE 24/30 H.O.T. (High Output Technology) brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake pads against the brake rotor.

## **AIR COMPRESSOR**

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

## **AIR GOVERNOR**

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket.

## **AUXILIARY AIR RESERVOIR**

One (1) auxiliary air reservoir with a 2084 cubic inch capacity shall be installed on the chassis to act as an additional reserve supply to the air system for air horn, air tool, or other non-service brake use. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

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## **MOISTURE EJECTORS**

Heated, automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system. The manual drain provision shall include an actuation pull cable coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.

## **AIR SUPPLY LINES**

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

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

## **AIR INLET CONNECTION**

An air connection for the shoreline air inlet shall be supplied.

## **AIR INLET LOCATION**

The air inlet shall be installed in the left hand side lower front step in the forward position.

## **AIR INLET/ OUTLET FITTING TYPE**

The air connector supplied shall be a 0.25 inch size Tru-Flate Interchange style manual connection which is compatible with Milton 'T' style, Myers 0.25 inch Automotive style and Parker 0.25 inch 10 Series connectors.

## **AIR TANK SPACERS**

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 1.50 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

## **REAR AIR TANK MOUNTING**

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

## **WHEELBASE**

The chassis wheelbase shall be 197.00 inches.

## **REAR OVERHANG**

The chassis rear overhang shall be 47.00 inches.

## **FRAME**

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each



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double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

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

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

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

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

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

## **MISCELLANEOUS FRAME OPTIONS**

The frame shall include hole patterns which shall be specific to Crimson Vibratorque style body mounting. There shall be nine (9) mounting locations forward of the centerline of rear axle, and seven (7) mounting locations rearward of the centerline of rear axle, and one (1) mounting location centered over the centerline of rear axle.

See PDF for OEM specified pattern.

## **REAR TOW DEVICE**

The frame rails shall contain (6) holes per frame in a pattern specified by the OEM for mounting Spartan ERV tow eyes at the rear of the frame at a location defined by the OEM.

## **FRAME PAINT**

The frame shall be hot dip galvanized prior to assembly and attachment of any components. The components that shall be galvanized shall include:

- Main frame “C” channel or channels
- Front splayed rails and fish plates
- Cross members (excluding suspension cross members)
- Cross member gussets
- Fuel tank mounting brackets
- Fuel tank straps (unless material/finish is specified in 3130 subcat)
- Air tank mounting brackets (unless material/finish is specified in 3205, 3305, or 2232 subcat)
- Exhaust mounting brackets
- Air dryer bracket
- Air cleaner skid plate (if applicable)
- Radiator skid plate (if applicable)
- Battery supports
- Battery trays (unless material/finish is specified in 5106 subcat)
- Battery covers (unless material/finish is specified in 5107 subcat)

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The frame parts which are not galvanized shall be powder coated prior to any attachment of components. Parts which shall be powder coated shall include but are not limited to:

- Bumper extensions
- Steering gear bracket
- Air tanks (unless color coded tanks are specified in 3205 subcat)

Other non-galvanized under carriage components which are received from the suppliers with coatings already applied shall include but are not limited to:

- Suspension components
- Front and rear axles

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

## **FRAME ASSEMBLY STRUCTURAL**

Purchaser shall receive a Frame Assembly Structural Fifty (50) Years or 250,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0305. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **FRAME RAIL CORROSION**

Purchaser shall receive a Frame Rail Corrosion (Zinc Plate and Powder Coat) Twenty Five (25) Years or 150,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0316. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **FRAME COMPONENTS CORROSION**

Purchaser shall receive a Frame Components Corrosion (Zinc Plate) Twenty (20) Years or 132,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0314. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **FRONT BUMPER**

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be 0.38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

The bumper shall be primed and painted as specified.

## **FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended approximately 21.00 inches ahead of the cab.

## **FRONT BUMPER PAINT**

The front bumper shall be painted the same as the lower cab color. The front bumper trim shall feature a black spray on bedliner coating.

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## **FRONT BUMPER TRIM**

A stainless steel trim angle, painted to the customer's specifications, shall be installed on the top corner of the bumper across the front and on the top corner of the bumper tails, terminating at the rearmost portion of the apron. The trim angle shall measure approximately 3.00 inches wide on the horizontal flange and 1.60 inches tall on the vertical flange. The trim shall be affixed to the bumper and bolted down to the apron with isolating washers.

## **FRONT BUMPER APRON**

The 21.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

## **FRONT BUMPER DISCHARGE**

The chassis shall include frame mounted 2.00 inch diameter plumbed pipe intended for use as a discharge trash line. The discharge pipe shall be routed from the right hand front splay rail area behind the bumper to the area rear of the front axle, ahead of the battery box.

The discharge shall pipe shall be a, 2.00 inch stainless steel schedule 10 tube. The discharge shall include a Victaulic groove for connecting to the pump and discharge hose plumbing on each end of the tube. The discharge tube shall be finished in a gloss black powder coating.

The apparatus manufacturer shall plumb the discharge pipe to the pump and shall provide all valves as required.

## **FRONT BUMPER COMPARTMENT CENTER**

The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall be the full size of available space in the apron from the cab fascia to the bumper and 38.00 inches wide X 10.88 inches deep. The clear opening shall be 37.75 inches wide. The compartment shall include a notched cover constructed of 0.19 inch thick bright embossed aluminum tread plate. The notch shall be located in the right front portion of the cover and shall be 4.00 inches in length with a 2.00 inches wide radius.

## **FRONT BUMPER COMPARTMENT COVER HARDWARE**

The front bumper compartment cover(s) shall include gas cylinder stays which shall hold the cover open. Each cover shall be held in the closed position via a D-ring style latch.

## **MECHANICAL SIREN**

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10.00 feet. The Q2B™ siren produces a distinctive warning sound that is recognizable at long distances. A unique clutch design provides a longer coast down sound while reducing the amp draw to 100 amps. The siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep. The siren shall include a pedestal mount to surface mount on a horizontal surface.

## **MECHANICAL SIREN LOCATION**

The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the driver side.

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## **AIR HORN**

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

## **AIR HORN LOCATION**

The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the bumper in the inboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left hand frame rail.

## **AIR HORN RESERVOIR**

One (1) air reservoir, with a 2084 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

## **ELECTRONIC SIREN SPEAKER**

There shall be two (2) Cast Products Inc. model SA4301, 100 watt speakers provided. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

## **ELECTRONIC SIREN SPEAKER LOCATION**

The two (2) electronic siren speakers shall be located on the front bumper face outboard of the frame rails with one (1) on the right side and one (1) on the left side in the outboard positions.

## **AUXILIARY ELECTRONIC SIREN SPEAKER**

There shall be two (2) Whelen Engineering Inc. Howler auxiliary electronic siren speakers provided. Each speaker shall measure approximately 7.25 inches in diameter X 9.00 inches deep.

## **AUXILIARY ELECTRONIC SIREN SPEAKER LOCATION**

The auxiliary electronic siren speakers shall be located one (1) on the left side and one (1) on the right side behind the bumper, in the furthest positions outboard of the frame rails.

## **FRONT BUMPER TOW HOOKS**

Two (2) heavy duty tow hooks, painted to match the frame components, shall be installed in the rearward position out of the approach angle area, bolted directly to the side of each chassis frame rail with grade 8 bolts.

## **TOW FORK PROVISION**

Two (2) heavy duty steel towing forks shall be bolt-on to the underside of the frame flange and butted to the bottom frame with a fish plate joint. Each shall be shaped like an upside down "U" to act as a designated hookup point to accept a tow bar from a service vehicle without having to reach the front axle. The robust design shall allow a disabled vehicle to be lifted and towed without doing damage to the bumper or bumper mounted options. The provisions shall be mounted directly behind the cab tilt cross member to provide optimal vehicle stability while maintaining access for most heavy duty tow stingers.

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## **CAB TILT SYSTEM**

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

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

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

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

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

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

## **CAB TILT AUXILIARY PUMP**

A manual cab tilt pump module shall be attached to the cab tilt pump housing/power distribution box.

## **CAB TILT LIMIT SWITCH**

A cab tilt limit switch shall be installed. The switch will effectively limit the travel of the cab when being tilted. The limit adjustment of the switch shall be preset by the chassis manufacturer to prevent damage to the cab or any bumper mounted option mounted in the cab tilt arc. Further adjustment to the limit by the apparatus manufacturer shall be available to accommodate additional equipment.

## **CAB TILT CONTROL RECEPTACLE**

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

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

## **CAB TILT LOCK DOWN INDICATOR**

The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

In addition to the alert message an audible alarm shall sound when the cab is unlocked and ajar with the parking brake released.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **GLASS FRONT DOOR**

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished using electric actuation. The left side front window shall be controlled using a switch on the left side inner door panel. The right side front door window shall be controlled using a switch on the right side door window ledge. The driver's inner door panel shall include a switch for each powered door window in the cab.

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

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

## **GLASS TINT FRONT DOOR**

The windows located in the left and right front doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

## **GLASS REAR DOOR RH**

The rear right hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the door panel ledge and on the driver's control panel.

## **GLASS TINT REAR DOOR RIGHT HAND**

The window located in the right hand side rear window shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

## **GLASS REAR DOOR LH**

The rear left hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the door panel ledge and on the driver's control panel.

## **GLASS TINT REAR DOOR LEFT HAND**

The window located in the left hand side rear door shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

## **CABIN AIR FILTRATION SYSTEM**

An Active Air Purification system will be installed in the cab. The system utilizes RGF's Photohydroionization® Cell (PHI-Cell®) technology which produces hydro-peroxides and hydroxide ions, reducing airborne mold, bacteria, viruses, and odors up to 99%.

The system shall include a stainless-steel housing approximately 7.50 inches high X 16.13 inches wide X 6.6 inches deep in a trapezoid shape and shall be located at the upper portion of the rear wall mounted in a horizontal orientation. The system shall be 12V DC and shall be active when the ignition power is on.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## CLIMATE CONTROL

A ceiling mounted combination defroster and cabin heating and air conditioning system shall be located above the engine tunnel area. The system covers and plenums shall be of severe duty design made of aluminum which shall be coated with a customer specified interior paint. The design of the system's covers shall provide quick access to washable air intake filters as well as easy access to other serviceable items.

Six (6) adjustable louvers shall provide comfort for the front seat occupants and ten (10) adjustable louvers shall provide comfort for the rear crew occupants. The plenum shall be shortened to terminate in the mid crew area on cabs with 10.00 inch raised roofs and greater. This shortened plenum shall allow for the customer to utilize the upper rear center wall for compartmentation, equipment, or apparatus operations.

Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122° F (+/- 3° F) to 80° F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.

The system shall also provide heater pull up performance which meets or exceeds the performance requirements of SAE J1612 as well as defrost performance that meets or exceeds the performance requirements of SAE J381.

A gravity drain system shall be provided that is capable of evacuating condensate from the vehicle while on a slope of up to a 13% grade in any direction.

The air conditioning system plumbing shall be a mixture of custom bent zinc coated steel fittings and Aeroquip flexible hose with Aeroquip EZ-Clip fittings.

The overhead heater/defroster plumbing shall include an electronic flow control valve that re-directs hot coolant away from the evaporator, via a bypass loop, as the temperature control is moved toward the cold position.

Any component which needs to be accessed to perform system troubleshooting shall be accessible by one person using basic hand tools. Regularly serviced items shall be replaceable by one person using basic hand tools.

***\*\*The chassis manufacturer recommends that the overall climate system performance be based off third-party testing in accordance with the Society of Automotive Engineering standards as a complete system.***

***Individual component level BTU ratings is not an accurate indicator of the performance capability of the completed system. System individual component BTU ratings:***

- Air conditioning evaporator total BTU/HR: 82,000
- Air conditioning condenser total BTU/HR: 59,000
- Heater coil total BTU/HR: 98,000

***Performance data specified is based on testing performed by an independent third-party test facility using a medium four-door 10" raised roof cab equipped with an ISL engine.***

## CLIMATE CONTROL DRAIN

The climate control system, including the roof mounted 110V auxiliary HVAC unit, shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

## CLIMATE CONTROL ACTIVATION

The heating, defrosting and air conditioning controls shall be in the center dash center switch panel, in a position which is easily accessible to the driver. The climate control shall be activated by a rotary switch.

## HVAC OVERHEAD COVER PAINT

The overhead HVAC cover shall be painted with a single stage flat paint to closely match the color of our dark red spray on bedliner.

## AUXILIARY A/C CAB CEILING/ROOF

A 110 volt Dometic Penguin II low profile high capacity air conditioning system shall be provided to cool the crew area of the cab. The system shall consist of one (1) 110 volt air conditioning roof mounted unit which shall be located

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above the crew area and centered left to right on the cab. The cover of the air conditioning unit shall be painted the upper cab color.

The system shall be pre-wired with 35.00 feet of coiled wire for installation of the 120 volt receptacle by the body manufacturer.

## **A/C CONDENSER LOCATION**

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

## **A/C COMPRESSOR**

The air-conditioning compressor shall be a belt driven, engine mounted compressor. The compressor shall be compatible with R134-a refrigerant.

***\*\*The chassis manufacturer recommends that the overall climate system performance be based off third-party testing in accordance with the Society of Automotive Engineering standards as a complete system.***

***Individual component level ratings are not an accurate indicator of the performance capability of the completed system.***

Refrigerant Compressor displacement: 19.1 cubic inches per revolution.

## **UNDER CAB INSULATION**

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

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

The engine tunnel insulation shall measure approximately 0.30 inch thick including a multi-layer foil faced glass cloth and polyester fiber layer. The foil surface acts as protection against heat, moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The cab floor insulation shall measure 0.56 inch thick including a 1.0#/sf PVC barrier and a moisture and heat reflective foil facing, reinforced with fiberglass strands. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by acrylic pressure sensitive adhesive. In addition, the insulation on the underside of the cab floor shall have aluminum pins with hard hat, hold in place fastening heads and an expanded metal overlay to assist in retaining the insulation tight against the cab. The insulation inside the tunnel shall have a removable aluminum overlay installed to protect the insulation and assist in retaining the insulation tight against the engine tunnel surfaces.

The cab floor insulation shall cover the driver and officer floor areas as well as all crew floor areas and compartment floor areas if applicable.

## **INTERIOR TRIM FLOOR**

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



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## **INTERIOR TRIM**

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

## **REAR WALL INTERIOR TRIM**

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

## **HEADER TRIM**

The cab interior shall feature header trim over the driver and officer dash constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum.

## **TRIM CENTER DASH**

The main center dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical access cover for ventilation. The center dash electrical access cover shall include a gas cylinder stay which shall hold the cover open during maintenance.

## **TRIM LH DASH**

The left hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate for a perfect fit around the instrument panel. For increased occupant protection the extreme duty left hand dash utilizes patent pending break away technology to reduce rigidity in the event of a frontal crash. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

## **TRIM RH DASH**

The right hand dash trim shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a Mobile Data Terminal (MDT) provision.

## **ENGINE TUNNEL TRIM**

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

## **POWER POINT DASH MOUNT**

The cab shall include two (2) Kussmaul 091-264 Dual serial bus (USB) charging receptacles in the cab dash rocker switch cutout to provide a power source for USB chargeable electrical equipment. Each USB receptacle shall include one (1) USB type A port capable of a 3.6 Volt-18 watt output and one (1) type C USB port capable of a 3.3 Volt-45 watt output. The receptacles shall be wired battery direct and include an LED indicator light.

## **STEP TRIM**

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of SAE 304 stainless steel with embossed perforations and diamond shaped cutout. The perforations and cutouts shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have drainage holes beneath the back of the step to allow debris and water to flow through rather than becoming trapped within the

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stepping surface. The stainless steel material shall have a number 8 mirror finish. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed in 0.08 inch thick 3003-H22 embossed aluminum tread plate.

## **STEP TRIM KICKPLATE**

The cab steps shall include a kick plate in the rise of each step. The risers shall be trimmed in 3003-H22 bright aluminum tread-plate which is 0.07 inch thick.

## **UNDER CAB ACCESS DOOR**

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

## **INTERIOR DOOR TRIM**

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

## **DOOR TRIM CUSTOMER NAMEPLATE**

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their department, city, township, or county.

## **CAB DOOR TRIM REFLECTIVE**

In accordance with the current standards of NFPA, the body builder shall provide 96.00 square inches of reflective material on the interior of each cab door.

## **INTERIOR GRAB HANDLE "A" PILLAR**

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

## **INTERIOR GRAB HANDLE FRONT DOOR**

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

## **INTERIOR GRAB HANDLE REAR DOOR**

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

## **INTERIOR SOFT TRIM COLOR**

The cab interior soft trim surfaces shall be black in color.

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## **INTERIOR TRIM SUN VISOR**

The header shall include two (2) sun visors, one (1) on each side forward of the driver and officer seating positions above the windshield. The sun visors shall be constructed of impact resistant, transparent acrylic polycarbonate sun visors with a smoke gray tint.

The see thru visors are designed for maximum flexibility of positioning utilizing an arm with virtually unlimited adjustability with lateral travel of the tinted visor at the end of the arm which can be locked in place by a thumbscrew.

The visors are easily adjusted and can be placed into a chosen position with one hand. The sun visors will help protect vehicle occupants from solar glare without obscuring their vision.

## **INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be black in color.

## **CAB PAINT INTERIOR**

The inner door panel surfaces shall feature a dark red spray on bedliner coating.

## **HEADER TRIM INTERIOR PAINT**

The metal surfaces in the header area shall feature a dark red spray on bedliner coating.

## **TRIM CENTER DASH INTERIOR PAINT**

The entire center dash and any accessory pods attached to the dash shall feature a dark flat red spray on bedliner coating.

## **TRIM LEFT HAND DASH INTERIOR PAINT**

The left hand dash shall feature a dark flat red spray on bedliner coating.

## **TRIM RIGHT HAND DASH INTERIOR PAINT**

The right hand dash shall feature a dark flat red spray on bedliner coating.

## **DASH PANEL GROUP**

The main center dash area shall include three (3) aluminum removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The panels shall be coated with a black texture finish. The center panel shall be within comfortable reach of both the driver and officer.

## **SWITCHES CENTER PANEL**

The center dash panel shall include one (1) rocker switch position in the panel.

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

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## **SWITCHES LEFT PANEL**

The left dash panel shall include one (1) windshield wiper/washer control switch located in the left hand side of the panel and one (1) rocker switch located in the left hand side of the panel.

A rocker switch with a blank legend installed directly above shall be provided for this position if not designated by a specific option. The non-designated switch shall be a two-position, black switch with a green indicator light. The blank switch legend can be custom engraved by the body manufacturer. The switch legend shall have backlighting provided.

## **SWITCHES RIGHT PANEL**

The right dash panel shall include no rocker switches or legends.

## **SEAT BELT WARNING**

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the vehicle display and control screen(s).

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

## **SEAT MATERIAL**

The seats shall be covered with a 45.00 ounce vinyl material. This material shall be semi-resistant to UV rays and from being saturated or contaminated by fluids.

## **SEAT COLOR**

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

## **SEAT BACK LOGO**

The seat back shall include the "North Richland Hills Fire Department" logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

## **SEAT DRIVER**

The driver's seat shall be an H.O. Bostrom 500 Series Firefighter Sierra model seat with air suspension. The four-way seat shall feature a 3.00 inches vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock.

