# Patterson Fire Department No. 1
## Rescue Pumper
### Build Specification

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**INSTRUCTIONS TO BIDDERS**

**PRICE**

Price shall be net and shall include delivery of new equipment to the point of delivery indicated in the request for proposals. Terms of payment to be outlined in proposal.

**DELIVERY**

Equipment described herein is urgently required and guaranteed date of delivery shall be taken into consideration when making award.

**INFORMATION TO BE FURNISHED WITH PROPOSAL**

Bidder must submit with proposal their own detailed specifications, circulars, and all necessary data on equipment he proposes to furnish, including horse power and torque curves of the engine. If the equipment offered differs from the provisions contained in this specification, such difference must be explained in detail, and request for proposal will receive careful consideration if such deviations do not depart from the intent of this specification and are to the best interests of the Patterson Fire Department No. 1.

**WARRANTY**

The Bidder shall warrant that the equipment offered is standard new equipment, latest model of regular stock product, with parts regularly used for the type of equipment offered; also that no attachment of part has been substituted or applied contrary to the manufacturer's recommendations and standard practice. Warranties shall comply with noted sections of these specifications.

**QUALIFICATIONS OF BIDDER**

No request for proposal shall be considered unless the submitting firm can meet the following conditions:

1. Each bidder shall furnish satisfactory evidence of his ability to construct the apparatus specified.
2. That it is bidding upon model of equipment which meets the requirements of the specifications without material changes or modifications.
3. That it has been engaged in the manufacture of new fire apparatus under it's own brand name, and shall be of this exact type bid upon for at least (120) months.
4. That it has factory authorized service facilities which have repair parts inventory and a trained factory service organization for making complete repairs and overhaul of its make of equipment.

**REGULATIONS**

The apparatus and equipment shall comply with the current rules and regulations of the Traffic and Motor Vehicle Laws of the State and Federal Government, and of the latest edition National Fire Protection Association 1901 Standards.

The unit must be in accordance with manufacturer's printed current standard specification sheets and the available options listed thereon, in addition to meeting these detailed specifications; and no major assemblies, accessories or deviations be submitted to the purchaser for approval.

Whether specifically mentioned herein or not, all parts necessary to provide complete and efficient fire apparatus shall be furnished. Such parts shall conform to the best current engineering practices of the industry relative to design, structure, quality of material and workmanship.

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**RIGHT TO ACCEPT OR REJECT**

Patterson Fire Department No. 1 reserves the right to reject any and all request for proposals or to accept any request for proposal deemed by them to be in the best interest of the purchaser.

**ACCEPTANCE OF VEHICLE**

The Patterson Fire Department No. 1 shall notify the Bidder in writing within seven (7) days after delivery of the vehicle, whether such unit shall not be acceptable. Such notification will clearly itemize specific contract deviations in the event of non-acceptance. Non-compliance with the terms and specifications of the contract will be the only basis for non-acceptance. The vehicle shall be deemed to have been accepted once Patterson Fire Department No. 1 has put into service. After acceptance, the Patterson Fire Department No. 1 remedy or recourse against the Manufacturer shall be under the warranty.

**SCOPE AND GENERAL REQUIREMENTS**

It is the intent of the Patterson Fire Department No. 1 to secure an emergency apparatus to withstand the continuous use encountered in the emergency service. The apparatus shall be of the latest type, symmetrically proportioned and constructed with due consideration of the load to be sustained.

All parts not specifically mentioned herein, but which are necessary in order to furnish a complete emergency apparatus, shall be furnished and shall conform to the best practices known to the emergency industry.

If any Bidder has questions in connection with these specifications, please contact the Patterson Fire Department No. 1 in writing at least seven (7) days before Bid date. It is not the purpose of these specifications to eliminate any qualified Bidder.

The Patterson Fire Department No. 1 will review the question, and where information sought is not clearly indicated or specified, in the Patterson Fire Department No. 1's opinion, same will issue a clarifying or correcting addendum bulletin. Proper interpretation or the making of any necessary inquiry will be the Bidders responsibility. Oral answers will not be binding on the Patterson Fire Department No. 1.

To be considered, all proposals must be made in accordance with these "Instructions for Bidders".

The apparatus and all major components shall be manufactured in North America. Where the following detailed specifications require specific brand names, model number, dimension or capacities of components such as: axles, brakes, spring suspension, frame, steering gear, drive line, universal joints, engine transmission, alternator, batteries, air brake system, they have been specified for the service because of their reliability/availability of replacement parts on a local basis.

Since components specified by brand name, model number, dimension, size or capacity are readily available to all manufacturers and/or potential bidders, substitutes or alternates claimed to be equal may not be acceptable.

The Patterson Fire Department No. 1 specifications, along with Manufacturer's specifications and any forms, questionnaires, and listed exceptions, shall be submitted as a part of the bidder's entire bid proposal.

In no case shall a Bidder photocopy Patterson Fire Department No. 1's specifications and submit as their proposal specifications and request for proposal.

Each Bidder is required to provide in his request for proposal a "complete and accurate description" of their own detailed product and engineering specifications.