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

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In

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order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208.

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

## SEAT BACK DRIVER

The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

## SEAT MOUNTING DRIVER

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

## OCCUPANT PROTECTION DRIVER

The driver's position shall be equipped with the IMMI 4Front and RollTek™ Systems which shall secure belted occupants and increase the survivable space within the cab. The 4Front and RollTek™ Systems shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, and rollover events.

The Driver's seating area protection shall include:

- Drivers airbag **DAB** - inflates a steering wheel airbag to protect the head and neck of the driver.
- Driver's knee airbag **DKAB** - inflating knee bolster airbags to protect the knees.
- Integrated roll sensor **IRS** - detects an imminent rollover, activates protective devices and records crash events.
- Integrated belt pretension **ICP** - device for air ride seats tightens the seat belt, securing driver in seat and positions driver for contact with seat integrated head cushion side roll airbag.
- Seat pull-down system **S4S** - device for air seats locks seat to lowest position, increases survivable space.

Inflatable Head Cushion seat integrated Side Roll Airbag **SRA** - protects driver's head/neck and shields driver from dangerous surfaces.

## SEAT OFFICER

The officer's seat shall be a H.O. Bostrom 500 Series Sierra seat model. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

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

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

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the

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weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

## SEAT BACK OFFICER

The officer's seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

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

## SEAT MOUNTING OFFICER

The officer's seat shall offer a special mounting position which is 4.00 inches rearward of the standard location offering increased leg room for the occupant.

## OCCUPANT PROTECTION OFFICER

The officer's position shall be equipped with the IMMI 4Front and RollTek™ Systems which shall secure belted occupants and increase the survivable space within the cab. The 4Front and RollTek™ Systems shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, and rollover events.

The Officer's seating area protection shall include:

- Officer's knee airbag **OKAB** - inflating knee bolster airbags to protect the knees.
- Integrated roll sensor **IRS** - detects an imminent rollover, activates protective devices and records crash events.
- Integrated belt pretension **IBP** - device for mechanical and/or electrical seats tightens the seat belt, securing officer in seat and positioning officer for contact with seat integrated head cushion side roll airbag.
- Inflatable head cushion seat integrated side roll airbag **SRA** - protects officer's head/neck and shields officer from dangerous surfaces.

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## **SEAT BELT ORIENTATION CREW**

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

## **SEAT FORWARD FACING CENTER LOCATION**

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

## **SEAT CREW FORWARD FACING CENTER**

The forward facing center seat shall be a H.O. Bostrom 500 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

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

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

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

## **SEAT BACK FORWARD FACING CENTER**

The forward facing center seat shall feature a SecureAll™ self contained breathing apparatus (SCBA) locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

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

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **OCCUPANT PROTECTION FFC**

The forward facing center seat positions shall be equipped with the RollTek™ rollover occupant protection system which shall secure occupants, increase the survivable space within the cab and protect against head/neck injuries in the event of a rollover accident.

The system shall function using a microprocessor-controlled, solid-state sensing device which, when the system detects a side roll shall provide instantaneous occupant protection (less than 0.3 seconds from trigger to total deployment) by automatically initiating the following sequence:

1. The seat belt shall tighten around the occupant.

System Components Shall Include:

Integrated Roll Sensor **IRS** - detects an imminent rollover, activates protective devices and records crash events. Integrated Belt Pretension **IBP** with flip-up (non theatre) and fixed mechanical seats - tightens the seat belt around occupant, securing occupant in seat.

Integrated Gas Pretension **IGP** with flip-up theatre style seats - tightens the seat belt around occupant, securing occupant in seat.

## **SEAT FRAME FORWARD FACING**

The forward facing center seating positions shall include an enclosed style seat frame located and installed at the rear wall. The seat frame shall measure 62.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The forward corners of the bench shall be chamfered 45-degrees X 4.00 inches.

## **SEAT FRAME FORWARD FACING STORAGE ACCESS**

There shall be two (2) access points to the storage area centered on the front of the seat frame. Each access point shall be covered by a hinged door to allow access for storage in the seat box.

## **SEAT MOUNTING FORWARD FACING CENTER**

The forward facing center seats shall offer a special mounting. The seats shall be installed 16.00 inches apart offering additional room for each occupant.

## **CAB FRONT UNDERSEAT STORAGE ACCESS**

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

## **SEAT COMPARTMENT DOOR FINISH**

All underseat storage compartment access doors shall feature a dark red spray on bedliner coating.

## **WINDSHIELD WIPER SYSTEM**

The cab shall include a triple arm linkage wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers; each shall be affixed to a radial arm. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position. The windshield wipers shall be interlocked with the park brake allowing activation only when the park brake is released.

There shall be virtual button on the vehicle display and control screen to override the park brake deactivation. This will reset when the park brake is cycled.



# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

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

## **CAB DOOR HARDWARE**

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a gloss black finish.

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

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

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel and painted gloss black.

## **DOOR LOCKS**

The cab entry doors shall include a Controller Area Network (CAN) based electronic door lock system which shall include two (2) external keypads, one (1) located on the left side next to the front grab handle and one (1) located on the right side next to the front grab handle. There shall be one (1) red rocker switch provided on the inside of the driver front cab entry door and one (1) red rocker switch on the top forward portion of the officer side window ledge to actuate the cab door locks. Each door lock may also be manually actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door. The electronic door lock system shall include four (4) key fobs for actuation with buttons for cab entry door locks and for compartment door locks.

When the doors are unlocked using the external keypad or the key fobs the interior dome lights shall illuminate and remain on for a period of twenty (20) seconds. The interior dome safety feature shall require the interior lighting power to be battery direct.

Wiring shall also be provided for up to four (4) exterior cab compartments and up to four (4) body compartments.

## **DOOR LOCK LH EMS COMPARTMENT**

The left hand side EMS compartment shall feature a power door lock actuator.

## **DOOR LOCK RH EMS COMPARTMENT**

The right hand side EMS compartment shall feature a power door lock actuator.

## **DOOR LOCK LH REAR CAB COMPARTMENT**

The left hand side rear compartment shall feature a manual door lock.

## **DOOR LOCK RH REAR CAB COMPARTMENT**

The right hand side rear compartment shall feature a manual door lock.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **POWER DOOR LOCK COMPARTMENT ACTIVATION**

The power door lock feature shall include activation for exterior compartment door locks through the key fob, keypads and through a virtual switch on the vehicle display and control screen.

## **GRAB HANDLES**

The cab shall include one (1) 18.00 inch three-piece knurled aluminum anti-slip exterior grab handle behind each cab door. The Hansen Anti-Slip Rails shall be mounted in bright anodized aluminum 4000 Series II stanchions, complete with weep holes to prevent the buildup of moisture.

The grab rails shall include red reflective tape.

## **LIGHTED GRAB HANDLES**

The grab rails shall include a 12 volt, 17.00 inch long red LED light to provide an increased margin of safety for night time cab entry and egress.

## **REARVIEW MIRRORS**

Ramco model CRM-310-1752-A8-PCHR-MLED bus style mirrors shall be provided. The mirror heads shall be injection molded chrome plated ABS plastic and shall measure 9.50 inches wide X 17.50 inches high. The mirrors shall be mounted one (1) on each front cab corner radius below the windshield with 17.00 inch long polished cast aluminum arms.

The mirrors shall feature an upper heated remote controlled flat glass and a lower heated remote controlled convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall also feature turn signal indicator arrows integrated into the flat mirror glass. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions.

## **REARVIEW MIRROR HEAT SWITCH**

The heat for the rearview mirrors shall be controlled through a virtual button on the vehicle display and control screen.

## **AUXILIARY EXTERIOR MIRRORS**

The cab exterior shall include one (1) Retractable 10.00 inch diameter polished stainless steel convex look down mirror. The mirror shall be located above the right side front windshield using a Retractable model 612665 stainless steel arm assembly to provide a stable three-point mount to reduce mirror vibration. The mirror shall provide additional visibility to the right front corner of the vehicle.

## **EXTERIOR TRIM REAR CORNER**

There shall be brushed finish stainless steel scuff plates on the outside corners at the back of the cab. The stainless steel plate shall be affixed to the cab using two sided adhesive tape.

## **CAB FENDER**

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Fender shall consist of an inner liner 16.00 inches wide made of ABS composite and an outer fenderette 5.00 inches wide made of polished aluminum.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **MUD FLAPS FRONT**

The front wheel wells shall have mud flaps installed on them.

## **CAB EXTERIOR FRONT & SIDE EMBLEMS**

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem on each of the cab sides.

## **CAB EXTERIOR MODEL NAMEPLATE**

The cab shall include "Metro Star" nameplates on the front driver and officer side doors.

## **IGNITION**

A master battery system with a keyless start ignition system shall be provided. There shall be a three-position rocker switch with off, battery, and ignition positions as well as a stainless-steel etched engine start push-button. The engine start button shall include an illuminated LED halo ring. Both switches shall be mounted to the left of the steering wheel on the dash.

The engine start switch shall only operate when the master battery and ignition switch is in the "ignition" position.

## **BATTERY TRAY**

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

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

## **BATTERY CABLE**

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

## **BATTERY JUMPER STUD**

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step, 8.00 inches apart. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

## **ALTERNATOR**

The charging system shall include a 320 amp Leece-Neville 12 volt alternator. The alternator shall include a self-exciting integral regulator.

## **STARTER MOTOR**

The single start electrical system shall include a Delco brand starter motor.

## **ELECTRICAL INLET LOCATION**

An electrical inlet shall be shipped loose for the OEM to install on the body.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **ELECTRICAL INLET**

A Kussmaul 30 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.

### **Amp Draw Reference List:**

*Kussmaul 40 LPC Charger - 5 Amps*

*Kussmaul 40/20 Charger - 8.5 Amps*

*Kussmaul 80 LPC Charger - 13 Amps*

*Kussmaul EV-40 - 6.2 Amps*

*Blue Sea P12 7532 - 7.5 Amps*

*Iota DLS-45/IQ4 - 11 Amps*

*1000W Engine Heater - 8.33 Amps*

*1500W Engine Heater - 12.5 Amps*

*120V Air Compressor - 4.2 Amps*

*120V Dometic HVAC - 15 Amps*

## **ELECTRICAL INLET CONNECTION**

The cab shall be pre-wired for an electrical inlet. Included in the eject feature wiring circuit from the starter button shall be 35.00 feet of coiled wire for installation of the auto-eject inlet by the body builder.

## **ELECTRICAL INLET COLOR**

The electrical inlet connection shall include a red cover.

## **HEADLIGHTS**

The cab front shall include two (2) FireTech rectangular LED headlamps with high/low beam in the same housing and two (2) separate FireTech LED high beam only headlamps mounted in bright chrome bezels.

## **HEADLIGHT LOCATION**

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

## **FRONT TURN SIGNALS**

The front fascia shall include two (2) Whelen model M6 4.00 inch X 6.00 inch amber LED with clear lens turn signals which shall be installed in a black radius mount housing above and outboard of the front warning and head lamps. The lights shall be programmed to emit the "Sequence to Solid 80 FPM" flash pattern.

## **SIDE TURN/MARKER LIGHTS**

The sides of the cab shall include two (2) Tecniq S170 LED side marker lights which shall be provided just behind the front cab radius corners. The lights shall be amber with clear lenses and black bezels.

## **MARKER AND ICC LIGHTS**

In accordance with FMVSS, there shall be five (5) Tecniq S170 LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level. The lights shall be clear lenses with black bezels.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **HEADLIGHT AND MARKER LIGHT ACTIVATION**

The headlights and marker lights shall be controlled via a virtual button on the Vista display. The headlamps shall be equipped with an LED halo parking light around the perimeter of each lamp that shall activate with marker lights "on". The headlights shall turn on in the low beam setting when the park brake is disengaged. The headlights shall turn off when the park brake is engaged. The marker and LED halo parking lights shall turn on when the ignition switch is in the "On" position. There shall be a virtual dimmer control on the Vista display to adjust the brightness of the dash lights.

## **CORNERING LIGHTS**

The chassis shall include two (2) Whelen 500 Series TIR6™ Super-LED® steady-on cornering lights with clear lenses, one (1) each side. The lights shall be mounted within a black bezel.

## **CORNERING LIGHTS ACTIVATION**

Each cornering light head shall illuminate when the respective side turn signal is activated.

## **CORNERING LIGHTS LOCATION**

Each cornering light head shall be centered on the flat surface of the steel channel bumper's angled front right and left corners in the lower position.

## **INTERIOR OVERHEAD LIGHTS**

The cab shall include a Whelen 60CREGCS LED dome lamp located over each door. The dome lamps shall be circular in shape and shall measure approximately 6.00 inches in diameter. The lights shall include push buttons on each lamp to activate both the clear and red portions of the light individually.

## **INTERIOR OVERHEAD LIGHTS ACTIVATION**

The red portion of each lamp shall be activated by opening the respective door.

## **LIGHTBAR PROVISION**

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by the chassis manufacturer. The light bar installation shall include a lowered mounting that shall place the light bar just above the junction box and wiring to a control switch on the cab dash.

## **CAB FRONT LIGHTBAR MODEL**

The cab shall be provided with one (1) Whelen model F4N72 light bar. The light bar shall be 72.00 inches in length and feature eighteen (18) customizable pods.

See the light bar layout for specific details.

## **LIGHTBAR SWITCH**

The light bar shall be controlled by a virtual button on the vehicle display and control screen. This button shall be clearly labeled for identification. Additionally, the lights shall activate when the transmission is placed in reverse.

## **FRONT SCENE LIGHTS**

The front of the cab shall include two (2) Whelen Pioneer model PFH2 contour roof mount scene light installed on the brow of the cab.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

Each 150 watt lamp head shall incorporate a 12 volt DC Super-LED flood light installed in a die-cast aluminum housing. Each lamp head shall use a collimator/metalized redux flood reflector assembly with Proclera™ silicone optics and a clear non-optic polycarbonate lens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The PFH2 shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Each combination flood light lamp head shall draw 13.0 amps in spotlight mode and generate 17,750 lumens total. Each lamp head shall measure 4.25 inches in height X 14.00 inches in width. The lamp heads and brackets shall be powder coated black. .

## **FRONT SCENE LIGHT LOCATION**

There shall be one (1) scene light mounted center on the front brow of the cab.

## **FRONT SCENE LIGHTS ACTIVATION**

The front scene lighting shall be activated by a virtual button on the vehicle display and control screen.

## **SIDE SCENE LIGHTS**

The cab shall include two (2) Whelen Pioneer model PCPSM2B LED surface mount lights installed one (1) on each side of the cab.

The PCPSM2B configuration shall consist of 24 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 48 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. The Pioneer flood/spot light shall draw 12.0 amps and generate 16,000 usable lumens. The PCPSM2B projects light directly down at 5-degree and producing illumination to the side of the vehicle arching upward to a 90-degree pattern of light. Each lamp head shall measure 6.37 inches in height X 16.22 inches in width and shall be painted black.

## **SIDE SCENE LIGHT LOCATION**

The scene lighting located on the left and right sides of the cab shall be mounted rearward of the cab "B" pillar in the 10.00 inch raised roof portion of the cab between the front and rear crew doors.

## **SIDE SCENE ACTIVATION**

The scene lights shall be activated by two (2) virtual buttons on the vehicle display and control screen(s), one (1) for each light, and by opening the respective side cab doors.

## **GROUND LIGHTS**

Each door shall include a Tecniq T44 LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life.

## **GROUND LIGHTS**

The ground lighting shall be activated when the parking brake is set, by the opening of the door on the respective cab side, through a virtual button on the vehicle display and control screen, when the truck is placed into reverse, and by the respective side turn signal.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **LOWER CAB STEP LIGHTS**

The middle step located at each door shall include a Tecniq T44 LED light which shall activate with the opening of the respective door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life.

## **INTERMEDIATE STEP LIGHTS**

The intermediate step well area at each door shall include a TecNiq D06 LED light within a chrome housing. The egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The egress step lights shall activate with entry step lighting.

## **CAB SPOTLIGHTS**

The cab shall include two (2) Golight model 30214ST black remote controlled LED spotlights. Each spotlight shall be mounted on a raised bracket on the flat surface of the cab roof as far rearward and outboard as possible. Each spotlight shall feature an LED lamp, capable of 370-degree rotation and 135-degree vertical adjustment. Each spotlight shall include a remote control installed on the switch panel.

## **ENGINE COMPARTMENT LIGHT**

There shall be a LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall activate automatically when the cab is tilted.

## **DO NOT MOVE APPARATUS LIGHT**

The front headliner of the cab shall include a flashing red TecNiq K50 LED light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be located centered left to right for greatest visibility.

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

## **MASTER WARNING SWITCH**

A master switch shall be included, as a virtual button on the vehicle display and control screen which shall be labeled "E Master" for identification. The button shall feature control over all devices wired through it. Any warning device switches left in the "ON" position when the master switch is activated shall automatically power up.

There shall be an additional virtual button on the vehicle display and control screen to manually override an automatic warning light dimmer clearly labeled "WARNING LIGHT DIMMER". The warning light dimmer will automatically reduce the brightness of the warning lights with the display screen "Night" dimmer setting and with the park brake set. The operator can override the warning light dimmer feature and manually select the warning lights to be at normal brightness using the warning light dimmer virtual button, or "Day" display screen brightness. The lights shall also default to normal brightness when the "E Master" button is activated, and the park brake is released.

## **HEADLIGHT FLASHER**

The LED Halo ring shall alternate from left to right on the driver side, outer to inner light and the LED Halo ring shall alternate from right to left on the officer side, outer to inner light.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **HEADLIGHT FLASHER SWITCH**

The flashing headlights shall be activated through a virtual button on the Vista display and control screen. There shall be no blocking mode on clear warning lights.

## **INBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn. The lights shall be mounted to the front fascia of the cab within a chrome bezel. The warning lights shall be set to emit the "DoubleFlash 150" left/right flash pattern.

## **INBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the inboard positions shall be green with a clear lens.

## **OUTBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right outboard positions. The lights shall feature multiple flash patterns including steady burn. The lights shall be mounted to the front fascia of the cab within a chrome bezel. The warning lights shall be set to emit the "Cylon Fast" flash pattern.

## **OUTBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the outboard position shall be red with a clear lens.

## **BUMPER FACE WARNING LIGHT**

The front bumper face shall include two (2) Whelen M6 series 4.31 inch tall X 6.75 inch wide Super LED® warning lights. The warning lights shall feature multiple flash patterns including steady burn. The lights shall be surface mounted within a black bezel. The warning lights shall be set to flash "DoubleFlash 150" in/out flash pattern.

## **BUMPER FACE WARNING LIGHT COLOR**

The warning lights in the bumper shall be red with clear lenses.

## **BUMPER FACE WARNING LIGHT LOCATION**

The front bumper face warning lights shall be located between the frame rails in the right and left side outboard positions.

## **FRONT WARNING SWITCH**

The front warning lights shall be controlled through a virtual control on the vehicle display and control screen. This switch shall be clearly labeled for identification. There shall be an additional virtual button on the vehicle display and control screen to manually override an automatic warning light dimmer clearly labeled "WARNING LIGHT DIMMER". The warning light dimmer will automatically reduce the brightness of the warning lights with Multiplex display screen "Dim" or "Night" dimmer setting and with the park brake set. The operator can override the warning light dimmer feature and manually select the warning lights to be at normal brightness using the warning light dimmer virtual button or "Max"/"Day" vista brightness. The lights shall default to normal brightness when the park brake is released. The lights will also come on in reverse.



# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Whelen M6 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn. The lights shall be set to flash "DoubleFlash 150" in/out flash pattern. The lights shall be mounted within a black bezel.

## **INTERSECTION WARNING LIGHTS COLOR**

The intersection lights shall be red with a clear lens.

## **INTERSECTION WARNING LIGHTS LOCATION**

The intersection lights shall be mounted centered front to rear on the flat portion of the side of the bumper tail.

## **AUXILIARY INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Whelen M6 series Super LED auxiliary intersection warning lights, one (1) each side. The lights shall be set to flash "DoubleFlash 150" in/out flash pattern. The lights shall be installed in a black bezel.

## **AUXILIARY INTERSECTION WARNING LIGHTS COLOR**

The auxiliary intersection warning lights shall be red with clear lens.

## **AUXILIARY INTERSECTION WARNING LIGHTS LOCATION**

Aux Intersection Warn Lts Loc Bmpr Corner Mnt Above Corner Lights

## **SIDE WARNING LIGHTS**

The cab sides shall include two (2) Whelen M6 Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a black bezel. The light shall be programmed to emit the "DoubleFlash 150" in/out flash pattern.

## **SIDE WARNING LIGHTS COLOR**

The warning lights located on the side of the cab shall be red with clear lens.

## **SIDE WARNING LIGHTS LOCATION**

The warning lights on the side of the cab shall be mounted over the front wheel well forward from the center of the front axle.

## **AUXILIARY SIDE WARNING LIGHTS**

The cab side shall include an auxiliary set of Whelen series M6 4.00 inch tall X 6.00 inch wide Super LED warning lights, one (1) each side, which shall feature multiple flash patterns including steady burn. The warning lights shall be set to flash "DoubleFlash 150" in/out flash pattern. The lights shall be surface mounted in a black bezel.

## **AUXILIARY SIDE WARNING LIGHTS COLOR**

The auxiliary warning lights located on the side of the cab shall be red with clear lens.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **AUXILIARY SIDE WARNING LIGHTS LOCATION**

The auxiliary warning lights on the side of the cab shall be mounted behind the rear crew door in the highest position available.

## **SIDE AND INTERSECTION WARNING SWITCH**

The side warning lights shall be controlled through a virtual button on the vehicle display and control screen. This button shall be clearly labeled for identification. There shall be an additional virtual button on the vehicle display and control screen to manually override an automatic warning light dimmer clearly labeled "WARNING LIGHT DIMMER". The warning light dimmer will automatically reduce the brightness of the warning lights with Multiplex display screen "Dim" or "Night" dimmer setting and with the park brake set. The operator can override the warning light dimmer feature and manually select the warning lights to be at normal brightness using the warning light dimmer virtual button or "Max"/"Day" display screen brightness. The lights shall default to normal brightness when the park brake is released. The lights will also come on in reverse.

## **TANK LEVEL LIGHTS**

There shall be two (2) FRC MaxVision surface mount water level light strips.

The light strips shall feature four (4) colors of LED lights to indicate the fluid level of a tank. The colors from top to bottom shall be green, blue, amber, and red.

## **TANK LEVEL LIGHTS ACTIVATION**

The tank level lights shall be pre-wired and coiled at rear of the cab for connection to the apparatus by the body builder.

## **TANK LEVEL LIGHTS LOCATION**

There shall be water level lights mounted on each side of the cab, centered between the rear cab doors and the rear corners of the cab below the side warning lights.

## **TRAFFIC CONTROL**

There shall be one (1) GTT (Global Traffic Technologies) Opticom model 795H traffic control optical emitter mounted in the lightbar on the front of the cab roof. The emitter shall be activated by a virtual button on the Vista display and control screen. The display shall also include an integral indicator. The emitter shall be deactivated when the parking brake is applied.

## **ROTO-RAYS WARNING LIGHT**

A Roto-Rays® warning light shall be provided on the cab. The Roto-Rays light shall consist of three (3) round chrome heads, each equipped with an LED light. The LED lights shall be two (2) red and one (1) green in color. The Roto-Rays light shall be installed on the top center of the cab front fascia using a custom bracket.

When activated, the entire light head assembly shall rotate at 200 RPM.

## **ROTO-RAYS WARNING LIGHT SWITCH**

The Roto-Rays® front warning light(s) shall be separately controlled through a virtual button on the Vista display and control screen. When the parking brake is engaged the light shall stop rotating. Additionally, the lights shall activate when the transmission is placed in reverse.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **SIREN CONTROL HEAD**

A Whelen 295SLSC1 electronic siren control head with hard wired microphone shall be mounted in the cab dash center panel in a location specified by the customer. The siren shall offer a selectable 100 or 200-watt output, radio broadcast, public address, and seventeen (17) Scan-Lock siren tones and hands free operation which shall allow the operator to turn the siren on and off from the steering wheel horn ring if a horn/siren selector switch option is also selected. The siren circuitry shall be placed behind the rocker switch panels under the electrical cover with a 30.00 inch loop for the OEM to route as desired.

## **STEERING WHEEL HORN BUTTON SELECTOR SWITCH**

A virtual button on the Vista display and control screen shall be provided to allow control of either the electric horn or the electronic siren from the steering wheel horn button. When the emergency master switch is on the horn button selector shall default to siren activation. The electric horn shall sound when the selector switch is in either position to meet FMCSA requirements.

## **AUDIBLE WARNING LH FOOT SWITCH**

Two (2) foot actuated switches shall be supplied for installation in the front section of the cab for driver actuation. One (1) switch shall be wired to actuate the air horn(s) and one (1) switch the mechanical siren(s).

## **AIR HORN FOOT SWITCH LH**

The air horn foot switch shall be a Linemaster model 491-S.

## **AIR HORN FOOT SWITCH LH LOCATION**

The air horn foot switch shall be located on the left hand side accessible to the driver between the steering column and the door.

## **AIR HORN FOOT SWITCH LH POSITION**

The air horn foot switch shall be positioned inboard of any other foot switch, if applicable.

## **MECHANICAL SIREN FOOT SWITCH LH**

The mechanical siren foot switch shall be a Linemaster model 491-S.

## **MECHANICAL SIREN FOOT SWITCH LH LOCATION**

The mechanical siren foot switch shall be located on the left hand side accessible to the driver between the steering column and the door.

## **MECHANICAL SIREN FOOT SWITCH LH POSITION**

The mechanical siren foot switch shall be positioned outboard of any other foot switch, if applicable.

## **AUDIBLE WARNING LH FOOT SWITCH BRACKET**

A 30.00 degree angled foot switch bracket, wide enough to accommodate (2) foot switches, shall be installed outboard of the steering column for specified driver accessible foot switch activations.

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## AIR HORN AUXILIARY ACTIVATION

The air horn activation shall be accomplished by a black momentary push button on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

## MECHANICAL SIREN BRAKE/AUXILIARY ACTIVATION

The mechanical siren shall be actuated by a black push button in the switch panel on the dash. A virtual button for the siren brake shall be provided on the vehicle display and control screen.

## MECHANICAL SIREN INTERLOCK

The siren shall only be active when master warning switch is on to prevent accidental engagement.

## ELECTRONIC SIREN AUXILIARY ACTIVATION

The Howler™ siren shall include activation by a black push button on the switch panel.

## BACK-UP ALARM

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

## INSTRUMENTATION

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

A twenty eight (28) icon lightbar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

One (1) three-movement gauge displaying vehicle speed, fuel level, and Diesel Exhaust Fluid (DEF) level. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H. The scale on the fuel and DEF level gauges shall read from empty to full as a fraction of full tank capacity. Red indicator lights in the gauge and an audible alarm shall indicate low fuel or low DEF at 1/8<sup>th</sup> tank level.

One (1) three-movement gauge displaying engine RPM, and primary and secondary air system pressures shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI) with a red line zone indicating critical levels of air pressure. Red indicator lights in the gauge and an audible alarm shall indicate low air pressure.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature shall be included. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds PSI with a red line zone indicating critical levels of oil pressure. A red indicator light in the gauge and audible alarm shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (°F) with a red line zone indicating critical coolant temperatures. A red indicator light in the gauge and audible alarm shall indicate high coolant temperature. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red indicator light in the gauge and an audible alarm shall indicate high or low system voltage. The low voltage alarm shall indicate when the system voltage has dropped below 11.8 volts for

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more than 120 seconds in accordance with the requirements of NFPA 1901. The scale on the transmission temperature gauge shall read from 100 to 300 degrees °F with a red line zone indicating critical temperatures. A red indicator light in the gauge and an audible alarm shall indicate a high transmission temperature.

The light bar portion of the message center shall include twenty-eight (28) LED backlit indicators. The lightbar shall be split with fourteen (14) indicators on each side of the LCD message screen. The lightbar shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

## **RED INDICATORS**

Stop Engine - indicates critical engine fault  
Air Filter Restricted - indicates excessive engine air intake restriction  
Park Brake - indicates parking brake is set  
Seat Belt - indicates a seat is occupied and corresponding seat belt remains unfastened  
Low Coolant - indicates critically low engine coolant  
Cab Tilt Lock - indicates the cab tilt system locks are not engaged.

## **AMBER INDICATORS**

Malfunction Indicator Lamp (MIL) - indicates an engine emission control system fault  
Check Engine - indicates engine fault  
Check Transmission - indicates transmission fault  
Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault  
High exhaust system temperature – indicates elevated exhaust temperatures  
Water in Fuel - indicates presence of water in fuel filter  
Wait to Start - indicates active engine air preheat cycle  
Windshield Washer Fluid – indicates washer fluid is low  
DPF restriction - indicates a restriction of the diesel particulate filter  
Regen Inhibit - indicates regeneration of the DPF has been inhibited by the operator  
Range Inhibit - indicates a transmission operation is prevented and requested shift request may not occur.  
SRS - indicates a problem in the supplemental restraint system  
Check Message - indicates a vehicle status or diagnostic message on the LCD display requiring attention.

## **GREEN INDICATORS**

Left and Right turn signal indicators  
ATC - indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system  
High Idle - indicates engine high idle is active.  
Cruise Control - indicates cruise control is enabled  
OK to Pump - indicates the pump is engaged and conditions have been met for pump operations  
Pump Engaged - indicates the pump transmission is currently in pump gear  
Auxiliary Brake - indicates secondary braking device is active

## **BLUE INDICATORS**

High Beam indicator

## **AUDIBLE ALARMS**

Air Filter Restriction  
Cab Tilt Lock  
Check Engine  
Check Transmission  
Open Door/Compartment  
High Coolant Temperature  
High or Low System Voltage  
High Transmission Temperature

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Low Air Pressure  
Low Coolant Level  
Low DEF Level  
Low Engine Oil Pressure  
Low Fuel  
Seatbelt Indicator  
Stop Engine  
Water in Fuel  
Extended Left/Right Turn Signal On  
ABS System Fault

## **BACKLIGHTING COLOR**

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

## **AUXILIARY SPEEDOMETER**

The right hand side vehicle display and control screen shall include an auxiliary speedometer with a digital readout.

## **RADIO**

A Jensen brand heavy-duty radio with weather band, AM/FM stereo receiver and Bluetooth capabilities shall be installed in a customer specified location. Radio shall be the current, commercially available heavy-duty single-DIN automotive model at time of vehicle manufacturing date.

## **RADIO LOCATION**

The radio shall be installed in the right hand overhead position above the officer.

## **AM/FM ANTENNA**

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

## **RADIO SPEAKERS**

There shall be two (2) speakers installed in the front portion of the cab recessed overhead and two (2) speakers installed in the rear portion of the cab overhead. The speakers shall be provided for connection to the sound system.

## **CAMERA REAR**

One (1) Audiovox Voyager heavy duty box shaped HD camera shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.

The rear camera display shall activate when the vehicle's transmission is placed in reverse.

## **CAMERA DISPLAY**

The camera system shall be wired to two (2) vehicle display and control screens located on the driver's and officer's side dash. The camera system display can be activated through the vehicle display and control screens.

## **COMMUNICATION ANTENNA**

The antenna shall be a custom configured Sharkee antenna shall be mounted on the right hand front corner of the cab raised roof so not to interfere with light bars or other roof mounted equipment installed by chassis builder. The antenna shall be chassis builder supplied.

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The custom configuration shall include:

- GPSB MULTI-BAND GPS 2G/3G/4G/WLAN ANT
- C23F-5F FME(ftd) FME(ftd) 5m CS23
- DPX-210-270 FILTER UNIT 50-210/270-100 FME
- C29SP-5SJ CS29 CABLE 5m SMA PLG TO SMA JACK
- C23F-1MP FME(f) MPL(m) 1m CS23 CABLE
- C74-FP-6-TNCP FME(m)-TNC(m) RG174 6m CABLE
- ASFC-155-U2-S5 FLEXI 155MHz/U2/S5 COMPRSD ANT

## **COMMUNICATION ANTENNA CABLE ROUTING**

The antenna cable shall be routed from the antenna base mounted on the roof to the area inside the center rocker switch console.

## **FIRE EXTINGUISHER**

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

## **DOOR KEYS**

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

## **WARRANTY**

Purchaser shall receive a Custom Chassis Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0102. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **CHASSIS OPERATION MANUAL**

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

## **ENGINE AND TRANSMISSION OPERATION MANUALS**

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:

- (1) Hard copy of the Engine Operation and Maintenance manual with digital copy
- (1) Digital copy of the Transmission Operator's manual
- (1) Digital copy of the Engine Owner's manual

## **CAB/CHASSIS AS BUILT WIRING DIAGRAMS**

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

## **SALES TERMS**

The sale of the chassis shall be governed by the terms contained on the Sales Terms – Acceptance of Purchase Order document, a copy of which is attached to this option.

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## DRIVELINE LAYOUT CONFIRMATION

During the design phase of the chassis the Spartan Chassis driveline engineer shall submit the driveline layout to an OEM engineer to review the chassis design for any potential problems integrating the OEM body to the chassis. The OEM engineer shall provide approval to the driveline engineer prior to driveline bills of materials being released.

## EXHAUST HEAT SHIELD

There shall be an exhaust heat shield added to the chassis provided exhaust. The shield shall terminate past the front compartment and shall incorporate a heavy duty spray on insulation under R1.

The heat shield shall be attached to the underside of the body utilizing a flexible bracket.

## UNIVERSAL MDT TRAY

There shall be one (1) Mobile Data Terminal (MDT) slide tray installed in the cab on the officer's side dash.

The tray shall incorporate one (1) locking and one (1) non-locking 10.00 inch bearing slides. The slides shall be installed 'flat' to reduce the overall height of the tray.

The tray shall be fabricated from .1875 inch smooth aluminum.

## TRAY FINISH

The tray shall be a painted finish/color equivalent to the chassis interior unless specified otherwise.

## SHORELINE RECEPTACLE W/AUTO EJECT

A Kussmaul "Super Auto-Eject" 120 volt shoreline receptacle shall be shipped loose with the chassis and installed on the apparatus.

## RECEPTACLE LOCATION

The shoreline connection shall be installed in the left rear body panel of the apparatus.

## MOUNTING BRACKET

The receptacle shall be installed in an angled housing that shall be mounted at the left rear vertical body panel.

The housing shall be painted [with black bedliner](#).

## ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery charger [and 110V AC](#).

## CHASSIS REQUIRED LABELING

[Innovated Controls](#) Signs that state "Occupants must be seated and belted when apparatus is in motion" shall be provided.

They shall be visible from each seating position.

There shall be a lubrication plate mounted inside the cab listing the type and grade of lubrication used in the following areas on the apparatus and chassis:



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- Engine oil
- Engine Coolant
- Transmission Fluid
- Pump Transmission Lubrication Fluid
- Drive Axle Lubrication Fluid
- Generator Lubrication Fluid (where applicable)
- Tire Pressures

## **APPARATUS INFORMATION LABEL**

There shall be a high-visibility label installed in a location clearly detectable to the driver while in the seated position.

The label shall indicate the following specified information.

- Overall Height (feet and inches)
- Overall Length (feet and inches)
- Overall GVWR (tons or metric tons)

## **CAB TILT CONTROL**

There shall be a cab tilt pendant control provided and installed on the right side of the apparatus. The pendant shall be located directly behind the lower auxiliary pump access panel, accessible through a small, hinged door secured with a push button style latch.

A label shall be provided that states "CAB TILT".

There shall also be a cab tilt instruction plate located as close as possible to the control pendant for ease of operation.

## **AIR TANK DRAIN LINES (extended)**

There shall be manual pull air tank drain lines provided with the apparatus. The air drain lines shall be extended to the outer edge of the apparatus to facilitate draining moisture from the chassis air tanks to a single location for all drains and shall be actuated by a key ring. A label shall be affixed indicating "Air Tank Drain".

## **HEAT EXCHANGER**

The supplementary heat exchanger cooling system shall be provided and installed to the discharge side of the fire pump through to the engine compartment without intermixing, for absorption of excess heat.

The heat exchanger shall be adequate in size to maintain safe operating temperature of the coolant in the pump drive engine and not in excess of the engine manufacturer's temperature rating, under all pumping conditions. Appropriate drains shall be provided to allow draining the heat exchanger to prevent damage from freezing.

## **HELMET RESTRAINTS**

All NFPA required helmet restraints will be supplied and installed by the Fire Department prior to the truck being placed into service.

## **MUD FLAPS**

Heavy-duty black rubber mud flaps with manufactures logo shall be provided behind the rear wheels. The mud flaps shall be bolted in place.

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## BRANCH GUARD

There shall be a guard installed around the front and sides of the 110V AC. The guard shall be manufactured from smooth aluminum and be painted to color match the top of the apparatus. The front of the guard shall be angled to 60 degrees and shall only be as high as the 110V AC.

The guard shall be designed to match 222115 North Richland Hills, TX.

## PUMP COMPARTMENT

The complete apparatus pump compartment shall be constructed of a combination of structural tubing and formed sheet metal. The same materials used in the body shall be utilized in the construction of the pump compartment. The structure shall be welded utilizing the same A.W.S. Certified welding procedure as used on the structural body module. These processes shall ensure the quality of structural stability of the pump compartment module.

The pump compartment module shall be separated from the apparatus body with a gap. This gap is necessary to accommodate the flexing of the chassis frame rails that are encountered while the vehicle is in transit so that harmful torsional forces are not transmitted into the structural framework.

## VIBRA-TORQ™ PUMP MODULE MOUNTING SYSTEM

The entire pump module assembly shall be mounted so that it “floats” above the chassis frame rails exclusively with Vibra-Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable pump module mounting system.

The pump module substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be powder coated for corrosion resistance. Each pump compartment mount bracket shall be mounted to the side chassis frame flange with two 5/8”-UNC Grade 5 HHCS.