In addition, all Bidders are required to submit Patterson Fire Department No. 1's specifications in their proposal, noting items where the Bidders proposal differs and consecutively number each item. The number shall correspond with the bidders exception, variation, or clarification page which must be attached to their proposal.

All specifications herein contained are considered as minimum. No exceptions to these minimum standards shall be allowed relating to gauge, alloy, and type of metal, size of compartments, and overall design.

The apparatus shall comply with all applicable State and Federal requirements pertaining to vehicles used for fire fighting and emergency vehicles at time of contract signing. The apparatus must also comply with all requirements as specified in the NFPA 1901 standards that are applicable on date of contract signing.

The delivered apparatus shall have a certified G.V.W.R. weight sticker applied to vehicle on delivery to assure the apparatus meets all laws pertaining to the weight carrying capacity of the vehicle.

**SCOPE AND GENERAL REQUIREMENTS**

Should the Manufacturer's current published data or specifications exceed these specifications, they shall be considered minimum and be furnished. Bidders shall furnish, with their proposal, technical information graphs, charts, photographs, engineering diagrams, drive train certification, or other means to show that the equipment specified fully complies with this specification.

In the event the published literature furnished by the Bidder is at variance with the requirements of any item of this specification, the Bidder shall explain in detail, with full engineering support data, the reasons why the proposed equipment will meet this specification and not be considered an exception thereto.

The apparatus body manufacturer shall be prime bidder and shall identify the location of their facility and the number of regular full time employees. A complete history of the Bidder's company shall be supplied in his request for proposal request for proposals are requested from responsible manufacturers who are engaged in the manufacture of emergency apparatus. Patterson Fire Department No. 1 does not request proposals from bankrupt, reorganized, or unproven manufacturers.

Each Bidder shall submit a list of a minimum of ten (10) Departments where the vendor has delivered similar type and size apparatus within the last twelve (12) months with contact addresses and telephone numbers. Bidders shall submit photographs with their proposal showing similar emergency apparatus manufactured.

The Bidder shall maintain full insurance coverage on the cab and chassis until the completed unit is delivered to, and accepted by, the Patterson Fire Department No. 1. The Bidder must provide certificate of insurance with Bid including overall blanket of not less than $2,000,000.00.

The Request for Proposal must be in the same sequences as these specifications for ease of comparison. Any bid not in this sequence shall be disregarded and immediately rejected. (No Exceptions).

Failure to comply with all conditions mentioned under General Terms and Conditions, or the failure to conform to the specifications, will be reasonable cause for the rejection. Any request for proposal containing options not asked for, or not containing all statements contained on the said price form, shall be rejected.

Request for proposal may be withdrawn by certified mail or telegraphic request from Bidders prior to the time fixed for opening. Negligence on the part of the Bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened. No Bidder may withdraw his bid after the time set for opening thereof.

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**EVALUATION OF BIDS**

Each bid proposal received shall be evaluated by the Patterson Fire Department No. 1 to include the following criteria:

1. Completeness of the proposal package. (The degree to which it responds to all requirements to these specifications.)
2. Bidders written detailed specifications and compliance.
3. Design and engineering of major components. (Including ease of maintenance of major components.)
4. Qualifications and capabilities of the Manufacturer to produce the described apparatus.
5. Compliance to submission of all engineering drawings, performance charts, scaans, and material samples.
6. Service and warranty information submitted.
7. Reasonableness of cost

The Patterson Fire Department No. 1 reserves the right to waive any informality in request for proposal received when such waiver is in the best interest of the Patterson Fire Department No. 1; also to except any item in the request for proposal, unless otherwise specified by the Patterson Fire Department No. 1 or Bidder.

The competency and responsibility of Bidders will be considered in making the award. The Patterson Fire Department No. 1 reserves the right to reject any or all request for proposals when such rejection is in the best interest of the Patterson Fire Department No. 1, and to reject the proposal of a Bidder who, in the judgment of the Patterson Fire Department No. 1 is not in a position to perform the Contract. The Patterson Fire Department No. 1 does not obligate itself to accept the lowest or any request for proposal

A statement of financial condition may be required by the Patterson Fire Department No. 1 prior to any award of contract. The past and present financial condition of the Bidder will be seriously considered during bid evaluation.

The Bidder shall disclose any current or pending litigation regarding failure to deliver or comply with specified components on complete apparatus.

**GENERAL CONSTRUCTION AND DESIGN**

The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment. All components shall be designed and protected so that heavy rains or other adverse weather conditions will not interfere with normal servicing or operation.

All oil, hydraulic and air tubing lines, and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through frame connector is necessary.

The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles, so that all specified equipment including personnel will be carried without injury to the apparatus. All dimensions are approximate and subject to a plus or minus 1/4" tolerance.

The following specifications describe minimum requirements for an emergency services vehicle designed for severe duty applications.

The materials specified are considered absolute minimum. Exceptions will not be accepted or permitted since all raw materials of the specified type are available to all Manufacturers. Since all custom Manufacturers have the ability to shear, break, and weld as these specifications require, all basic design requirements shall be complied with.

Subletting any part of the fabrication, painting, or finishing of the apparatus will not be acceptable.

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**ACCESSIBILITY**

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

Cover plates which must be removed for component adjustment or part removal should be equipped with quick disconnect fasteners or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders, and check points for all components should be located so that they are readily accessible and do not require special tools for proper servicing. Design practices should minimize the number of tools required for maintenance.

**MATERIALS**

The materials specifications are considered absolute minimum. Exceptions will not be accepted or permitted since all raw materials of specified type are available to all manufacturers. Since all manufacturers have the ability to shear, break and weld as these specifications require, all basic design requirements shall be complied with.

Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for purpose of commercial practice. Materials shall be free of all defects and imperfections that might affect the serviceability of finished product.

**QUALITY AND WORKMANSHIP**

The manufacturing process, including quality control, shall be consistent with present industry standards. All equipment, material, and articles required under these specifications are to be new or fabricated from new materials produced from recovered materials. The term "Recovered Materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this document. The term "Heavy Duty", as used to describe an item, shall mean in excess of the standard, quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, Patterson Fire Department No. 1system, etc., that is available. The Patterson Fire Department No. 1 or their designate shall be the sole judge of quality, construction and stability of the apparatus and equipment being offered.

Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the ready removal of any component part for service or repair. All steel and stainless steel welding shall be done to American Welding Society D1.1-83 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-83 requirements for structural welding of aluminum.

Defective components shall not be furnished. Parts, equipment, and assemblies, which have been repaired or modified to overcome deficiencies, shall not be furnished without the approval of the Patterson Fire Department No. 1. Welded, bolted, and riveted construction utilized shall be in accordance with the highest standards of the industry. Component parts and units shall be manufactured to definite standard dimensions with proper fits, clearances, and uniformity. General appearance of the vehicle shall not show any evidence of poor quality of work.

**INTERNET IN-PROCESS SITE**

The Bidder shall post and maintain a website where the Patterson Fire Department No. 1 will be able to view digital images of their apparatus as its being manufactured. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of the apparatus.

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**EXCEPTIONS, VARIATIONS, AND CLARIFICATIONS**

These specifications are based upon design and performance criteria which have been developed by the Patterson Fire Department No. 1 as a result of extensive research and careful analysis of the data. Subsequently, these specifications reflect the only type of vehicle that is acceptable at this time. Therefore, major exceptions to specifications will not be accepted. Certain exceptions may be accepted if they are minor and equal or superior to that which is specified.

Any exception or clarification to these specifications shall be noted on an individual sheet of paper referencing the section number and the exception or clarification offered. Any exception shall be clearly defined with details as to the proposed alternative referencing manufacturer and model where appropriate. A general exception cannot be taken for any paragraph. A full word for word written comparison must be included within the bid for any exception listed. Each exception will be considered by their degree of impact and total effect on their bid. Bidders taking total exception to the request for proposal specifications shall not be considered by the Patterson Fire Department No. 1. The Patterson Fire Department No. 1 shall determine which (if any) exceptions are acceptable and this determination shall be final.

The Patterson Fire Department No. 1 assumes that silence to exception indicates that the item will comply with specifications as determined by the Patterson Fire Department No. 1, regardless of cost to the Bidder. Should the item not comply, and the exception is not indicated, then the item shall be rejected when delivered. All items shall be given a general inspection for material, workmanship, and compliance with specifications prior to acceptance. Should the item not comply, and an exception not be taken, the Bidder shall be held responsible to fulfill that specification.

**CONSTRUCTION DOCUMENTATION**

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

(1) The manufacturers record of apparatus construction details, including the following information:
- (a) Owner's name and address
- (b) Apparatus manufacturer, model, and serial number
- (c) Chassis make, model, and serial number
- (d) GAWR of front and rear axles and GVWR
- (e) Front tire size and total rated capacity in pounds (kilograms)
- (f) Rear tire size and total rated capacity in pounds (kilograms)
- (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
- (h) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
- (i) Type of fuel and fuel tank capacity
- (j) Electrical system voltage and alternator output in amps
- (k) Battery make, model, and capacity in cold cranking amps (CCA)
- (l) Chassis transmission make, model, and serial number;and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- (m)Ratios of all driving axles
- (n) Maximum governed road speed
- (o) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (p) Pump transmission make, model, serial number, and gear ratio
- (q) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (r) Water and Foam tank certified capacity in gallons or liters
- (s) Paint manufacturer and paint number(s)
- (t) Company name and signature of responsible company representative
- (u) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)

(2) Certification of compliance of the optical warning system
(3) Siren manufacturer's certification of the siren
(4) Written load analysis and results of the electrical system performance tests
(5) Certification of slip resistance of all stepping, standing, and walking surfaces
(6) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
(7) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
(8) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
(9) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
(10) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
(11) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
(12) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
(13) When the apparatus is equipped with a water tank, the certification of water tank capacity
(14) If the apparatus has an aerial device, the certification of inspection and test for the aerial device
(15) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
(16) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
(17) If the apparatus has a line voltage power source, the certification of the test for the power source
(18) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification *(see 24.9.7)*, and the results of the testing of the air system installation
(19) Any other required manufacturer test data or reports

**OPERATION AND SERVICE DOCUMENTATION**

The contractor shall supply, at time of delivery, at least two sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the apparatus and all major components thereof.