Each assembly shall have a two-part rubber vibration isolator. The isolator shall be of a specific durometer to carry the necessary loads of the pump module, apparatus body, equipment, tank, water, and hose. The quantity of mounts utilized shall correspond directly to the anticipated weight being supported. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

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

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature pump module structural failures. The Vibra-Torq™ mounting system shall have a lifetime warranty.

## PUMP COMPARTMENT WORK LIGHT

One (1) LED OnScene Solutions "Access" Series 54.00 inch (1371.60 mm) tube light shall be installed inside the pump compartment module to illuminate the piping and plumbing components.

The light shall be activated by a weather resistant toggle switch installed inside the pump compartment.

## LEFT SIDE OPERATORS PANEL & PUMP PANEL

The pump operator's panel shall be located on the left side of the apparatus pump compartment. The panel shall be

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split into an upper and lower section.

The material of the operator's panel shall match that of the overlays and right side panels specified.

The upper panel shall house gauges and controls and be hinged to allow easy access to components. The door shall have a stainless steel hinge, dual point chrome push button latches and a rubber seal provided to prevent excessive moisture from entering or leaving the pump house.

The lower panel on the left side shall be a removable panel attached with mechanical fasteners.

Valve controls shall be immediately adjacent to its respective gauge. The valve controls shall be properly labeled, and color coded for ease of use. All markings shall be permanent in nature.

## **OPEN DOOR WARNING**

If the hinged panel is not properly closed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

## **VALVE CONTROL - T-HANDLE PULL ASSEMBLY**

Unless specified otherwise, the discharge valves shall be controlled from an Innovative Controls side mount valve control assembly. The ergonomically designed handle shall be chrome-plated with recessed areas for name plate and color code. A .75 inch (19.5 mm) diameter hardcoat anodized aluminum control rod and housing shall, together with a stainless spring steel locking mechanism, eliminate valve drift. Teflon impregnated bronze bushings in both ends of the rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation. The control assembly shall include a decorative chrome-plated panel-mounting bezel. The valve operating mechanism will indicate the position of the valve at all times.

## **PUMP PANEL LIGHTS**

There shall be adequate illumination provided at the side pump panels with the installation of two (2) embossed aluminum diamond plate shielded light assemblies functioning as an intermediate step and installed on a stationary surface, one (1) on the left and one (1) on the right side pump compartment.

There shall be up to three (3) handhold cutouts provided in the top step surface measuring approximately 2.50 inches deep. There shall be one (1) full length aluminum non lit handrail integrated into each side assembly.

Each shield shall contain one (1) maximum length available OnScene LED "Access" light.

The operator panel light shield shall have squared ends for maximum stepping surface.

## **PUMP PANEL LIGHT ACTIVATION**

One (1) pump panel light at the operator's panel shall be illuminated at the time the pump is ready to pump and it is "OK TO PUMP". The Pump shift has been completed and the chassis automatic transmission is engaged.

The remaining lights shall be controlled by a switch located on the side operator's panel.

## **PUMP COMPARTMENT SERVICE ACCESS**

The front portion of the pump compartment structure (directly behind the chassis cab) shall not be overlaid. The outer edges of the pump compartment shall be overlaid with aluminum diamond plate for a pleasing appearance.

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## **PUMP COMPARTMENT WIDTH**

The width of the pump compartment (front to back) shall be 48.00 inches (1.21 m).

## **RIGHT SIDE PUMP PANELS STYLE**

There shall be two (2) pump panels on the right side of the pump compartment, one (1) upper and one (1) lower. Each panel shall be reinforced with hat channels installed on the backside of the panel to add stiffness.

Both panels shall be vertically hinged on the rearward or body side of the panel with a gas shock hold open device installed. Both openings shall be accessible by quick-release mechanical type latches closing against a door seal.

When opened; the panels shall provide a large access opening to the pump for ease of serviceability.

The upper panel shall open first and there shall not be a fixed middle sill between the hinged panels.

## **RIGHT & LEFT SIDE BLACK LAMINOL PANELS & OVERLAYS**

The panels for the pump compartment on the left and right side shall be made from heavy duty "Black Laminol" covered aluminum, capable of withstanding the conditions of effects of extreme weather and temperature changes.

The tubular structure shall be overlaid on each side of the pump compartment underneath the access panels and shall be made of heavy duty "Black Laminol" covered aluminum.

## **OPEN DOOR WARNING**

If the hinged panel(s) are not properly closed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

## **SOFT SUCTION HOSE STORAGE**

There shall be a recessed cavity on the left side of the pump compartment module integrated into the side panel to store a roll of 25 feet of 5.00 inch suction hose. The cavity shall be approximately 10.00 inches (254 mm) wide. The floor area shall have a light taper downward so assist in restraining the hose. Drain holes shall be provided in the rear corners.

## **COMPARTMENT LOCATION**

The storage cavity shall be located forward of the steamer inlet on the pump panel.

## **HOSE COMPARTMENT STORAGE CAVITY INTERIOR FINISH**

The interior of the hose storage compartment shall feature a painted black Superliner finish.

## **PUMP HOUSE STORAGE TRIM**

The above storage compartment shall have brushed stainless steel trim provided around the opening.

## **SOFT SUCTION HOSE STORAGE**

There shall be a recessed cavity on the right side of the pump compartment module integrated into the side panel to store a roll of 25' of 5" suction hose. The cavity shall be approximately 10.00 inches (254 mm) wide. The floor area shall have a light taper downward so assist in restraining the hose and notched as required for exhaust configurations. Drain holes shall be provided in the rear corners.

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## **COMPARTMENT LOCATION**

The storage cavity shall be located forward of the steamer inlet on the pump panel.

## **HOSE COMPARTMENT STORAGE CAVITY INTERIOR FINISH**

The interior of the hose storage compartment shall feature a painted black Superliner finish.

## **PUMP HOUSE STORAGE TRIM**

The above storage compartment shall have brushed stainless steel trim provided around the opening.

## **RUNNING BOARDS**

The pump compartment running boards shall be made of a structural tubular framework. The tubular frame supports all loads by transmitting the loads through the pump compartment structure directly to the chassis frame rails.

The running boards shall be independent of the apparatus body and shall be integrated to the pump compartment structure only, eliminating any pump compartment to body interference. This is essential in keeping a truly 'modular' configuration. Slip-resistant abrasive adhesive materials shall be applied to the top surface of the running board framework to provide a suitable stepping surface where applicable.

## **EMBOSSSED ALUMINUM DIAMOND PLATE OVERLAYS**

The side running boards shall have a .188 inch (4.76 mm) embossed aluminum diamond plate overlays installed. The stepping areas shall be as large as possible, overlapping the perimeter of the running board structure.

## **LEFT SIDE SLIDE OUT PLATFORM**

There shall be an OnScene brand slide out platform installed under the left side pump compartment running board. The platform shall be as wide as possible to fit the pump compartment and shall be approximately 16.00 inches (406.40 mm) deep when extended.

The platform shall lock into place while in the extended and stowed positions. The platform surface shall be constructed of "Aluminum Diamond Grip Strut" material with adhesive tape covering the framework.

There shall be a reinforcement channel on the back of the step.

If the slide out step is not properly stowed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

## **RIGHT SIDE SLIDE OUT PLATFORM**

There shall be an OnScene brand slide out platform installed under the right side pump compartment running board. The platform shall be as wide as possible to fit the pump compartment and shall be between 12.00 inches (304.80 mm) and 16.00 inches (406.40 mm) deep when extended pending exhaust configuration.

The platform shall lock into place while in the extended and stowed positions. The platform surface shall be constructed of "Aluminum Diamond Grip Strut" material with adhesive tape covering the framework.

There shall be a reinforcement channel on the back of the step.

If the slide out step is not properly stowed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

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## PRESSURE GOVERNOR, MONITORING, and MASTER PRESSURE DISPLAY

Fire Research "InControl 400" Series pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

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

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

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

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

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

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

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

## INTAKE PRESSURE RELIEF VALVE

A Task Force Tips model #A18XX pressure relief valve shall be provided. The valve shall have an easy to read adjustment range from 90 to 300 PSI with easy to read 90, 125, 150, 200, 250, 300 psi settings and an "OFF" position. Pressure adjustment can be made utilizing a 1/4" hex key, 9/16" socket or 14mm socket.

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For corrosion resistance the cast aluminum valve shall be a hardcoat anodized with a powder coat interior and exterior finish. The valve shall meet NFPA, Standard for Automotive Fire Apparatus, requirements for pump inlet relief valves. The unit shall be covered by a five year warranty. The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure, unless otherwise shop noted. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere and shall dump on the opposite side of the pump operator.

For normal pumping operations, the relief valve shall not be capped and there shall be a placard stating "DO NOT CAP" installed.

## **MASTER GAUGES**

Thuemling 4.50 inch (115 mm) gauges shall be supplied for the master intake and master discharge gauges.

The gauges shall be model FA-LFP-410.

## **GAUGE SCALE**

The master intake gauge shall be marked for a reading from -30 to 400 PSI and the master discharge shall be marked for reading a discharge pressure of 0 to 400 PSI.

## **GAUGE FACE COLOR**

Each gauge shall have black markings on a white face.

## **TESTING PORTS**

Test port connections for pressure and vacuum shall be provided at the pump operator's panel. One (1) shall be connected to the intake side of the pump, and the other to the discharge manifold side of the pump.

Each port shall have 0.25 inch (6.35 mm) standard pipe thread connection and be manufactured of non-corrosive polished stainless steel or brass plugs.

## **TANK LEVEL GAUGE**

A Fire Research TankVision model WLA300-A00 tank indicator kit shall be installed at the pump operator's panel location. The kit shall include an electronic indicator module, a pressure sensor, and a 20.00 foot sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

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

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the water tank near the bottom. No probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

## **CHASSIS INSTALLED TANK LEVEL GAUGE**

The chassis shall include two (2) tank level gauges installed.

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## **AIR HORN BUTTON**

There shall be an air horn activation red push button provided and installed on the pump operator's gauge panel. The air horn button shall be of weather resistance type and labeled "AIR HORN".

## **PUMP COMPARTMENT TOP OVERLAY**

The top cap of the pump compartment shall be overlaid with materials of a non-slip .188 inch (4.76 mm) embossed aluminum diamond plate.

## **DUNNAGE AREA**

A single wall .125 inch (3.18 mm) aluminum diamond plate dunnage area shall be provided above the pump house compartment for equipment mounting and storage space.

The dunnage area shall be as wide as possible from side to side, and as deep as allowed with the available space.

## **SINGLE STAGE FIRE PUMP**

The pump shall be a Darley PSM single stage fire pump, capable of up to a 1500 GPM rating.

The pump casing shall be a fine grain cast iron alloy, vertically split, with a minimum 40,000 psi tensile strength and bronze fitted.

The pump shall contain a cored heating jacket feature that, if selected, can be connected into the vehicle antifreeze system to protect the pump from freezing in cold climates as well as cooling the vehicle chassis engine.

The impeller shall be a high strength bronze alloy of a radial flow design for high suction lift capacity, accurately balanced and splined to the pump shaft for precision fit and durability.

The pump shaft shall be precision ground stainless steel with long wearing, very hard, chrome oxide coating. The shaft shall be splined to receive broached impeller hubs, for greater resistance to wear, torsional vibration, and torque imposed by engine. Shaft seal comes standard with face-type, self-adjusting corrosion- and wear-resistant mechanical seals.

The bearings provided shall be heavy duty, deep groove, and radial type ball bearings. They shall be oversized for extended life. The bearings shall be protected at all openings from road dirt and water splash with oil seals and water slingers.

The transmission case shall be heavy duty cast iron alloy with adequate oil reserve capacity for low operating temperatures. A magnetic drain plug shall be provided. Transmission case shall include a dip stick for checking oil level. The transmission shall be cooled with patented "AutoCool" cooler plate. Due to potential damage from freezing, designs which send water into the transmission are prohibited.

The pump drive shaft shall be precision ground, heat treated alloy steel, with a minimum 2.50 inch by 10.00 inch spline ends. Gears shall be helical design and shall be precision cut for quiet operation and extended life. The gears shall be cut from high strength alloy steel, heat treated, precision ground and carburized.

The gear shift shall be a heat treated alloy steel splined spur gear to engage either the pump drive gear or the truck drive shaft gear. The gear teeth shall be bullet nosed to minimize potential for a butt-tooth condition. The gear ratio of the pump shall be selected by the pump and apparatus manufacturer's Engineering Department.

Due to the advantages of the above gear and drive feature, chain drive and designs requiring additional lubrication are not acceptable.

A discharge manifold, as supplied as part of the pump by the pump manufacturer, shall include a discharge head check



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valve assembly to allow priming of the pump from draft with discharges open and caps off, and to prime faster than designs that require the air to be evacuated from the discharge manifolding.

Discharge outlets shall have extensions with companion flange openings to allow ease of service.

## **DARLEY PUMP WARRANTY**

W. S. Darley & Co. shall provide a limited manufacturer's pump warranty to be free from defects in materials and workmanship, under normal use and service, for a period of six (6) years from the date placed into service, (6 ½) years from the date of manufacture or 6000 hours of usage {unless otherwise specified} whichever comes first.

## **PUMP SEALS**

The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner that they will remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

## **PUMP SHIFT MANUAL OVERRIDE**

In the event of pump shift failure, the pump can be shifted into gear by a push/pull manual override mechanism, allowing the pump to be engaged manually. The handle shall be located on the lower portion of the driver's side pump panel and shall be labeled accordingly.

## **AIR PRIMER SYSTEM**

The priming system shall be a Trident Emergency Products compressed air powered high efficiency, multi-stage, venturi based Air Prime System.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction. A single panel mounted control will activate the priming pump and open the priming valve to the pump.

The priming components shall be mounted above the highest priming point on the suction side of the pump to permit air removal and allow for drainage. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a brass 'wye' type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

The system shall employ an 80 PSI (5.5 bar) pressure protection valve, located on the chassis auxiliary air tank.

The primer shall be covered by a five (5) year parts warranty.

## **PRIMER CONTROL**

There shall be one (1) push button control to actuate the primer control valve at the operator's panel.

## **DISCHARGE AND INLET MANIFOLDS**

A pump manifold inlet shall be provided on the pump as required for the layout.

The inlet(s) shall protrude up to 2.00 inches (50 mm) away from the side panels and maintain a low connection height.

A discharge manifold shall also be added to the pressure side of the pump to feed the specified discharge waterways.

## **MAIN PUMP INLET-LEFT SIDE**

A 6.00 inch (150 mm) pump manifold inlet shall be provided on the left side of the pump. The shorter style inlet shall

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protrude less than 2.00 inches (50 mm) away from the side panel, allowing an external valve to be connected and not protrude past the apparatus body sides while maintaining a low connection height.

The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.

## **EXTERNAL INTAKE VALVE**

There shall be one (1) external valve with cap provided and installed on the steamer inlet by the Dealership.

## **MAIN PUMP INLET-RIGHT SIDE**

A 6.00 inch (150 mm) pump manifold inlet shall be provided on the right side of the pump. The shorter style inlet shall protrude less than 2.00 inches (50 mm) away from the side panel, allowing an external valve to be connected and not protrude past the apparatus body sides while maintaining a low connection height.

The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.

## **EXTERNAL INTAKE VALVE**

There shall be one (1) external valve with cap provided and installed on the steamer inlet by the Dealership.

## **MASTER DRAIN VALVE**

A Trident manifold type drain valve shall be installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled from the left side lower pump house sill. The control shall be a hand wheel knob marked "open" and "closed".

The drain shall be located such that it shall not interfere with pumping operations or function such as soft suction hoses, etc. nor shall it protrude past the outer edge of the apparatus, to prevent damage to the valve.

In some cases, it is necessary to locate the master drain in a secondary location to ensure proper draining. If no lower or vertical sill exists, the drain shall be located below the bottom outside edge of the hose body near the forward most corner on the driver's side hose body. The drain shall not protrude past the outer edge of the body, thus preventing damage to the valve.

## **PUMP COOLING LINE**

There shall be a .38 inch (9.5 mm) line running from the pump to the water tank to assist in keeping the pump water from overheating. A valve shall be installed on the operator's panel.

## **PUMP ANODES**

Two (2) pump anodes shall be installed in the pumping system, one (1) on the discharge side and one (1) on the suction side, to prevent damage from galvanic corrosion within the pump system.

## **PUMP ANODE INDICATOR**

The pump anode(s) shall be painted orange in color.

## **STAINLESS STEEL PLUMBING**

All auxiliary suction and discharge plumbing related fittings, and manifolds shall be fabricated with a minimum of 3.00 inch (77 mm), or greater as required by design, schedule 10 stainless steel pipe; brass or high pressure flexible piping

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with stainless steel couplings. Galvanized components and/or iron pipe shall NOT be accepted to ensure long life of the plumbing system without corrosion or deterioration of the waterway system. Where waterway transitions are critical (elbows, tees, etc.), no threaded fittings shall be allowed to promote the smooth transition of water flow to minimize friction loss and turbulence. All piping components and valves shall be non-painted, unless otherwise specified. All piping welds shall be wire brushed and cleaned for inspection and appearance.

The high pressure flexible piping shall be black SBR synthetic rubber hose with 700 PSI working pressure and 1200 PSI burst pressure for flexible piping sizes 1.50 inches (38 mm) through 4.00 inches (100 mm). Sizes .75 inch (19 mm), 1.00 inch (25 mm) and 5.00 inches (125 mm) are rated at 250 PSI working pressure and 1000 PSI burst pressure. All sizes are rated at 30 in HG vacuum. Reinforcement consists of two plies of high tensile strength tire cord for all sizes and helix wire installed in sizes 1.00 inch (25 mm) through 5.00 inches (125 mm) for maximum performance in tight bend applications. The material has a temperature rating of -40 degrees Fahrenheit to +210 degrees Fahrenheit.

The stainless steel full flow couplings are precision machined from high tensile strength stainless steel. All female couplings are brass. Mechanical grooved and male .75 inch (19 mm) and 1.00 inch (25 mm) couplings are brass. A high tensile strength stainless steel ferrule with serrations on the I.D. is utilized to assure maximum holding power when fastening couplings to hose.

## **PUMP HOUSE LINE PROTECTION**

All drain lines for the discharges, suction, ABS discharge gauge lines and any other appropriate connections in the pump house area shall have a protective cover provided on the lines in the required areas of the lines to prevent the lines from rubbing on any other components in the pump house area.

All drain lines, ABS lines, high pressure discharge lines and electrical wiring in the pump house area shall be properly and neatly routed, wire tied, and rubber coated "P" clamped, to keep the items secured.

## **DRAIN VALVES**

An Innovative Controls 3/4" quarter turn drain valve shall be included on each discharge, gated intake, and steamer valve (if applicable). A side stem, long stroke chrome plated lift handle shall be provided on the drain valve to facilitate use with a gloved hand. The drain valve shall have an ergonomically designed handle with a recessed verbiage tag area easily read by the operator before opening.

The drain valve shall be connected to the valve with a flexible hose that is routed in such a manner as to assure complete drainage to below the apparatus.