The contractor shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

1. Manufacturers name and address
2. Country of manufacture
3. Source of service and technical information
4. Parts and replacement information
5. Descriptions, specifications, and ratings of the chassis, and pump
6. Wiring diagrams for low voltage and line voltage systems to include the following information: representations of circuit logic for all electrical components and wiring, circuit identification, connector pin identification, zone location of electrical components, safety interlocks, alternator-battery power distribution circuits, and input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
7. Lubrication charts
8. Operating instructions for the chassis, any major components such as a pump or any auxiliary systems
9. Instructions regarding the frequency and procedure for recommended maintenance
10. Overall apparatus operating instructions
11. Safety considerations
12. Limitations of use
13. Inspection procedures
14. Recommended service procedures
15. Troubleshooting guide
16. Apparatus body, chassis, and other component manufacturers warranties

17. Special data required by this standard
18. Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
19. A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The contractor shall deliver with the apparatus all manufacturers operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

**NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM**

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a CD-ROM. These manuals shall be divided into sections for ease of reference. There shall be two (2) copies of the CD-ROM provided with the completed vehicle.

**BID BOND AND/OR SECURITY**

Each bid must be accompanied by a bid bond in the amount of 10% of the maximum amount of the bid, or in lieu thereof, a deposit of cash or, certified check payable to Patterson Fire Department No. 1 in an amount equal to 10% of the maximum amount of the bid, to assure the Patterson Fire Department No. 1 of the adherence of the Bidder to their bid, and the execution of the contract, if their bid is accepted.

Within ten (10) days after the opening of bids, the deposits of all but the three (3) lowest responsible Bidders who comply with these specifications will be returned.

Within ten (10) days after the award of the contract, if an award is made, the deposits of the remaining two (2) unsuccessful Bidders will be returned, or if all bids are rejected, the deposits of said three (3) lowest Bidders will be returned.

Within ten (10) days after the execution of the contract and acceptance of the Bidder's bond by the Patterson Fire Department No. 1, the deposit of the successful Bidder will be returned.

No plea of mistake in such accepted bid shall be available to the Bidder for the recovery of their deposit or as a defense to any action based upon such accepted bid.

**PERFORMANCE BOND**

The successful Bidder will be required to provide a 100% performance bond in the amount equivalent to the total amount of its bid including any additional options that may have been given. Performance bond shall be provided within two (2) weeks after notice of award.

If the Bidder to whom the contract is awarded, refuses or neglects to execute, or fails to furnish the required 100% performance bond within two (2) weeks after notice, the amount of his deposit may be forfeited and retained by the Patterson Fire Department No. 1 as liquidated damages.

The terms of the performance bond shall continue one (1) year after completion and delivery of the apparatus.

**WARRANTY**

The Bidder shall provide a full statement of the warranty provided for the vehicle(s) being bid. This warranty should clearly describe the terms under which the vehicle's Manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material, and for the applicable period of time after delivery.

Cost of repairs refers to all costs related thereto including, but not limited to, the cost of materials, the cost of labor.

The Manufacturer shall warrant all materials and accessories used in the vehicle(s), whether fabricated by the Manufacturer or purchased from an outside source and will deal directly with the Patterson Fire Department No. 1 on all warranty work.

The warranty shall commence upon acceptance of the vehicle.

**GENERAL WARRANTY - TWO (2) YEARS**

The entire body and all contractor installed components shall be warranted, including parts and labor for a period of at least *Two (2) Years* commencing upon the placing of the unit in-service by the Patterson Fire Department No. 1 (except that warranty on the tires and tubes, batteries, electrical lamps, and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for same are to be made directly with the manufacturer). Extended warranties on the engine, transmission, or other major components shall be detailed by contractor in their proposal.

This warranty shall not apply to those items which are usually considered normal maintenance and repair; including but not limited to normal lubrication or proper adjustment of main functional operating components. All manufacturers' warranties (apparatus & equipment) shall be furnished and indicated in the manufacturer's bid. Any standard warranties, including, but not limited to engine, transmission, tires and axles furnished by the original equipment manufacturer (OEM) or the prime contractor will be passed on to the Patterson Fire Department No. 1. Also include any available extended warranties that will start after the initial warranty period. Goods or property shall be as represented by these specifications as well as additional agreements as a result of discussions regarding these specifications and shall be as promised with implied liability on the manufacturer.

The contractor must be the "single source" coordinator of all warranties on the vehicle.

**STRUCTURAL WARRANTY - FIFTEEN (15) YEARS**

The contractor shall warrant that each new rescue body (exclusive of paint, finish, hardware, moldings, windows, and other appointments and accessories) is structurally sound and free of all structural defects of both material and workmanship and further warrants that it will maintain such structural integrity for a period of *Fifteen (15) Years* from the completion date listed on the contractor's data plate attached to the vehicle inside the cab.

The contractor further warrants that this structural integrity warranty may be transferred to a second Purchaser providing the vehicle is inspected by the original contractor or their authorized representative within thirty (30) days of ownership transfer. To maintain warranty coverage, the proper ownership transfer papers shall be kept on file at contractor's facility.

In the event of a chassis remount, this structural warranty shall remain in effect providing that the re-chassis work is completed by the contractor or a facility which obtains written authorization from the Manufacturer.

Should repairs become necessary under the terms of this warranty, the extent of the repair shall be determined solely by the contractor and shall be repaired by the contractor an Authorized Service Center designated by the contractor. The expense of any transportation to or from the ASC shall be the responsibility of the Patterson Fire Department No. 1 and is not an item covered by this warranty.

There shall be a warranty certificate supplied with the completed apparatus to detail the warranty configuration.

## TESTING

### LOW VOLTAGE ELECTRICAL SYSTEM NFPA PERFORMANCE TEST

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C).

### TEST SEQUENCE

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

### (1) RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off, and the minimum continuous electrical load shall be activated for 10 minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

### (2) ALTERNATOR PERFORMANCE TEST

### TEST AT IDLE

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

### TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

### (3) LOW VOLTAGE ALARM TEST

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system, or 36 V for a 42 V nominal system.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

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

**DOCUMENTATION**

The manufacturer shall deliver the following with the fire apparatus:

(1) Documentation of the electrical system performance tests
(2) A written electrical load analysis, including the following:
  (a) The nameplate rating of the alternator
  (b) The alternator rating
  (c) Each of the component loads specified that make up the minimum continuous electrical load
  (d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
  (e) Each individual intermittent electrical load.

**120/240 VOLT AC NFPA TEST - BY UNDERWRITERS LABORATORIES**

The apparatus 120/240 volt electrical system shall be tested and certified Underwriters Laboratories. The certification shall be delivered to the customer with the apparatus.

The test shall be performed with the air temperature between 0 degrees F and 110 degrees F.

**TEST SEQUENCE**

The following test shall be performed in the order indicated below.

The wiring and permanently connected devices (excluding utilization devices) are subjected to 900 VAC for one (1) minute. The test is conducted between live parts and the neutral conductor, as well as between the live parts and the vehicle frame with any switches in the circuit closed. The test is accomplished with a Biddle HiPot tester model 230315.

The generator output is tested at 100% of its nameplate rating for a minimum of two (2) hours, into a resistive load. The following information is recorded of the generator and its power supply at 30 minute intervals during the test: voltage, amperage and frequency output of the generator, as well as the oil pressure, water temperature, transmission temperature, hydraulic temperature, and the battery charge rate, as applicable.

**INSPECTION TRIPS**

The Bidder shall provide one (1) individual inspection trip(s) to the factory. The quantity of people and number of trips can be configured to meet the needs of the Patterson Fire Department No. 1. The cost of transportation, food, and lodging shall be borne by the Bidder.

If the Patterson Fire Department No. 1 is more than 250 miles from factory than the transportation shall be by commercial airline.

The description of these factory trips must be included in Bid. If nothing is described or mentioned in the Bid pertaining to inspection trips, then it is assumed that the Bidder is taking exception to inspection trips required, and bid shall be rejected.

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**DELIVERY AND DEMONSTRATION**

The contractor shall be responsible for the delivery of the completed unit to the Patterson Fire Department No. 1s location. On initial delivery of the apparatus, the contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Patterson Fire Department No. 1 regarding the operation, care, and maintenance of the apparatus and equipment supplied at the Patterson Fire Department No. 1s location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by Patterson Fire Department No. 1.

After delivery of the apparatus, the Patterson Fire Department No. 1 shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment as defined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

**MODEL**

The cab and chassis shall include design considerations for one hundred (100) percent on-road applications, a high horsepower engine, including high speed operations and a consideration for above normal starts and stops. This chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained. The chassis shall be designed for a duty rating of one hundred (100) percent loaded full time.

**MODEL YEAR**

The chassis shall have a vehicle identification number that reflects a 2009 model year.

**COUNTRY OF SERVICE**

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

**APPARATUS TYPE**

The apparatus shall be created for the Emergency Services Industry and include the functions of a Rescue which shall include the functions of a multipurpose vehicle which primarily provides support services at emergency scenes.

**TRUCK TYPE**

The chassis shall be manufactured as a truck style and designed to include permanently mounted compartments behind the cab, known as the body. The body of the truck shall be supplied and installed by the apparatus manufacturer.

**AXLE CONFIGURATION**

The chassis shall offer a single rear drive axle with a single front steer axle configuration (4 X 2).

**GAWR FRONT**

The gross apparatus weight rating and the gross capacity weight rating shall be adequate to carry the weight of equipment and the apparatus, with water tanks full and other tanks at full capacity, miscellaneous equipment and all personnel weights considered as recommended by the most current edition of NFPA 1901.

The chassis front gross axle weight rating (GAWR) shall be 20,000 pounds.

**GAWR REAR**

The chassis rear gross axle weight rating (GAWR) shall be 27,000 pounds.

**CAB STYLE**

The cab shall be a custom, enclosed model, built specifically for the fire service by a company specializing in cab and chassis design for all fire service applications.