## **FOAMPRO 2001**

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, and discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates and most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flowmeter(s), while also monitoring foam concentrate pump output. This compares values to ensure that the operator's preset is proportional to the amount of foam concentrate injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in the discharge system specified to be "foam capable. The flow meter shall be mounted in a manifold providing accurate water flow readings from 30-1150 gpm and operate up to 1380 gpm.

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

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Provide push-button control of foam proportioning rates from 0.1% to 10.0%, in 0.1% increments

Show current flow-per-minute of water

Show total volume of water discharged during and after foam operations are completed

Show total amount of foam concentrate consumed

Simulate flow rates for manual operation

Perform setup and diagnostic functions for the computer control microprocessor

Flash a "low concentrate" warning when the foam concentrate tank(s) runs low

Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty

A 12-volt electric motor drive positive displacement foam concentrate pump, rated up to 2.5 gpm (9.5 L/min) @ 150 psi with operating pressures up to 400 psi (27.6 BAR), shall be installed in a suitable, accessible location. The system will draw a maximum of 40 amps @ 12 VDC. A pump motor electronic driver (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.40 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.

When two types of foam concentrates are to be used, a dual tank switch over system will be installed to provide rapid changeover of foam concentrate reservoirs. The digital computer control display shall interface with the dual tank switch over system, provide dual foam calibration, and display separate totals for each foam concentrate used.

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

Components of the complete proportioning system shall include:

Operator control and display

Paddlewheel flowmeter

Pump and electric motor/motor driver

Wiring harnesses

Low level tank switch

Foam injection check valve

Main waterway check valve

## **FOAM SYSTEM TESTING**

The apparatus foam system shall be tested, and the Water Flow meter shall be certified by the manufacturer prior to delivery.

## **FOAM SYSTEM SUPPLY**

The system shall be supplied by a single foam tank that shall be monitored by the control display. The display shall flash a "low concentrate" warning for two minutes when the foam tank runs low. In the event that no additional concentrate is added to the tank, the foam concentrate pump shall be deactivated.

## **FOAM TANK**

A 30 gallon foam tank with square hinged lid, equipped with a hold down device shall be installed and plumbed with non-corrosive piping to the foam system. The fill tower shall be approximately 10.00 inch by 10.00 inch.

A label shall be affixed to the foam tank fill indicating: "WARNING" Class A (or B) foam tank fill, do not mix brands or types of foam.

Each foam tank shall be integral with the booster water tank provided.

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## **FOAM TANK DRAIN**

There shall be a 1.00 inch (25.4 mm) quarter turn drain valve installed to drain the foam tank. The valve shall be installed in the pump house with a drain line extended to the side running board.

The drain line shall be labeled "FOAM DRAIN".

## **SHUTOFF VALVE**

There shall be a 1/4 turn valve installed at the foam tank to shut off the flow from the supply line.

## **FOAM TANK LEVEL GAUGE**

Fire Research TankVision Pro model WLA360-A00 tank indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, a 20.00 foot sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the foam tank near the bottom. No probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

## **FOAM PRO POWER FILL**

The apparatus shall be equipped with a FoamPro Power Fill foam system. The foam fill system shall be a FoamPro Power Fill with electronic, automatic, concentrate refill system, to increase safety of firefighter personnel. The system shall operate independently of the foam proportioner allowing simultaneous use. Refill operation shall not require apparatus or fire pump to be running. The system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell. External fill and flush connections shall be quick-connect cam-lock type. Internal piping shall incorporate check valves to prevent back flow. Concentrate tank inlet shall be positioned to minimize agitation. The refill operation shall be based on direct measurement of concentrate level in tank. The system must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporated within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all-bronze three-way valve shall be included to allow the operator to flush system after use. Valve control, intake and flush ports shall be located within corresponding panel plate.

The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

- a) Provide push-button start/stop control of foam refill
- b) Solid green light advises operator concentrate cell is full
- c) Flashing green indicates system is running
- d) Green light off, system off
- e) Allow override of "full tank" condition
- f) Provide a means to flush the pump and intake piping

The system shall include a 12 or 24-volt electric motor driven, positive displacement concentrate pump. The pump(s) shall deliver minimum flow of 10 gpm (37.8 L/min) @ 20 psi with all concentrates currently utilized in fire apparatus.

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Pump body to be of all-bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system will draw a maximum of 38 amps @ 12 VDC or 19 amps @ 24 VDC. A pump/motor solenoid (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.4 Kw) electric motor directly coupled to the concentrate pump. The system(s) shall receive readings when the concentrate tank is full and stop operation to prevent overflow.

Components of the complete refill system shall include:

- a) Operator control and display with Weather-Pac connectors
- b) Refill/flush quick-connect cam-lock fittings and cap
- c) Check valves
- d) Pump/motor assembly and solenoid
- e) Strainer
- f) Tank level switch
- g) Three-way fill/flush valve
- h) Stainless steel pickup wand and 6 feet of reinforced suction hose, 1 inch in diameter to allow maximum flow
- i) Panel placards

A label shall be affixed to the foam tank fill indicating: "WARNING" Class A (or B) foam tank fill, do not mix brands or types of foam.

## **LEFT SIDE INLET**

There shall be one (1) gated suction inlet with .75 inch (19mm) bleeder installed on the left side of the apparatus with the following specified components.

## **INTAKE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with stainless steel ball.

## **INTAKE VALVE CONTROL**

The intake control valve shall be a 'swing out type' direct operation manual lever actuator at the valve.

## **INTAKE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **SUCTION/INTAKE TERMINATION**

The termination shall include the following components:

One (1) 2.50 inch (65 mm) NST swivel female straight adapter with screen

One (1) 2.50 inch (65 mm) self-venting plug, secured by a chain

## **INLET LOCATION**

The inlet shall be located on the pump panel in the rearward position.

## **LEFT SIDE DISCHARGE**

There shall be two (2) gated discharges installed on the left side of the apparatus with the following specified components.

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## **DISCHARGE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series rack and sector actuated valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from a rack and sector actuator having an ergonomically designed T-handle. The handle shall be chrome-plated with name plate insertion recess area.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) NST female by male swivel with 30 degree elbow

One (1) 2.50 inch (65 mm) female by 1.50 inch (38 mm) male reducer

One (1) 1.50 inch (38 mm) female self-venting cap, secured by a [cable](#).

## **RIGHT SIDE DISCHARGE**

There shall be one (1) gated discharge installed on the right side of the apparatus with the following specified components.

## **DISCHARGE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) NST female by male swivel with 30 degree elbow

One (1) 2.50 inch (65 mm) female by 1.50 inch (38 mm) male reducer

One (1) 1.50 inch (38 mm) female self-venting cap, secured by a [cable](#).

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## **RIGHT SIDE MASTER DISCHARGE**

There shall be one (1) master discharge installed on the right side of the apparatus provided with the following specified components.

### **DISCHARGE VALVE**

A 3.00 inch (77 mm) Akron Brass 8000 series valve with handwheel control and position indicator.

### **DISCHARGE PLUMBING**

The plumbing shall consist of 3.00 inch (77 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

### **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 3.00 inch (77 mm) Male NST adapter

One (1) 3.00 inch (77 mm) NST female by 5.00 inch (125 mm) Storz with 30 degree elbow

One (1) 5.00 inch (125 mm) Storz cap, secured by a chain

## **LEFT REAR DISCHARGE**

There shall be one (1) gated discharge installed on the left rear of the apparatus with the following specified components.

### **DISCHARGE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

### **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

### **DISCHARGE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

### **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) [by 2.50 inch \(65 mm\) straight bulkhead adapter](#).

One (1) 2.50 inch (65 mm) female self-venting cap, secured by a chain

## **RIGHT REAR DISCHARGE**

There shall be one (1) gated discharge installed on the right rear of the apparatus with the following specified



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components.

## **DISCHARGE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) [by 2.50 inch \(65 mm\) straight bulkhead adapter](#)

One (1) 2.50 inch (65 mm) female self-venting cap, secured by a chain

## **CROSSLAY AREA**

The crosslay hose beds shall be located in the upper portion of the pump compartment.

The crosslay area shall span the entire width of the apparatus pump module. Removable flooring shall be provided in the hose bed area for drainage.

[The crosslays will be as low as possible match 222115 NRH TX.](#)

## **DOUBLE STACK CROSSLAYS**

The crosslay area shall be constructed with a minimum of 25.00-inch (635mm) approximate depth for laying a double stack of each hose size as specified below. Each individual crosslay hose bed shall be separated by a divider constructed of .188 inch (4.76 mm) aluminum.

Chiksan swivels shall be installed just below the floor of each crosslay bed just high enough for hose couplings to be accessed and tightened on to chiksans. Chiksan swivels shall swing from left to right to allow attached hose to be deployed from either side.

## **FIXED CROSSLAY DIVIDERS WITH NO HAND HOLD CUTOUTS**

Each crosslay divider acting as a hose bed separator shall be fabricated of .188-inch smooth aluminum and shall have a dual-action sanded finish. Each divider shall NOT have hand hold cutouts provided.

## **1 3/4" CROSSLAY**

A crosslay with the following specified components shall be provided for up to 200 feet (60 m) of 1.75 inch (44.4 mm) hose.

There shall be a total of two (2) provided.

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## **DISCHARGE VALVE**

A 2.00 inch (50 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.00 inch (50 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.00 inch (50 mm) NPT x 1.50 inch (38 mm) NST brass chiksan swivel

## **DISCHARGE CAPABILITY**

Two (2) discharge(s) shall be foam capable.

## **2 1/2" CROSSLAY**

A crosslay with the following specified components shall be provided for up to 200 feet (60 m) of 2.50 inch (63.5 mm) hose.

There shall be a total of one (1) provided.

## **DISCHARGE VALVE**

A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.50 inch (65 mm) piping and shall incorporate a manual drain control installed below the pump area for ease of access.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) NPT x 2.50 inch (65 mm) NST brass chiksan swivel

## **DISCHARGE CAPABILITY**

One (1) discharge(s) shall be foam capable.

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## **CROSSLAY TRIM**

Brushed stainless steel trim shall be installed at the openings on the bottom and on each side of the crosslay hose bed area. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.

## **CROSSLAY HOSE BED HOSE RESTRAINTS**

The Dealership shall provide a means of restraining the hose stored in the crosslays to prevent inadvertent deployment of hose during transit. A hose restraint safety label shall be affixed by the Dealership and visible to personnel at each hose storage area.

## **CROSSLAY HOSE BED LIGHT**

There shall be one (1) 18.00 inch OnScene "Access" LED strip light in a bezel provided and installed on the [bottom of the Aux A/C unit](#) to illuminate the crosslay hose bed.

## **CROSSLAY LIGHT ACTIVATION**

The crosslay light shall be activated when the park brake is set.

## **DECK GUN MONITOR WATERWAY**

There shall be one (1) deck gun monitor waterway installed on the apparatus with the following components.

## **DISCHARGE VALVE**

A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

## **STYLE 9333 VALVE CONTROLLER**

The controller shall be an Akron Brass Style **9327** Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation and menu navigation. The controller must have up to three preset locations that can be user set and easily recalled upon each use.

The unit must be capable of being used in conjunction with at least two additional displays to control one valve. The unit must provide position indication through a full color backlit LCD display. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. The unit must carry a five year warranty.

## **DELUGE PLUMBING**

The deluge waterway shall consist of 3.00 inch (77 mm) piping and shall be drained with an auto-drain located at the lowest point of the waterway plumbing if required.

## **DELUGE PIPE LOCATION**

The deluge pipe shall be located up through the pump compartment, at the center location.

## **EXTEND-A-GUN-DEALER SUPPLIED**

There will be one (1) dealer supplied Task Force Tips 18.00 inch (457.2 mm) Extenda-Gun and saddle bracket (if included) installed by Spartan on the deluge pipe.

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If the Extenda-Gun is not properly stowed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

## **FRONT BUMPER DISCHARGE OUTLET**

One (1) front bumper discharge outlet shall be provided and installed in the location specified.

## **DISCHARGE VALVE**

A 2.00 inch (50 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.00 inch (50 mm) piping and incorporate a manual drain control installed below the pump area for ease of access. Auto-drain(s) shall be installed in the discharge piping at lowest point of the plumbed system.

## **FRONT BUMPER DISCHARGE PLUMBING PAINTED**

All front bumper discharge plumbing shall be painted black.

## **DISCHARGE TERMINATION**

The discharge termination shall include the following components:

One (1) 2.00 inch (50 mm) NPT x 1.50 inch (38 mm) NST, polished stainless steel chiksan swivel

## **FRONT BUMPER DISCHARGE LOCATION**

The front bumper discharge shall be mounted on top of the gravel shield of the front bumper extension. The discharge shall be placed outboard of the frame rail extensions on the right side.

## **FRONT BUMPER DISCHARGE CHIKSAN GUARD**

The front bumper discharge chiksan shall include a chiksan guard installed on the front bumper gravelshield to prevent the chiksan from hitting the cab. The guard shall be fabricated of smooth aluminum with a dual-action sanded finish on all sides. There shall be two (2) rubber bumper stops installed on the guard to protect the chrome chiksan.

## **DISCHARGE CAPABILITY**

The discharge shall be foam capable.

## **BOOSTER REEL**

There shall be an **Hannay Model EF** electric rewind booster reel with automatic brake installed on the apparatus. The booster reel shall have a capacity to handle 1.00-inch diameter (25.4 mm) booster hose.

There shall be a manual rewind device provided. A manual crank shall be mounted adjacent to booster reel.

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## **BOOSTER HOSE**

The reel shall come equipped with 200 feet (60 m) of 800 psi (55 BAR) booster hose.

The hose shall be provided in two (2) 100 foot (30 m) lengths with hardcoat aluminum couplings.

There will be a 1.50 inch FNST x 1.00 inch MNST reducer installed on the gooseneck to install the 1.00 inch hose (match 222115).

## **REEL FINISH**

The hose reel specified shall be steel and painted the standard silver utilized by Hannay.

## **HOSE REEL VALVE**

The reel shall be plumbed to the pump with a 1.00 inch (25.40 mm) quarter turn Akron brass 8000 series ball valve and 1.00 inch (25.40 mm) high pressure hose and couplings.

The valve shall be controlled from the operator's panel.

## **REWIND ACTIVATION**

An electric rewind switch shall be located adjacent to the booster reel. The switch shall have a weather resistant rubber cover and a label indicating its function.

The switch shall be labeled "HOSE REEL".

## **HOSE REEL LOCATION**

The hose reel shall be mounted as high as possible and to the left side on the rear wall of the Rear Center, B-1 compartment.

## **HOSE REEL ROLLERS**

Two (2) stainless steel hose roller guides shall be provided and installed, one (1) on either side of the compartment door openings. The rollers shall allow free hose deployment and retraction while preventing sharp edges from cutting or damaging the hose.

The discharge shall be plumbed with an auto-drain located at the lowest point of the plumbed system.

## **BOOSTER REEL GAUGE**

There shall be a pressure gauge supplied for the Booster Reel as specified below.

## **DISCHARGE CAPABILITY**

The discharge shall be foam capable.

## **DISCHARGE GAUGES**

An (Innovative Controls) TC Series nominal 63 mm gauge shall be supplied for reading the pressure of each discharge greater than 1.50 inches (38 mm) in diameter, unless otherwise specified.

A KEM-X socket saver diaphragm, located in the stem, eliminates freeze-up by preventing water from entering and/or clogging the gauge internals while containing a low temperature instrument oil that fills and protects the socket and the

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bourdon tube.

The molded glass-filled Nylon 66 case will not corrode and includes a scratch-resistant molded polycarbonate lens with O-ring seal. The gauge shall withstand pressures up to 100psi over gauge range with operation from -40° F to +160°F.

## **GAUGE SCALE**

Each gauge shall be marked for reading a pressure range of 0-400 PSI.

## **GAUGE FACE COLOR**

Each gauge shall have black markings on a white face.

## **BEZELS FOR 2.5" DISCHARGE GAUGES**

Highly-polished stainless steel Innovative Control bezels shall be provided around each of the 2.50 inch (65 mm) discharge pressure gauges to prevent corrosion and protect lenses and gauge cases. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve identifying verbiage and/or color labels.

## **APPARATUS PLUMBING LABELING**

Innovative Controls verbiage tag bezels shall be installed. The bezel assemblies will be used to identify apparatus components. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The verbiage tag bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to-read UV resistant polycarbonate inserts featuring the specified verbiage and color coding. These UV resistant polycarbonate verbiage and color inserts shall be subsurface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive, which meets UL969 and NFPA standards.

## **PLUMBING LABELS**

The plumbing labels, where applicable, shall be full color in place of the standard grey.

Color code tag sheet to be **completed** during the preconstruction meeting.

## **FASTENERS FOR LABELS**

All labels that are not installed into discharge handles shall be attached with mechanical fasteners.

## **BEZELS FOR TOP CONTROL VALVE HANDLES**

Innovative Controls deluxe metal bezels shall be supplied around the openings for all valve control handles at the top operator's panel. The bezels shall be chrome-plated with recessed areas for name plate and color code. The color code graphics shall denote the open and closed direction (or wet and dry as it would apply to CAFS operation) of the valve control.

## **TRIM BEZELS FOR DISCHARGES AND INLETS**

Mirrored stainless steel trim bezels shall be supplied around the openings at the pump panels for all applicable valve controls, discharge & suction inlet fittings.

Any additional cutouts on the pump panels used for access to pump components, such as manual overrides, shall also have trim bezels provided.

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## TANK TO PUMP LINE

The connection between the tank and the pump shall be capable of the flow recommendations as set forth in NFPA, Standard for Automotive Fire Apparatus, latest revision and shall be tested to those standards when the pump is being certified.

One (1) non-collapsible flexible hose and valve shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation. Four (4) inch stainless steel schedule 10 piping shall be used to complete the connection from the tank to pump valve to the water tank.

## TANK TO PUMP CHECK VALVE

There shall be a tank to pump check valve, conforming to NFPA standard requirements to prevent water from back flowing at an excessive rate if the pump is being supplied from a pressurized source. The check valve shall be mounted as an integral part of the pump suction extension. A hole up to .25 inch (6.00 mm) is allowable in the check valve to release steam or other pressure buildup so that the void between the valve and check valve may drain of water that could be subject to freezing.

## TANK TO PUMP VALVE

A 3.00 inch (77 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## VALVE CONTROL

The valve shall be controlled from the pump operator's panel location.

## TANK FILL LINE

One (1) 2.00 inch (50.80 mm) tank fill/recirculating line shall be installed from the pump directly to the booster tank.

## TANK FILL VALVE

A 2.00 inch (50 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## VALVE CONTROL

The valve shall be controlled from the pump operator's panel location.

## TRI-MAX™ *Space Frame Body* - ALUMINUM

The apparatus body shall be a Tri-Max™ **Space Frame** design, which serves as an incredibly durable, structural body framework. This framework acts as a series of beams and columns that support and protect the body and its contents. The space frame design provides maximum torsional resistance and load capabilities. The entire space frame structure shall be welded together utilizing an A.W.S. Certified welding procedure.

The space frame design shall also be required because it provides energy absorbing impact zones in the structure, thus providing increased safety to the rest of the apparatus and personnel on board. Documented proof of this extra safety shall be required upon request.