The cab shall be manufactured for heavy-duty service utilizing adequate strength and capacity for the application of protecting firefighters. The cab shall be of a modular design offering improved strength, durability and reduced weight. The modular design shall allow for faster, less costly replacement of components. Per pound, sheet panel aluminum extrusions offer a higher tensile strength, 45,000 PSI, and yield strength, 40,000 PSI, than that of lower grade sheet such as 3003-H13. For this reason, the cab shall be of aluminum extrusion construction, which shall offer superior strength and the truest, flattest surface ensuring less expensive paint repairs if needed.

The method of cab construction shall use a process incorporating techniques outlined in accordance with the American Welding Society D1.1-96 requirements for structural steel welding. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side panels shall be assembled using proven industrial adhesives, designed specifically for aluminum fabrication, which exceed the strength of a weld, for construction.

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

The cab shall be constructed of 5052-H32 Marine Grade, one hundred percent primary aluminum plate. A single formed, one (1) piece extrusion, manufactured from 6061-T6 100 percent primary one- quarter inch thick aluminum shall be used for the “A” pillar adding strength and rigidity to the cab as well as additional roll-over protection. The cab side wall skins and shall be 0.125 inch thick, the rear wall and roof skin shall be 0.19 inch thick, the front skin shall be 0.125 inch thick.

The cab shall incorporate tongue and groove fitted 6061-T6 0.25 inch thick aluminum extrusions for extreme duty situations. The cab shall include multi-layer composite insulation for improved cab heating and cooling in addition to noise reduction.

Proposals offering products built with anything less than the alloy-temper mentioned or from any other material, other than aluminum, shall not be considered. Additionally, any cabs utilizing recycled or recovered aluminum plate or extrusion products shall not be considered due impurities in the composition leading to a lack of strength.

The cab shall incorporate a fully enclosed design, allowing for a spacious cab area with no partition between the front and rear sections of the cab. The walls of the vehicle shall include roof supports allowing for an open design. The outside dimension of the cab shall be 96 inches wide with a minimum interior width of 90 inches.

The cab overall length shall be 130.38 inches in length with 54.00 inches from the centerline of the front of the axle to the back of the cab. The cab shall offer a height of 58.00 inches from the front floor to the headliner and a rear floor to headliner height of 65.00 inches, at a minimum. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

In order to offer the optimum amount of cab space to occupants, there shall be no consideration given for any cab unable to comply with the minimum measurements for interior cab space as listed.

The cab shall include a driver and officer area with two (2) cab door openings. The front door opening shall offer a clear door opening of 43.00 inches wide X 56.00 inches high. The rear door opening shall offer a clear door opening of 34.00 inches wide X 63.00 inches high. This style of cab shall also include a crew area offering up to (8) seating positions.

The cab shall incorporate a (2) step configuration from the ground to the cab floor for each door opening. The lower step shall be constructed of heavy duty safety grating which meets or exceeds Federal Specification RRG-1602-latest revision and performs under dry, greasy, muddy, soapy and icy conditions and offers open drainage.

The first step for the driver and officer area shall measure 11.44 inches deep X 31.13 inches wide. The intermediate step shall measure 8.75 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure 12.13 inches deep X 20.44 inches wide. The intermediate step shall measure 10.50 inches deep X 23.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

**CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.090 of an inch thick, one hundred percent primary aluminum plate which shall be attached as the front cab skin to offer an appealing exterior. The cab fascia will encompass the front of the aluminum cab structure at the bottom of the windshield to the lower section of the cab and include a Classic design.

The front fascia will cover the front aluminum cab structure from the bottom of the windshield down to the bottom of the cab. The front cab fascia shall include a cast molded module accommodating up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights.

**FRONT GRILLE**

The front fascia shall include a box style, stainless steel front grille 39.00 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 632.90 square inches shall be installed on the front of the cab with the upper portion of the grille hinged. The grille shall include two (2) flush push button latches which shall allow access to the front fluid fills of the cab. The front grille shall include a cast diamond shape at the top and offer easy access in examination of and adding engine oil or wiper washer fluid as well as access to the windshield wiper motor and linkage.

**CAB ENGINE TUNNEL**

The cab interior shall include a fixed type engine tunnel cover sized to accommodate an engine with a smaller block or an engine which has a large block. The engine tunnel shall be an integral part of the cab constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The tunnel shall be a maximum of 41.50 inches wide X 29.00 inches high.

The engine tunnel shall be insulated with multi-layer insulating material, consisting of foam, a sound barrier of 1.0 pounds per square foot with a facing which resists heat transfer. This insulation shall be held in place by adhesive, aluminum stick pins and retention caps. Any exposed insulation seams and edges shall be sealed reducing moisture and debris.

**CAB ENTRY DOORS**

The cab shall include a driver and officer area with two cab door openings which offer a clear door opening of 40.75 inches wide.

The doors shall be constructed of extruded aluminum with a nominal thickness of .125 inch. The exterior skins shall be constructed of .125 inch aluminum plate. The cab shall include four (4) entry doors as high as possible for ease of entering and egress when outfitted with an SCBA.

All cab and crew doors shall be of substantial weight for the optimum strength and rigidity for the best performance in all cab crash testing. Any cab with front and crew doors manufactured of less than the material thickness of .125 inch in both the extrusion and exterior skin shall not be considered.

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 hinge shall be .375 inch piano style and be constructed of stainless steel.