The Tri-Max™ body structure shall consist entirely of closed section members, except where the body is mounted to the chassis. Closed section members (such as square, rectangular, triangular, or round tubes) are required because they provide maximum strength and torsion rigidity. This solid tubular structural style of design ultimately adds longevity to the body structure by eliminating flex and twists in material, creating less stress and fatigue. Body designs that use independent sub-frames will not be acceptable.

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## **BODY STRUCTURE MEMBERS**

The space frame body shall have triangular shaped structural members in certain areas of the body. This shape is required to prevent loss of useable compartment space. Other body structure members shall be square or rectangular. Each structural member will have a nominal outside dimension of 2.50 inches (63.50 mm) in at least one direction. The body shall be designed for maximum strength to weight ratio, therefore the gauge of sheet metal and structural members varies from .125 inches (3.18 mm) to .250 inches (6.35 mm) throughout, dependent on the design requirement.

## **BODY MATERIAL TYPE**

All body structural members shall be Aluminum 6061-T6 alloy material. All .125 inch (3.18 mm) sheet material shall be Aluminum Alloy 5052-H32, and .250 inch (6.35 mm) sheet materials shall be Aluminum Alloy 3003. These alloys are required because it provides optimum all-around performance for strength, manufacturing properties, and corrosion resistance.

## **ECK® ANTI-CORROSION PROCESS**

Absolutely no dissimilar metals shall be used in the body and its supporting substructure without being separated by Eck®, which prevents corrosion by providing a barrier between dissimilar metals, sealing out moisture and absorbing energy created by a dissimilar metal reaction.

## **FRONT BODY COMPARTMENT WALLS**

The front compartment walls of both forward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments.

## **REAR BODY COMPARTMENT WALLS**

The rear compartment walls of both rearward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments. Access panels from the rear walls shall be strategically placed to ensure access to the rear taillight clusters for any servicing that may be completed.

## **COMPARTMENT TOP**

The top of the compartments shall be an integral portion of the body. No overlay material shall be visible from the interior of the compartments.

## **COMPARTMENT FLOORS**

The body compartments shall be enclosed with aluminum sheet metal as specified above. The compartment floors shall have a 1.00 inch (25.40 mm) lip downward at the door opening side of the compartment. This lip shall integrate with a structural member on the bottom edge and form a “sweep-out” compartment. This design shall also allow for a structural flush fitting door frame and a complete door/weather seal.

## **COMPARTMENT LOAD CAPACITY**

Each compartment shall have a minimum of one additional structural compartment floor support centered on the underside of the compartment floor. This additional member shall be integral with the rest of the body structure. Each compartment must be designed, and 3<sup>rd</sup> party analyzed to carry a working load of:

Full depth side compartment: 1,000 lbs (453.59 kg) per compartment

Half depth side compartment: 750 lbs (340.19 kg) per compartment

Rear center compartment: 1,500 lbs (680.39 kg)



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**NOTE:** These values are for design purposes only for individual compartment construction and are not meant to be used as an actual overall weight rating for equipment load per compartment for the specified apparatus. The apparatus shall be engineered such that the completed unit, when loaded to its estimated in-service weight, shall comply with the gross axle weight ratings {GAWR}, the overall gross vehicle weight rating {GVWR}, and the chassis manufacturer's load balance guidelines per NFPA.

## **EXTERIOR HOSE BED WALLS**

The exterior hose bed walls shall be an integral portion of the body. The wall shall give a smooth exterior look and finish with no vertical supports tubing visible from the exterior of the truck.

## **FASTENERS**

All bolts and nuts used in the finish construction of the apparatus shall be coated stainless steel which helps prevent dissimilar metal electrolytic reaction and corrosion. Any bolt extending into a compartment or into the hose bed area shall have an acorn nut attached or be protected in such manner where sharp edges are avoided.

## **FINITE ELEMENT ANALYSIS**

The proposed body design must have completed a review and analysis by a legitimate 3<sup>rd</sup> party engineering firm. At a minimum, the 3<sup>rd</sup> party must have conducted a computer model finite element analysis of the proposed design. The analysis is to include real world working load scenarios. Analysis to cover both static and dynamic situations must be completed. The purpose of the finite element analysis is to ensure proper design of the apparatus body, and that it is capable of carrying the typical fire apparatus loads and those specified by NFPA for equipment. The analysis process must conclude that the body structure is properly designed and manufactured to provide longevity under normal conditions. The 3<sup>rd</sup> party must also validate the manufacturing processes are consistent with the design and analysis performed. Proof of having completed this testing must be submitted with the bid.

## **PAINT SPECIFICATIONS**

All bright metal fittings, if unavailable in stainless steel, shall be heavily chrome plated.

Critical body and sub-frame area which cannot be primed after assembly shall be pre-painted.

All welded metal surfaces shall be ground to a smooth surface prior to a degreasing and high pressure, high temperature phosphatizing process. The entire surface shall be sprayed with a non-chromate sealing compound to prevent formulation of stains or flash rust on previously phosphatized parts.

The paint applied to the apparatus shall be Akzo Nobel, Sikkens brand, LVBT650 basecoat, applied throughout a multi-step process including at least two coats of each color and clear coat finish.

The coating shall be an infra-red, baked air dried. The coatings shall provide full gloss finished suitable for application by high-pressure airless or conventional low pressure air atomizing spray.

The coatings shall not contain lead, cadmium or arsenic. The polyisocyanate component shall consist of only aliphatic isocyanates, with no portion being aromatic isocyanates in character. The solvents used in all components and products shall not contain ethylene glycol mono-ethyl ethers or their acetates (commercially recognized as cello solves), nor shall they contain any chlorinated hydrocarbons. The products shall have no adverse effects on the health or nor present any unusual hazard to personnel when used according to manufacturer's recommendations for handling and proper protective safety equipment, and for its intended use.

The coating system, as supplied and recommended for application, shall meet all applicable federal, state and local laws and regulations now in force or at any time during the courses of the bid.

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The manufacturer shall supply (upon request) for each product and component of the system, a properly complete OSHA "Safety Data Sheet".

The following documents of the issue in effect on the date of the invitation to quote form a part of this document to the extent specified herein:

Federal Standards: Number 141A and 141B paint, varnish, lacquer and related material: methods of inspection, sampling, and testing.

Military Standard: MIL-C 83486B Coating, Urethane, Aliphatic Isocyanates, for Aerospace applications.

Industry Methods and Standards: ASTM Method of Analysis (American Society for testing and Materials). BMS 10-72A (Boeing Material Specifications).

The entire exterior body structure (excluding roll-up doors) shall receive the primer coats and the finish coats. The apparatus body will be painted in a down draft type paint booth to reduce dust, dirt or impurities in the finish paint. The painted surfaces shall have a finish with no runs, sags, craters, pinholes or other defects. The coating will meet the following test performance properties as a minimum standard.

## **BODY PAINT COLOR**

The apparatus body shall be painted to match [Sikkens FLNA 33188 Red](#)..

## **SUPERLINER COMPARTMENT FINISH**

The compartment interiors shall be coated with Superliner.

## **COMPARTMENT FINISH COLOR**

The Superliner Color shall be Medium Gray.

## **STRUCTURAL BODY WARRANTY**

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

## **PAINT WARRANTY**

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

## **DIAMOND PLATE FRONT OVERLAYS**

The entire front face of the apparatus body shall have aluminum diamond plate overlays installed.

## **RAW ALUMINUM REAR OVERLAYS**

The entire rear face of the apparatus body shall have [smooth painted](#) aluminum overlays installed for the installation of chevron striping. [The overlay shall be painted job color red](#).

## **FRONT CORNER TRIM 1/8" ALUMINUM DIAMOND PLATE**

The front of the apparatus body, vertical wall overlay shall be integrated with a 1/8" aluminum diamond plate 1.00 inch x 1.00 inch corner trim pieces for edge protection. The vertical edge trim shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.

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## **REAR CORNER TRIM 16 GAUGE BRUSHED STAINLESS STEEL**

The rear face of the apparatus body, vertical wall overlays shall be installed with a 16 gauge brushed stainless steel 1.00-inch by 1.00-inch corner trim piece, for edge protection. The vertical edge trim shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.

The vertical edge trim piece that is protecting the chevron striping surface or that is utilized for the purpose of striping, shall be secured utilizing fasteners only.

## **CATWALKS**

The catwalks shall be constructed with materials of a non-slip .125 inch embossed aluminum diamond plate.

## **VIBRA-TORQ™ BODY MOUNTING SYSTEM**

The entire body module assembly shall be mounted so that it “floats” above the chassis frame rails exclusively with Vibra-Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable body mounting system.

The body substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be powder coated for corrosion resistance. Each body mount bracket shall be mounted to the side chassis frame flange with two 5/8”-UNC Grade 5 HHCS.

Each assembly shall have a two-part rubber vibration isolator. The isolator shall be of a specific durometer to carry the necessary loads of the apparatus body, equipment, tank, water, and hose. The quantity of mounts utilized shall correspond directly to the anticipated weight being supported. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

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

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature body structural failures. The Vibra-Torq™ body mounting system shall have a lifetime warranty.

## **BODY STRUCTURE WIDTH**

The width of the apparatus body from the outside of the left compartments to the outside of the right compartments shall be 99.00 inch (2.51 m) excluding any attached peripherals such as rub rails, fenderettes, grab handles, etc.

## **COMPARTMENT VENTILATION**

To allow for proper air circulation & flow, each compartment shall have a venting route. The venting locations shall be determined by best-fit for each body configuration. Chrome louvered plate vents shall be installed appropriately on the compartment interior walls.

## **COMPARTMENTATION**

The following compartments shall be supplied on the apparatus:

Compartment "L1"

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There shall be one (1) full height compartment ahead of the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be 44.00 inches (1117.6 mm) wide by 69.00 inches (1752.60 mm) high with a lower depth of 25.50 inches (647.70 mm) and an upper depth of 12.50 inches (317.50 mm).

The framed opening shall measure approximately 41.5 inches (1054.1 mm) wide by 65.00 inches (1651.00 mm) high.

## Compartment "L2"

There shall be one (1) compartment located directly over the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be 62.00 inches (1574.8 mm) wide by 39.50 inches (1003.30 mm) high with a depth of 12.50 inches (317.50 mm). The lower 4.50 inches shall be full depth.

The framed opening shall measure approximately 62.00 inches (1574.8 mm) wide by 35.50 inches (901.70 mm) high.

## Compartment "L3"

There shall be one (1) full height compartment located behind the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be 47.75 inches (1212.85 mm) wide by 69.00 inches (1752.60 mm) high with an upper depth of 12.50 inches (317.50 mm) and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 45.25 inches (1149.35 mm) wide by 65.00 inches (1651.00 mm) high.

## Compartment "R1"

There shall be one (1) full height compartment ahead of the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be 44.00 inches (1117.6 mm) wide by 69.00 inches (1752.60 mm) high with a lower depth of 25.50 inches (647.70 mm) and an upper depth of 12.50 inches (317.50 mm).

The framed opening shall measure approximately 41.5 inches (1054.1 mm) wide by 65.00 inches (1651.00 mm) high.

## Compartment "R2"

There shall be one (1) compartment located directly over the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be 62.00 inches (1574.8 mm) wide by 39.50 inches (1003.30 mm) high with a depth of 12.50 inches (317.50 mm). The lower 4.50 inches shall be full depth.

The framed opening shall measure approximately 62.00 inches (1574.8 mm) wide by 35.50 inches (901.70 mm) high.

## Compartment "R3"

There shall be one (1) full height compartment located behind the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be 47.75 inches (1212.85 mm) wide by 69.00 inches (1752.60 mm) high with an upper depth of 12.50 inches (317.50 mm) and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 45.25 inches (1149.35 mm) wide by 65.00 inches (1651.00 mm) high.

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## **ROLL-UP DOOR CONSTRUCTION**

All horizontal and vertical side compartment doors shall be roll-up style doors.

### **R•O•M ROLL-UP DOOR**

A R•O•M Corporation Series IV roll-up shutter door shall be installed. Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.

Shutter slats shall feature a double wall extrusion 0.315 inches thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slat inner seal shall be a one piece PVC extrusion; seal design shall be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125 inches. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counterbalance system. Counterbalance system shall be 4.00 inches in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counterbalance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counterbalance system.

### **SIDE COMPARTMENT DOORS WET PAINTED**

The side compartment roll up doors shall be wet finish painted to color match the apparatus body. The door track and trim shall be satin aluminum finish.

### **ROLL-UP DOOR PROTECTORS**

There shall be a protective cover installed under each body side compartment door roll to protect the door in the rolled up position.

### **ROLL-UP DOOR PROTECTOR FINISH**

The roll-up door protector shall be left Natural finish.

### **DOOR ASSIST STRAPS**

There shall be nylon straps installed on both the left and right body side 'high side' compartment doors to assist in closing the door. The strap shall be attached to each door and permanently mounted to the rearward wall with footman loops using Nutserts, halfway between the top and bottom of the compartment.

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## **DOOR OPEN INDICATOR**

Each roll up door shall have an integral door open indicator magnet in the lift bar.

If the door is not properly closed and the parking brake is released, it shall activate the "hazard light" in the cab to alert the crew.

## **REAR CENTER COMPARTMENT**

There shall be one (1) compartment, "B1", located at the rear of the apparatus, below the hose bed access area.

The approximate interior dimensions of this compartment shall be 43.00 inches (1092.20 mm) wide and 33.00 inches (838.20 mm) high or as high as possible determined by the hose bed height and rear configuration. The depth shall be determined by the length of the rear side compartments specified and maximized for the suspension specified for the chassis.

The framed opening shall be approximately 38.00 inches (965.20 mm) wide and 30.50 inches (774.70 mm) high.

## **FUEL TANK ACCESS PANEL**

There shall be a removable panel located on the interior back wall of the rear center compartment for maintenance access to the chassis fuel tank.

## **RECESSED INTERMEDIATE REAR STEP**

There will be an 8.00 inch recessed intermediate step above the rear center compartment designed into the rear body wall. This step will shorten the length of the hose bed by 8.00 inches and lower the door opening of the rear center compartment. The stepping surface shall be overlaid with embossed diamond plate, while the side shall be overlaid with standard diamond plate.

## **STEP LIGHTING**

One (1) light shall be installed to illuminate the stepping areas as provided. The light shall be an OnScene Solutions "Access" Series 20 inch (457.20 mm) red LED with "P" clamps.

The light shall be mounted under the 5.00 inch extensions.

## **STEP LIGHT ACTIVATION**

The step light shall be activated when the park brake is set.

## **REAR COMPARTMENT PARTITIONS**

The rear center compartment of the apparatus shall have permanent partitions installed on each side to increase utilization of the rear center area and to block access to either of the side compartments. The partitions shall be constructed of the same materials as used in the body structure and shall be welded in place to form permanent compartmentation.

## **SILL PLATES**

Brushed stainless steel sill plates shall be installed at the bottom of each body compartment door opening.

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## **ONSCENE COMPARTMENT STRIP LIGHTING**

OnScene "Access" LED strip lighting shall be installed in the compartments as specified. Each light strip shall be of maximum length available to fit the opening.

The lighting in each compartment shall be on a separate circuit, and only illuminate when the compartment doors are open.

Two (2) full length "Access" Red LED strip lights shall be installed in two (2) over wheel compartment(s), one (1) each side of framed opening.

Two (2) full length "Access" Red LED strip lights shall be installed in four (4) full height compartment(s), one (1) each side of framed opening.

One (1) full length "Access" Red LED strip light shall be installed at the front top of the the rear center compartment. The light will be activated through a switch near the booster reel rewind.

## **COMPARTMENT LIGHTING ACTIVATION**

Each compartment light shall be activated with the ignition, park brake and the respective compartment door open switch

## **BEVELED REAR TAILBOARD**

The rear of the apparatus body shall be vertical in design - otherwise known as a 'flat-back'.

The rear tailboard shall be fabricated of the same tubular materials as used in the apparatus body.

The tailboard shall be an independent assembly welded to the rear body structural framing to provide body protection and a solid rear stepping platform. The tailboard framework shall be 'beveled' at an appropriate angle to decrease the 'swing-out' of the rear of the apparatus when making tight turns.

The rear step shall be designed to incorporate "crush zone" technology. This idea incorporates lighter materials in the tailboard than the body structure so the step will "crush" in a collision before the body structure.

On the rear body surface, a sign shall be attached that states: "DO NOT RIDE ON REAR STEP, DEATH OR SERIOUS INJURY MAY RESULT."

The rear tailboard and body shall be constructed such that the angle of departure shall be no less than 8 degrees at the rear of the apparatus when fully loaded, per NFPA, Standard for Automotive Fire Apparatus.

## **TAILBOARD LENGTH**

The rear tailboard shall be approximately 13.50 inches (342.90 mm) deep and shall incorporate a .188 inch (4.78 mm) embossed aluminum diamond plate overlay.

The stepping area shall span the width of the apparatus, overlapping the perimeter of the structural tailboard framework.

## **SLIDE OUT PLATFORM**

One (1) slide out platform, utilizing an OnScene Solutions brand slide shall be installed at the center of the rear tailboard, approximately 1.00 inch (25.4 mm) below the split outward tailboard sections.

The platform shall be 41.00 inches wide and shall extend approximately 20.00 inches from the stowed position. The platform stepping surface shall be constructed of .188 inch (4.76 mm) embossed aluminum diamond plate material.

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The face of the platform shall have no rub rail installed for ease of deployment. The step will be reinforced on the back edge.

The platform shall lock into place while in the extended and stowed positions. There shall be a reinforcement channel on the back of the step.

If the slide out platform is not properly stowed and the parking brake is released, it shall activate the hazard light in the cab to alert the crew.

## **WHEEL WELLS**

Wheel wells shall have semicircular black polymer composite inner liners that are bolted to the wheel well panel and supported inboard by brackets that are connected to the body framework. Each wheel well shall be a continuous piece with no breaks or ledges where road grime or debris may accumulate. This liner shall be removable for access to suspension assembly for repairs. There shall be no exception to the bolted wheel well inner liner requirement.

## **WHEEL WELL MODULES**

The body wheel well area shall be fabricated of same material type as the body and finish painted. There shall be "smart storage" compartmentation features incorporated on each side of the apparatus body wheel well modules to utilize and maximize storage space availability.

## **LEFT FRONT WHEEL WELL**

There shall be provisions in the wheel well on the left side in front of the axle.

## **FIRE EXTINGUISHER STORAGE COMPARTMENT**

The compartment shall hold one (1) 2.5 gallon water extinguisher and one (1) 20 lb. ABC fire extinguisher.

## **LEFT REAR WHEEL WELL**

There shall be provisions in the wheel well on the left side behind the axle.

## **FUEL FILL & MISCELLANEOUS STORAGE**

The fuel fill shall be located within the smart storage compartment. The remaining space available shall be divided off for small equipment storage.

## **SMART STORAGE FUEL FILL ASSEMBLY**

There shall be a fuel fill assembly located on the apparatus body accessing the chassis supplied fuel tank. The assembly shall be located in the rear Smart Storage module specified behind the rear axle.

There shall be a drain in the fuel fill assembly to allow overflow to drain on the back side of the apparatus body. The fuel fill cap shall be manufactured of plastic materials, green in color and equipped with a tether.

The fuel fill cap shall be labeled "DIESEL FUEL". The fuel fill neck shall have a .375 inch inside diameter vent line installed from the top of the fuel tank to the fill tube.

## **RIGHT FRONT WHEEL WELL**

There shall be provisions in the wheel well on the front side in front of the axle.



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## **SCBA COMPARTMENT**

The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.

## **RIGHT REAR WHEEL WELL**

There shall be provisions in the wheel well on the right side behind the axle.

## **SCBA COMPARTMENT**

The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.

## **SMART STORAGE DOORS**

The smart storage compartment doors shall be .188 inch smooth aluminum and painted to match body job color. Where a module storage compartment is specified, a hinged door shall be provided. Each compartment door shall be secured with a **black** push button latch.

## **DOOR OPEN INDICATOR**

There shall be a switch installed for each smart storage compartment door.

If the door is not properly closed and the parking brake is released, it shall activate the "hazard light" in the cab to alert the crew.

## **FENDERETTES**

Two (2) polished stainless steel fenderettes shall be provided and installed on body rear wheel well openings, one (1) each side. Rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering. A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to resist deterioration.

## **HOSE STORAGE**

A hose bed shall be provided and installed with the minimum capacity as required by NFPA, Standard for Automotive Fire Apparatus.

The hose bed shall have a slotted .25 inch (6.35 mm) aluminum flooring installed to allow drainage through the tank cavity to the ground below.

The aluminum flooring shall be manufactured in discrete sections to allow for ease of removal and stability. The area shall be free of sharp edges to protect the hose when loading and unloading.

## **HOSE BED EXTENSION**

A 5.00 inch (127.00 mm) deep hose bed extension shall be provided at the rear of the hose bed. The extension shall be constructed of .188 inch (4.78 mm) embossed diamond plate and shall be as wide as the hose bed.

## **HOSE BED AREA**

The hose bed area of the apparatus shall be overlaid with brushed stainless steel material.

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## HOSE BED AREA TRIMMED W/ BRUSHED SST

The vertical corners at the back hose bed shall be trimmed with brushed stainless steel. The trim shall extend from the hose floor level up to the top edge of the body side.

## HOSE BED WALL CAP

The top rail on the hose bed side walls shall have a trim cap fabricated of 16 gauge brushed 304L stainless steel. The cap shall run the entire length of the hose bed side wall and shall provide a smooth surface with a highly finished appearance. It shall extend down at least 1.00 inch on each side of the hose bed side wall.

## HOSE BED WALL HEIGHT

The walls of the hose bed shall be 85.00 inches (2.16 m) tall, measured from the bottom edge of the compartments to the top flange.

## 'A' FRAME HOSE BED COVER

There shall be a double door cover provided and installed which overlays a tubular structure for the hose bed.

Each cover shall be capable of supporting 600 pounds (272 kg) while standing on the cover. Each cover shall be capable of being opened independently and rest on a tubular structure which runs down the middle of the hose bed with a truss support at the rear of the apparatus. The covers in the closed position shall be higher in the center of the hose bed than they are at the hinged end to create an 'A' frame appearance and to aid in water runoff.

The front and rear of hose bed covers shall have vertical end caps that extend down to create a level line of diamond plate the width of the covers.

The doors shall be fabricated of .125 inch (3.18 mm) embossed aluminum diamond plate with full length two-piece stainless steel piano hinges.

The hose bed covers shall be wired to the hazard light in chassis cab. Inductive proximity switches shall be installed at the hose bed cover door hinges. If the door is not properly closed with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.

## MANUAL RAISED COVERS

Each cover shall be raised independently and manually. There shall be a gas shock hold open device provided to hold each cover in the open position. Each gas shock shall be accompanied by a vinyl covered safety chain.

## CHROME HANDLES

Two (2) 7.00 inch (177.80 mm) chrome handles shall be provided and installed at the [front](#) vertical flange of the hose bed covers, one (1) each cover.

[Two 10" handrails shall be installed on the rear side of the "A" frame structure.](#)

## REAR HOSE BED RESTRAINT

The dealer shall provide a means of restraining the hose at the rear of the hose bed to prevent inadvertent deployment of hose during transit.

## LED HOSE BED COVER LIGHTING

Two (2) OnScene "Access" [Red](#) LED strip lights of equal length shall be mounted to the underside of each hose bed

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cover.

The lights shall be on a circuit and turning on only when the covers are opened.

## **HOSE BED DUNNAGE AREA**

A vertical bulkhead shall be provided and installed at the front of the hose bed area, behind the water tank fill tower, forming a storage area that is separated from the hose bed.

The rear face of the bulkhead shall serve as a mounting surface for the hose bed dividers, resulting in the ability to move any hose bed divider across the entire width of the hose bed.

## **LED HOSE BED DUNNAGE COMPARTMENT LIGHTING**

One (1) full length OnScene Solutions "Access" Red LED strip light shall be mounted to the full length upper inside wall of the hose bed dunnage compartment.

The hose bed dunnage lighting shall be activated when the park brake is applied.

## **REINFORCED HOSE BED DIVIDER WITH HAND CUTOUT**

There shall be a full height adjustable reinforced hose bed divider provided and installed in the hose bed area of the apparatus body.

The divider shall be fabricated of .25 inch (6.35 mm) thick aluminum plate with a double sided reinforcement and attached to the adjustable slide rails. The rear of the divider shall have a radius to provide a smooth corner and a hand cut out to aid in access to the hose bed area. The top and rear edges shall be reinforced with 1.00 inch (25.40 mm) round aluminum tubing for extra rigidity. Hose payout shall be unobstructed by the divider. [The dividers shall have an overall heights of 28"](#).

There shall be a total of two (2) provided and installed in the hose bed.

## **HOSE LOAD**

The hose bed shall accommodate the following hose loads:

### **BAY 1:**

-400 feet of 2.50 inch hose

In the same bay, the following hose shall be stacked on top of the previously specified hose:

[One \(1\) TFT Blitzfire provided by the dealer/department.](#)

### **BAY 2:**

-1000 feet of 5.00 inch hose

### **BAY 3:**

-300 feet of 2.00 inch hose

## **TANK CAPACITY**

The tank shall be 750 gallons (2839 liters) in capacity and have an 'L' configuration with the majority of the water being

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located at the front of the body creating a low hose bed.

## **PRO POLY POLYPRENE TANK**

The water tank shall be designed to utilize cavities that have commonly been wasted space. The water tank shall extend up and over the rear center compartment to just behind the rear body wall. The water tank shall fill the void between the main hose bed floor and the top of the rear center compartment. This tank design shall provide for a lower overall tank height, resulting in a lower overall main hose bed height. In addition, this design shall create a lower center of gravity of the vehicle, for improved vehicle handling. .

## **TANK CONSTRUCTION**

The booster tank shall be constructed of .50 inch (12.70 mm) thick Polyprene sheet stock which is a non-corrosive stress relieved thermoplastic. It shall be designed to be completely independent of the body and compartments. All joints and seams are extrusion welded and/or contain the "Bent Edge" and tested for maximum strength and integrity. The top of the booster tank is fitted with lifting eyes designed with a 3 to 1 safety factor to facilitate tank removal.

## **COVER**

The tank cover shall be constructed of .50 inch (12.70 mm) thick Polyprene and shall be recessed. A minimum of two lifting dowels shall be drilled and tapped .50 inch (12.70 mm) x 2.00 inch (50.00 mm) to accommodate the lifting eyes.

## **BAFFLES**

The swash partitions shall be manufactured from .50 inch (12.70 mm) Polyprene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments to provide maximum water flow. All swash partitions interlock and are welded to one another as well as to the walls of the tank.

## **MOUNTING**

The tank shall have a reinforced .75 inch (19.10 mm) floor for added strength and durability. The tank shall be isolated from the body substructure cross members with .50 inch (12.70 mm) x 2.50 inch (65.00 mm) rubber strips that are 60 durometer in hardness. The tank shall sit nested inside the center body substructure and shall be completely removable without disturbing the body side panels. Tank stops on all four sides will keep the tank from shifting front to back or side to side.

## **TANK WARRANTY**

A lifetime tank warranty will be provided by the tank manufacturer, Pro Poly.

Please see the official warranty document in the appendix (attached) for specific details.

## **FILL TOWER**

The fill tower opening shall be approximately 13.00 inches (330.20 mm) x 12.00 inches (304.80 mm).

The tower will have a .25 inch (6.40 mm) thick removable Polyprene screen and a Polyprene hinged type cover that will open if the tank is filled at an excess rate. There shall be a removable .25 inch (6.40 mm) thick Polyprene screen to prevent debris from falling into the tank.

The fill tower shall have a 4.00 inch (100.00 mm) overflow that will discharge underneath the tank, behind the rear axle(s), avoiding the chassis fuel tank and suspension components where applicable. The overflow shall terminate above the tank water level when filled to the rated capacity.

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## FILL TOWER LOCATION

The fill tower shall be located to the left side at the front of the hose bed.

## SUMP

The sump will be constructed in an 8.00 inch (203.20 mm) x 16.00 inch (406.40 mm) x 3.00 inch (77.00 mm) deep area.

The construction material shall utilize .50 inch (12.70 mm) Polypropylene and be located in line with the tank suction valve. There shall be a 4.00 inch (100.00 mm) schedule 40 Polypropylene tube installed that will run from the suction outlet to the sump location. The tank will have an anti-swirl plate located approximately 2.00 inch (50.00 mm) above the sump.

## SUMP PLUG

The sump shall have a 3.00 inch (77.00 mm) plug for use in draining and cleaning out the tank.

## OUTLETS

In addition to the tank suction valve outlet located in the sump, there shall be an outlet provided for the tank fill valve. If there are any additional options selected (such as an extra tank suction or direct tank inlets), there shall be additional outlets provided to accommodate these items.

## LADDER COMPARTMENT

The ground ladders shall be stored within a compartment installed beside the booster tank.

All items shall be stored in their own independent section to allow one item to be removed without disturbing another. There shall be polypropylene slide angles installed in each section where applicable, to support the ladders and allow ease of removal. There shall be a stop in the front of each section to prevent the items from sliding forward.

The whole ladder box shall be extended to the top of the hosebed. There shall be a fixed floor separating the upper empty section and the trash hook/pike pole area. The area under the hose bed cover shall be left open but shall have a 1" reveal (match 222115 NRHTX After final).

## LADDER COMPARTMENT MATERIAL

The ground ladder compartment shall be fabricated of .125-inch smooth aluminum.

## LADDER COMPARTMENT LOCATION

The ground ladder compartment shall be mounted vertically on the right side of the water tank.

## LADDER COMPARTMENT OPEN END

The compartment shall be enclosed through the tank and open at the pumphouse end; where an "Austin Style" "stop" will be incorporated to prevent the ladders from sliding forward and damaging internal pumphouse components.

## LADDER COMPARTMENT DOOR HINGE LOCATION

The door hinge shall be mounted vertically across the inboard edge of the compartment door opening.

## LADDER COMPARTMENT DOOR CONSTRUCTION

There shall be a lap door with a slam latch provided to secure the ladders during transit.

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The latch shall attach to the door assembly without any fasteners penetrating the door skin material, with a rubber gasket provided between the handle and the door skin. The [Eberhard Black](#) door latch assembly must be completely enclosed by the door assembly, to prevent damage from shifting equipment carried in the compartment. An adjustable striker shall be provided for easy adjustment in the future. [The door shall be extra long by ending at the top of the hosebed. The door shall be painted color job.](#)

The door shall utilize a weather strip applied to the backside of the door skin to prevent moisture and debris from entering the compartment. [\(Match 222115 NRHTX\)](#)

## **LADDER COMPARTMENT DOOR MATERIAL**

The ladder compartment door shall be fabricated of 5052 smooth aluminum and finish painted to match the body.

## **LADDER COMPARTMENT DOOR HANDLE**

The ladder compartment doors handle shall be an Eberhard ergonomic pull handle.

## **LADDER COMPLEMENT**

The following ladders shall be supplied with the apparatus:

One (1) Duo-Safety 24 foot (7.0 m) two (2) section aluminum extension ladder(s), model 900A.

One (1) Duo-Safety 14 foot (4.0 m) aluminum roof ladder(s) with folding hooks, model 775A.

One (1) Duo-Safety 10 foot (3.0 m) aluminum attic ladder(s), model 585A.

## **PIKE POLE STORAGE**

There shall be [two \(2\) tubes and one \(1\) storage slot](#) provided for storage of the pike poles installed with the ground ladder complement.

The [following](#) pike poles shall be supplied and installed by the Fire Department before the apparatus is placed into service:

[One \(1\) standard head pike pole](#)

[One \(1\) NY roof hook](#)

[One \(1\) 6 ft D handled trash hook](#)

## **COMPARTMENT UNISTRUT**

Vertically mounted Unistrut shall be installed in all apparatus body compartments, in the upper and lower sections, to accommodate the installation of shelves, trays, and or other miscellaneous equipment.

## **OVER-WHEEL COMPARTMENT PARTITIONS**

Compartment partitions fabricated of the same material as the body shall be permanently installed in the left over-wheel compartment, right over-wheel compartment, or both where applicable by design.

The partitions shall be permanently installed in place and flush to the forward and rearward frame openings.

The partitions shall aid in keeping loose equipment from falling into the fore and aft compartments.

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## **SHELVING**

The shelving shall be made out of .190 inch (4.83 mm) smooth aluminum sheet material with a formed 2.00 inch (50.80 mm) lip on the front and back.

The side mounting brackets shall be provided for vertical adjustment.

Standard manufacture shelf construction capacity ratings are as follows, any requested change to the manufacture's standard design may affect/reduce the ratings accordingly:

Shelving shall be rated at a capacity of 200 pounds (90.72 kg) and applicable to the design configuration.

The following shelving shall be provided:

### **UPPER HALF DEPTH SHELVING**

A full width x half depth shelf shall be provided and installed in the upper area of the compartment specified.

There shall be a total quantity of six (6) provided.

### **UPPER SHELF DEPTH MODIFICATION**

Any shelf specified to be installed in the upper body side compartments shall be reduced in depth by 1.00 inch (25.40 mm) for installation of wall mount tool boards.

- One (1) located in the L1 compartment.
- Two (2) located in the L2 compartment.
- One (1) located in the L3 compartment.
- One (1) located in the R1 compartment.
- One (1) located in the R3 compartment.

### **LOWER FULL DEPTH SHELVING**

A full width x full depth shelf shall be provided and installed in the lower area of the compartment as specified.

There shall be a total quantity of four (4) provided.

- One (1) located in the L1 compartment.
- One (1) located in the L3 compartment.
- One (1) located in the R1 compartment.
- One (1) located in the R3 compartment.

### **ROLL OUT TRAY(S)**

Each tray shall be fabricated of .19 inch (4.83 mm) thick 3003 grade or higher aluminum sheet material with four (4) 3.00 inch (76.20 mm) side flanges, corner welded for maximum strength and shall be as wide and as deep as compartment allows.

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The following shall be supplied:

## **ROLL-OUT ASSEMBLY/ONSCENE**

The floor mounted tray shall be full width and shall be secured to an (OnScene) rollout slide system constructed of anodized aluminum extrusions and assembled using stainless steel fasteners (no welds).

The slide shall use a three extrusion rail design utilizing twelve to sixteen (12-16) urethane rollers. The roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The slide shall have a cable operated, spring loaded latch complemented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions.

The tray shall have a 1000# capacity and 100% extension.

There shall be a total quantity of one (1) provided.

- One (1) located in the R3 compartment.

## **ROLL-OUT ASSEMBLY/AUSTIN**

The floor mounted tray shall be full width and shall be secured to an Austin Hardware 22.00 inch (558.80 mm) long ball bearing "heavy duty" slide assembly. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a lock-in, lock-out front drawer release system (FDR).

The tray shall have a 300# capacity and 100% extension.

There shall be a total quantity of two (2) provided.

- One (1) located in the L2 compartment.
- One (1) located in the R2 compartment.

## **SHELF AND TRAY FINISH**

The shelf(s) or roll-out tray(s) installed shall be finish coated with medium gray Superliner.

## **WALL MOUNTED TOOL BOARD/PAC-TRAC**

A Pac Trac tool board with DA finish shall be installed to the back wall of the compartment as specified. The completed tool board assembly shall be attached directly to the upper back wall utilizing custom manufactured plate or angle brackets.

There shall be a total quantity of three (3).

## **REFLECTIVE STRIPING FOR PAC TRAC SLATS**

The rib surface of the pac trac tool board shall have 3M Diamond Grade RED reflective striping installed.

- One (1) located in the L1 compartment.
- One (1) located in the L3 compartment.
- One (1) located in the R2 compartment.



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## **SIDE RUB RAILS (ALUMINUM CHANNEL)**

The lowest edge of the apparatus body side compartments shall be trimmed with brightly anodized aluminum channel rub rail material.

The rub rails shall be approximately 3.00 inches high with flanges turned outwards for increased rigidity, with each end chamfered to a 45 degree angle. The rub rails shall not be constructed as an integral part of the apparatus body structure, allowing each rub rail to be easily removed in the event of damage.

The rub rails shall be secured with stainless steel fasteners and spaced away from the apparatus body with .50 inch nylon spacers to help absorb moderate side impacts and prevent the collection of water and debris for easier cleaning.

## **RUB RAIL REFLECTIVE STRIPING**

One inch reflective 3M "Diamond Grade" striping shall be applied to the length of each side rub rail section making the perimeter of the apparatus more readily visible.

The reflective striping shall be "Ruby Red" in color.

## **REAR RUB RAIL (ALUMINUM CHANNEL)**

The rearward edge of the rear step shall be trimmed with brightly anodized aluminum channel rub rail.

The rub rail shall be approximately 3.00" high with flanges turned outwards for increased rigidity, with each end chamfered to a 45 degree angle. The rub rail shall not be constructed as an integral part of the apparatus body structure, allowing the rub rail to be easily removed in the event of damage.

The rub rail shall be secured with stainless steel fasteners and spaced away from the edge of the rear step with .50 inch nylon spacers, to help absorb moderate rear impacts and prevent the collection of water and debris for easier cleaning.

## **RUB RAIL REFLECTIVE STRIPING**

One inch reflective 3M "Diamond Grade" striping shall be applied to the length of the rear rub rail section making the rear of the apparatus more readily visible.

The reflective striping shall be white in color.

## **FOLDING STEPS**

Innovative Controls Inc. model #3004234 steps, made of high strength die cast aluminum, conforming to current NFPA requirements, shall be provided and installed on the apparatus as specified.

The steps shall include a molded gasket and drain at the bottom to allow any water to escape the assembly, preventing water ingress and keeping the mount from damaging painted surfaces.

The steps shall have a minimum of 46 sq. inches of surface area capable of sustaining a 1200 lb. static load. The steps shall be mounted no more than 18" inches between each step.

The following components shall be provided on each step:

- One (1) Logo label
- One (1) White step light
- One (1) White down light
- One (1) Safety label
- One (1) Flying leads termination

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **STEP LOCATION**

Three (3) folding steps shall be installed on the right forward vertical wall of the front compartment.

## **10" HANDRAILS**

One (1) 10.00 inch long by 1.25 inch diameter handrail constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated LED light strip shall be installed [vertically on the side face of the body, forward of the body compartment](#). There shall be a minimum of 2.00 inches of clearance between the bracket and the body.