The piano style hinge and hidden flush mounted door is the most favorable construction keeping dirt and debris out of the hinge allowing for optimum operation throughout the lifetime of the door.

Proposals offering door hinge thickness any less than stated shall not be considered.

Proposals including doors that do not comply with the flush mounting as described or those including exposed hinges shall not be considered.

**CAB ENTRY DOOR TYPE**

All entry doors shall be of a flush, full height design and shall be located on the sides of the cab.

**CAB STRUCTURAL WARRANTY**

The cab structure shall be warranted for a period of ten (10) years. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

**CAB CRASH TEST ECE-29**

The cab shall have successfully achieved survival of the International crash test ECE-29, Addendum 28, Revision 1 as indicated below.

As part of the ECE regulation 29 test, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 pounds foot of force to the cab front face. The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse. The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by cameras, high speed imagers, accelerometers and strain gauges, with notarized copies of the letters verifying the test results and videos of said test shall be available upon request.

**CAB PAINT EXTERIOR**

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

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

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

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

**CAB PAINT MANUFACTURER**

The cab shall be painted with PPG Industries paint.

**CAB PAINT PRIMARY/ LOWER COLOR**

The lower paint color shall be PPG FBCH 71663 Red.

**CAB PAINT WARRANTY**

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for 7 years from the first owners date of purchase or in service or the first 70,000 actual miles, whichever occurs first.

**LOW VOLTAGE ELECTRICAL SYSTEM**

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

**APPARATUS WIRING PANEL**

An apparatus wiring panel shall be installed on the officer side bulkhead below the dash which shall include (8) each open circuits with three (3) each 20.00 amp, (1) each 30.00 amp, (3) each 10 amp and (1) each 15 amp relay and breaker with trigger wires which shall be connected to the rocker switch panel.

**CLASS 1 TOTAL SYSTEM MANAGER**

The apparatus shall be equipped with a Class 1 Total System Manager (TSM) for performing electrical load management. The TSM shall have sixteen (16) programmable outputs to supply warning and load switching requirements. Outputs one (1) through twelve (12) shall be independently programmable to activate during the scene mode, the response mode, or both. These outputs can also be programmed to activate with the ignition or master warning switch, or to sequence and shed along with the priority. Output thirteen (13) shall be designated to activate a fast idle system. Output fourteen (14) shall provide a low voltage warning for an isolated battery. Output fifteen (15) is a user configurable output and shall be programmable for activating between 10.50 and 15.00 volts. Output sixteen (16) shall provide a low voltage alarm that activates at the NFPA required 11.80 volts. The TSM shall have a digital display to indicate system voltage in normal operation mode and also indicate the output configuration during programming mode. The TSM shall be protected against reverse polarity and shorted outputs and be enclosed in a metal enclosure to enhance EMI/RFI protection.

**POWER AND GROUND STUD**

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

**EXTERIOR ELECTRICAL TERMINAL COATING**

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

**ENGINE**

The power plant for the vehicle shall offer proven performance and reliability while meeting all Federal diesel-engine emission requirements. During acceleration, the electronically actuated variable geometry turbocharger (VGT) shall automatically and precisely boost output across the operating range for improved throttle response and greatly reduced turbo lag. The VGT shall optimize airflow during Jake operation which shall offer increased auxiliary engine braking performance.

The Detroit Diesel engine shall achieve the oxides of nitrogen by 55 percent and particulate matter by 90 percent. The Detroit Diesel shall achieve the nitrogen oxide target by optimizing the existing exhaust gas recirculation system. Particulates shall be reduced with the after treatment system, comprised of a Diesel Oxidation Catalyst and a Diesel Particulate Filter (DPF). The engine manufacturer shall be responsible for total engine emissions by the addition of maintenance free crankcase breather and oil separator. The centrifugal oil separator shall send oil droplets back to the sump which shall emit a much cleaner vapor.

The Series 60 engine shall include an advanced fuel system which shall add performance and cleanliness to the engine. Dual solenoid Electronic Unit Ejectors shall provide exact fuel and metering and enable independent injection pressure control. This system shall have multiple injection capability to maintain performance advantages and improved sound quality. The Series 60 shall be rated at 515 HP at 1800 RPM and shall be governed at 2100 RPM with 1650 foot pounds of torque with peak torque occurring at 1100 RPM for rapid off the line acceleration. The engine shall have an 855 cubic inch displacement (14 Liters).

The Series 60 shall include a DDEC VI engine management system. The DDEC VI shall employ a powerful microprocessor, increased memory and enhanced diagnostics. The DDEC VI shall be capable of managing all engine functions and shall be a key strategy in greater operating efficiency and cleaner exhaust emissions. A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**ENGINE CONFIGURATION**

The engine shall be located in the front of the chassis in cab-over configuration.

**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 when the engine is at a specified RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall automatically re-engage when the brake is released, or when the transmission is placed in neutral.

**ENGINE PROGRAMMING**

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

**FORWARD FLUID FILLS**

The front of the chassis shall accommodate fluid fills for the engine oil and the windshield washer fluid though the grille. This area shall also accommodate checks for the engine oil.