Each handrail LED light strip specified shall be red in color.

## **ILLUMINATED HANDRAIL LIGHTING ACTIVATION**

The illuminated handrail light shall be activated when the park brake is set.

## **STEP LIGHT ACTIVATION**

The step light shall be activated when the park brake is set.

## **STEP LOCATION**

One (1) folding step shall be installed on the right rear vertical face of the body.

## **STEP LOCATION**

Three (3) folding steps shall be installed on the left forward vertical wall of the front compartment.

## **10" HANDRAILS**

One (1) 10.00 inch long by 1.25 inch diameter handrail constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated LED light strip shall be installed [vertically on the side face of the body, forward of the body compartment](#). There shall be a minimum of 2.00 inches of clearance between the bracket and the body.

Each handrail LED light strip specified shall be red in color.

## **ILLUMINATED HANDRAIL LIGHTING ACTIVATION**

The illuminated handrail light shall be activated when the park brake is set.

## **STEP LIGHT ACTIVATION**

The step light shall be activated when the park brake is set.

## **STEP LOCATION**

One (1) folding step shall be installed on the left rear vertical face of the body.

## **HANDRAILS KNURLED ALUMINUM ILLUMINATED**

Handrails shall be 1.25 inches in diameter, constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated LED light strip.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

There shall be a 2.00 inch minimum clearance between the handrail and the body. The light shall illuminate an area adjacent to the handrail and in accordance with NFPA, Standard for Automotive Fire Apparatus, standard requirements.

The following handrails shall be installed at the approximate lengths noted:

## **REAR HANDRAIL LOCATION**

Three (3) handrails shall be installed on the rear of the apparatus. Each handrail shall be of an adequate length, as available usable space allows, to provide a suitable gripping area for personnel.

The **left and center** handrails shall be spaced away from the body using chrome plated straight stanchions **while the right handrail shall be spaced away from the body using chrome plated off-set stanchions**. Two (2) vertical handrails shall be installed, one on each side, just below the hose bed sides. These vertical handrail(s) shall utilize an offset stanchion with the offset directed away from storage door openings for added clearance, where applicable. The remaining handrail shall be installed horizontally, just below the hose bed area.

Each handrail LED light strip specified shall be red in color.

## **ILLUMINATED HANDRAIL LIGHTING ACTIVATION**

The illuminated handrail light shall be activated when the park brake is set.

## **TOW EYES**

There shall be two (2) rear tow eyes installed to the frame rails, one each side, accessible below the rear of the apparatus.

They shall be manufactured of 1.00 inch plate steel and each plate shall be bolted to the chassis frame rail with a minimum quantity of six (6) grade 8 bolts. The two plates shall be anchored together with 1.00 inch steel tubing to prevent swaying of the frame rails during a towing operation. All steel components shall be painted black.

## **LOW-VOLTAGE ELECTRICAL SYSTEM**

The apparatus shall be equipped with a Logic Controlled, Low-Voltage (12v) Electrical System, compliant with the latest revision of the NFPA, Standard for Automotive Fire Apparatus.

The system shall be capable of performing total load management, load management sequencing, and load shedding via continuous monitoring of the low-voltage electrical system. In addition, the system shall be capable of switching loads (similar to operating as an emergency warning lamp flasher) eliminating the dependency on many archaic electrical components such as conventional flasher modules. The system shall also incorporate provisions for future expansion or system modification.

The low-voltage electrical system shall be designed to distribute the placement of electrical system hardware throughout the apparatus thereby enabling a smaller, optimized wire harness. The programmable, logic controlled system shall eliminate redundant electrical hardware such as extra harnesses, circuit boards, relays, circuit breakers, and separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

As-built electrical system drawings and an apparatus-specific reference of I/O shall be furnished in the final delivery manuals. These drawings shall illustrate the electrical system broken down into separate functions, or small groups of related functions. Drawings shall depict circuit numbers, electrical components and connectors from beginning to end. **A single drawing for all electrical circuits installed by the apparatus manufacturer shall not be accepted.**

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## **MULTI-PLEXED ELECTRICAL WARRANTY**

A four (4) year limited (V-MUX) multiplex system warranty, of Weldon Technologies, Inc.; shall be provided by the apparatus manufacture for parts and labor, while under normal use and service; against mechanical, electrical and physical defects from the date of installation.

The warranty shall exclude; sensors, shunt interface modules, serial or USB kits, transceivers, cameras, GPS, and electrical display screens, which shall be limited to a period of one a (1) year repair parts and labor from the date of installation.

## **VEHICLE SCREEN LAYOUT APPROVAL**

Vehicle display layouts shall be provided prior to manufacturing for fire department approval.

## **NODE**

An electrical distribution node or relay shall be installed in the below locations of the apparatus body.

The pump node shall be mounted as high as practical in the full depth portion of the right front compartment.

The rear body nodes shall be mounted as high and as far inboard as practical on the rear wall in the rearmost compartment.

A protective cover shall be installed to prevent damage to the node or electrical system during equipment installation and or removal. Node covers shall be approximately 16.00 to 22.00 inches in length with an inspection hole positioned for view of the node indicator LED lights. The finish of the cover shall match the compartments interior finish. Node covers will not include any type of shelve mounting structure and shall limit the height of unistrut or shelf height within the compartments.

NO Whelen CORE system

## **PERIMETER LIGHTS LOCATION**

There shall be four (4) underbody perimeter lights installed on the apparatus positioned to provide illumination to the immediate ground area around the unit.

One (1) under each side of the pumphouse running boards and two (2) under the rear tailboard.

## **PERIMETER LIGHTS**

The underbody perimeter lights provided will be TecNiq model T44 series, 4" round, 8 diode LED lights.

## **PERIMETER LIGHTS ACTIVATION**

The perimeter lights under the body shall illuminate the area with the activation of the chassis ground lights, excluding any chassis door programming.

## **UPPER LIGHTING PACKAGE**

The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the upper areas of the vehicle.

All warning lights shall be DVI'd with the park brake and the display in "night" mode.

# NORTH RICHLAND HILLS FIRE DEPARTMENT

## UPPER ZONE B&D-FORWARD:

There shall be [four \(4\)](#) Whelen WION series LED lights with black housing provided and installed with the apparatus.

There shall be [two \(2\)](#) each side of the body centered above the front compartment on the door header.

[The lights shall be evenly spaced above the side compartment doors, four \(4\) on each side \(Match 222115 NRHTX\).](#)

## SIDE WARNING LIGHTS FLASH

The upper side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "ActionScan" flash pattern.

## SIDE WARNING LIGHTS COLOR

The upper warning lights mounted on the side positions shall be red with clear lenses.

## UPPER ZONE B&D-REAR:

There shall be [four \(4\)](#) Whelen WION series LED lights with black housing provided and installed with the apparatus.

There shall be [two \(2\)](#) each side of the body centered above the rear compartment on the door header.

[The lights shall be evenly spaced above the side compartment doors, four \(4\) on each side \(Match 222115 NRHTX\).](#)

## SIDE WARNING LIGHTS FLASH

The upper side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "ActionScan" flash pattern.

## SIDE WARNING LIGHTS COLOR

The upper warning lights mounted on the side positions shall be red with clear lenses.

## UPPER SIDE WARNING LIGHT SWITCH E-MASTER/DISPLAY

The upper side warning lights shall be controlled through the master warning switch and a secondary side warning switch located on the vehicle display control screen. The switches shall be clearly labeled for ease of identification.

## UPPER ZONE C:

There shall be [two \(2\)](#) Whelen R316 series Super-LED® Rota-Beam beacon model #R316\*F. The low profile beacon shall incorporate Super-LEDs, one (1) each side.

The solid state beacon light shall be vibration resistant.

[The light shall come with a black base.](#)

## REAR WARNING LIGHTS COLOR

The upper warning lights mounted at the rear shall be red with clear lenses.

## LIGHT MOUNT LOCATION

The upper ZONE C specified lights shall be mounted directly to the horizontal body surface as far rearward as possible.

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## **AUXILIARY UPPER ZONE C:**

There shall be two (2) Whelen model M9 series LED lights with black bezels, one (1) each side, provided and installed with the apparatus.

## **REAR WARNING LIGHTS FLASH**

The rear upper lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "DoubleFlash 150" L/R flash pattern.

## **REAR WARNING LIGHTS COLOR**

The upper warning lights mounted at the rear shall be split red/blue with a clear lens. [The red shall be outboard.](#)

## **UPPER REAR WARNING LIGHT SWITCH E-MASTER/REVERSE VISTA**

The upper rear warning lights shall be controlled through the master warning switch and a secondary rear warning switch located on the vehicle display control screen. The switches shall be clearly labeled for ease of identification.

## **AUXILIARY UPPER WARNING LIGHT ACTIVATION**

The upper warning lights shall be activated automatically when the transmission is placed in reverse.

## **LOWER LED WARNING LIGHTING**

The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the lower areas of the vehicle.

[All warning lights shall be DVI'd with the park brake and the display in "night" mode.](#)

## **LOWER FRONT WARNING LIGHT SWITCH E-MASTER/DISPLAY**

The lower front warning lights shall be controlled through the master warning switch and a secondary front warning switch located on the vehicle display control screen. The switches shall be clearly labeled for ease of identification.

## **LOWER ZONE B&D:**

There shall be two (2) Whelen model M6 series LED lights with black bezels, one (1) each side, provided and installed with the apparatus.

## **SIDE WARNING LIGHTS FLASH**

The lower side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "DoubleFlash 150" in/out flash pattern.

## **SIDE WARNING LIGHTS COLOR**

The lower side warning lights mounted on the side positions shall be red with clear lenses.

## **SIDE WARNING LIGHTS LOCATION**

The warning lights on the side of the apparatus shall be mounted at the pump compartment.

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## **AUXILIARY WARNING LIGHTS LOWER ZONE B&D**

There shall be **eight (8)** auxiliary Whelen WION series LED lights with black bezels installed **four (4)** each side.

One (1) shall be installed in front and one (1) behind the rear axle on the lower body sides. These four (4) lights shall be installed in the rear fender (wheel well) area of the body.

One (1) shall be installed in the side rub rails, centered under L1/R1 and L3/R3.

## **SIDE WARNING LIGHTS FLASH**

The lower side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "ActionScan" flash pattern.

## **SIDE WARNING LIGHTS COLOR**

The lower side warning lights mounted on the side positions shall be red with clear lenses.

## **LOWER SIDE WARNING LIGHT SWITCH E-MASTER/DISPLAY**

The lower side warning lights shall be controlled through the master warning switch, **reverse** and a secondary side warning switch located on the vehicle display control screen. The switches shall be clearly labeled for ease of identification.

## **LOWER ZONE C:**

There shall be two (2) Whelen model M9 series Super-LED lights with black bezels, one (1) each side, on provided and installed on the rear of the body.

## **REAR WARNING LIGHTS FLASH**

The lower rear lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "DoubleFlash 150" in/out flash pattern.

## **REAR WARNING LIGHTS COLOR**

The lower rear warning lights mounted at the rear shall be red with clear lenses.

## **LOWER REAR WARNING LIGHT SWITCH E-REVERSE/VISTA**

The lower rear warning lights shall be controlled through the master warning switch, **reverse** and a secondary rear warning switch located on the vehicle display control screen. The switches shall be clearly labeled for ease of identification.

## **AUXILIARY LOWER WARNING LIGHT ACTIVATION**

The lower warning lights shall be activated automatically when the transmission is placed in reverse.

## **LED REAR TAILLIGHT ASSEMBLY**

There shall be Whelen M9-Series Super LED rear taillight assemblies provided and installed with the apparatus, one (1) each side at the rear.

The following shall be installed in the order as specified from top to bottom:

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One (1) M92BTT LED red brake light

One (1) M92T LED series amber turn signal light ([match chassis programming](#))

One (1) M92BU LED clear back-up light

## **MOUNTING FLANGES**

There shall be individual black bezels provided for each light of the taillight assembly.

## **REAR TAILLIGHTS COLOR**

The taillights mounted at the rear shall have clear lenses.

## **BACKUP LIGHTS**

The backup lights shall illuminate when the apparatus is placed in reverse.

## **LED DOT LIGHTING**

There shall be a total of thirteen (13) red clearance lights and two (2) amber clearance lights installed on the apparatus.

There shall be seven (7) red clearance lights located on the rear of the apparatus, [two \(2\)](#) lights shall be located in the tailboard portion, three (3) lights centered [above B1](#), and two (2) in the outboard corners. The two additional (2) lights shall be located as high and wide as possible on the rear of the apparatus.

On the sides of the apparatus there shall be six (6) red clearance lights, three (3) located on each side of the apparatus. Two (2) shall be located in the lower body at the front and rear portion of the rear side compartments and one (1) in the upper body corners as rear as possible.

Additionally, the sides of the apparatus shall have two (2) amber clearance lights installed, one (1) located on each side of the apparatus in the lower body at the front portion of front compartments.

The lights shall be TecNiq S17 series LED red and amber markers with [clear lens and black bezels](#).

## **DOT ADDITIONAL MARKER LIGHTS**

There shall be two (2) amber LED intermediate marker lights/intermediate turn signals installed in the rub rail, forward of the rear wheel well, one (1) each side.

The lights shall be TecNiq S17 series LED amber markers/turn with [clear lens and black bezels](#).

## **INTERMEDIATE TURN SIGNALS**

The intermediate turn signals will flash with the turn indicators.

## **REAR VIEW CAMERA LOCATION**

A camera shipped loose with the chassis shall be mounted at the center location to the underside of the [hose bed extension](#) at the rear of the apparatus body for maximum viewing capability.

## **SIDE SCENE LIGHT LOCATION**

There shall be two (2) scene lights installed on the side of the apparatus, one (1) on each side at the rear corner.



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## SCENE LIGHT MODEL

Whelen Pioneer series model #PCPSM2B LED dual combination spot/flood scene lighting with black flange shall be mounted on the apparatus.

Each lamp head shall have two (2) 12v Super-LED® panels at 154 watts total. The light head shall draw 12.0 amps and generate 16,000 lumens. Each lamp head shall be of true surface mount style requiring no body cutouts. Each lamp head shall be no more than 6.37" inches high by 16.22" inches wide by 1.72" inches deep.

## BODY SIDE SCENE LIGHT ACTIVATION

The scene lighting shall be activated with the chassis side scene lights.

## REAR SCENE LIGHT LOCATION

There shall be two (2) scene lights installed on the rear facing vertical surface of the apparatus, one (1) on each side.

The scene lights on the rear vertical panel shall be positioned far outboard on each side below the warning lights specified.

## SCENE LIGHT MODEL

Whelen Pioneer series model #PCPSM1B LED single combination spot/flood scene lighting with black flange shall be mounted on the apparatus.

Each lamp head shall have one (1) 12v Super-LED® panel at 76 watts total. The light head shall draw 6.0 amps and generate 8,000 lumens. Each lamp head shall be of true surface mount style requiring no body cutouts. Each lamp head shall be no more than 6.37" inches high by 8.97" inches wide by 1.72" inches deep.

## REAR SCENE LIGHT ACTIVATION

The rear scene lighting shall be activated when the apparatus transmission is shifted into reverse and by a virtual button on the vehicle display control screen. The scene shall also be interlocked with the park brake.

The switch shall be labeled as follows:

Rear Scene

## LINE VOLTAGE OUTLETS

### NEMA 5-20 DUPLEX RECEPTACLE(S)

There shall be two (2) type NEMA 5-20 120V/20A duplex receptacle with a [household stainless steel](#) cover installed in the below specified location(s).

### RECEPTACLE LOCATION

Two (2) receptacles shall be provided and installed inside the chassis cab, one (1) behind the driver's seat and one (1) behind the officer's seat.

[Each outlet shall be coiled up with 5 ft of additional cable for Metro to mount upon delivery.](#)

The outlet(s) shall be powered by the shoreline connection and shall be live when the shoreline power is provided.

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## **REFLECTIVE STRIPING**

The reflective striping shall be supplied and installed by the Dealer.

## **REAR RETRO-REFLECTIVE CHEVRON STRIPING**

A minimum of 50 percent of the rear-facing vertical surface, visible from the rear of the apparatus, shall be equipped with 3M Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the vehicle at an angle of 45-degrees.

The stripe shall be 6.00 inches (152.40 mm) wide alternating in colors.

## **RETRO-REFLECTIVE STRIPING-SEVERE DUTY STEEL FRONT BUMPER**

The vertical surfaces of the steel front bumper shall be equipped with 3M Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the bumper at an angle of 45-degrees. The stripe shall be 6.00 inch (152.40 mm) wide alternating in colors.

## **CHEVRON COLOR**

The retro-reflective chevron striping shall be **black** in color. **The black shall alternate with the red of the bumper.**

## **DEALER SUPPLIED LETTERING**

The apparatus lettering shall be provided and installed by the Dealership before final delivery of the completed apparatus.

## **DEALER SUPPLIED DECALS**

The apparatus decals shall be provided and installed by the Dealership prior to the apparatus being placed into service.

## **LICENSE PLATE MOUNTING**

A Cast Products, model LP0004-1-B, cast aluminum fully enclosed license plate bracket shall be installed. The bracket shall incorporate a clear LED light (WL0501) to illuminate the license plate and meet DOT requirements.

## **LICENSE PLATE BRACKET LOCATION**

The above specified license plate bracket shall be installed at the back of the apparatus on the left side. The bracket shall be mounted to meet all applicable DOT standards.

## **DEALER SUPPLIED EXTRAS**

### **EMS CABINETS**

There will be one (1) EMS cabinets provided and installed between the chassis provided cabinets on the apparatus. The cabinets will include one (1) shelf and cargo netting.

### **LISTA TOOL BOX**

There will be a lista tool box provided and installed on the apparatus.

### **HOSE RESTRAINTS**

There will be a custom hose restraints provided and installed on the apparatus for the crosslays/speedlays and hose

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bed.

## **TFT HURRICANE DECK GUN**

There will be a TFT Hurricane deck gun with 18" extend-a-gun provided and installed on the apparatus.

## **CUSTOMER SUPPLIED KNOX BOX INSTALLED**

The customer supplied Knox Box will be installed in the apparatus.

## **CUSTOMER SUPPLIED MED-VAULT INSTALLED**

The customer supplied Med-vault will be installed in the apparatus.

## **CUSTOMER SUPPLIED HAAS INSTALLED**

The customer supplied HAAS will be installed in the apparatus

## **CUSTOM MAP BOOK ORGANIZER**

There will be a custom 3/16" aluminum map book tray provided and installed on the apparatus. The tray will be covered in a bed liner material for durability.

## **FIRECOM WIRELESS INTERCOM**

There shall be a Firecom Wireless intercom system provided and installed on the apparatus.

## **SURVIVOR LED FLASH LIGHTS**

There will be four (4) survivor and two (2) Vulcan LED flashlights provided and installed on the apparatus.

## **MOUNTING OF DEALER SUPPLIED EQUIPMENT**

All equipment provided by the dealer will be installed.

## **MOUNTING OF CUSTOMER SUPPLIED RADIOS AND MDC**

All mobile radios and MDC provided by the customer will be installed by the dealer.