**ELECTRONIC LOW ENGINE OIL INDICATOR**

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

**ENGINE BLOCK HEATER**

A Kim Hotstart 1000 watt, 120 volt engine coolant heater with automatic thermostat shall be installed. The block heater shall be connected to the electrical inlet.

**ENGINE WARRANTY**

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

**ENGINE PROGRAMMING REMOTE THROTTLE**

The engine ECM (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 FAN DRIVE**

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall 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.

**ENGINE COOLING SYSTEM**

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the fire 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 utilize heavy-duty welds and 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 stacked, single depth package that provides the maximum cooling capacity for the specified engine as well as offers excellent serviceability. The main components shall include a surge tank, charge air cooler, recirculation shield, radiator and transmission cooler.

There shall be a single depth core that allows greater efficiency, enhanced serviceability, and lighter weight with a higher ambient capability.

The cooling package core shall be protected by a radiator skid plate and not protrude below the frame of the vehicle by more that 3.5 inches. This feature shall provide an improved angle of approach thereby reducing possible damage.

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall include a minimum of a 910 square inch core and shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injected molded Polymer fan blade designed to provide long life in harsh environments. Polymer fans provide a significant weight reduction over metal fans providing longer life for fan clutch linings and bearings along with increased fan belt life.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a cap that meets the engine manufactures pressure requirements as well as the system design requirements.

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. When a center bumper compartment is installed an additional shield may be required to redirect the airflow into the coolers.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with welded side tanks. The charge air cooler shall have a minimum of a 473 square inch core and be bolted to the top of the radiator to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

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 manufactures requirements.

**ENGINE COOLANT**

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

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

**COOLANT FILTER**

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

**LOW COOLANT INDICATOR LIGHT AND TONE ALARM**

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 with stainless steel constant torque clamps.

**ENGINE AIR INTAKE**

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

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

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

The charge air cooler hose shall be formed from aluminized steel tubing and include silicone hump hose with stainless expansion rings and stainless steel “constant torque” style clamps meeting the engine manufactures requirements.

Proposals shall include an indication light representative of the need for replacement of the air intake filter and shall be located at the front of the vehicle.

**EXHAUST SYSTEM**

The exhaust system shall include a diesel particulate filter and a diesel oxidation catalyst to meet current EPA standards. The system shall be designed and installed using 0.065 inch aluminized steel plumbing from the diesel particulate filter to the discharge which shall terminate horizontally on the officer side of the vehicle ahead of the rear tires. The exhaust system shall be mounted on the underside of the frame inboard, maximizing space for the body compartments. All joints along plumbing following the diesel particulate filter shall be connected with lapping band style clamps.

The system shall include a 5.00 inch diameter plumbing which shall be 0.065 inch thick stainless steel exhaust between the engine turbo and the diesel particulate filter. The tubing shall include a thermal cover in order to retain heat between the engine turbo and diesel particulate filter. The entire exhaust system shall be bolted to the frame and include system joints connected with zero leak clamps between the turbo and diesel particulate filter.

**ENGINE EXHAUST ACCESSORIES**

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

**TRANSMISSION**

The drive train shall include an Allison Gen IV-E 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 Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

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

The transmission gear ratios shall be:
1st- 3.51 to 1; 2nd- 1.91 to 1; 3rd- 1.43 to 1; 4th- 1.00 to 1; 5th- 0.74 to 1; 6th- 0.64 to 1 (if applicable); Rev- 4.80

**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 EVS group package number 127 shall contain the 199 vocational package in consideration of the duty of this apparatus for rescue. 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.
An 8 pin

**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 will provide a prognostic indicator (wrench symbol) between the selected and attained indicators.

**ELECTRONIC LOW TRANSMISSION OIL LEVEL INDICATOR**

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

**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.

**TRANSMISSION COOLING SYSTEM**

The transmission shall include an air to oil cooler integrated into the lower portion of cooling package. The transmission cooling system shall meet all transmission manufacturer requirements. The cooling system shall feature a circuit provision located within the hydraulic transmission oil which shall provide for rapid warm up to the optimum transmission operating temperature.

Proposals offering water to oil style transmission cooling systems shall not be accepted.

**TRANSMISSION DRIVEN PTO CLEARANCE CAB MTG SHIMS**

The cab shall include spacers raising the cab to afford the clearance of the power take off from the transmission.

**DRIVELINES**

All drivelines shall be heavy duty metal tube and equipped with Spicer 1810 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. A splined slip joint shall be provided in each driveshaft and shall be coated with Glide coat®.

**DRIVELINE RETARDER**

A Telma electric focal mounted driveline retarder shall be provided.

**DRIVELINE RETARDER CONTROL**

There are four (4) stages to the driveline retarder. Stage 1 is 25% activation, Stage 2 is 50% activation, Stage 3 is 75% activation, and Stage 4 is 100% activation. The retarder shall work off pressure applied to the service brake. The first stage shall activate with 3 PSI of pressure. The second stage shall activate with 5 PSI of pressure. The third stage shall activate with 7 PSI of pressure and the fourth stage shall activate with 10 PSI of pressure. The driveline retarder shall be controlled by an On/Off switch which shall be located on the dash, with an indicator light which shall be mounted on the instrument panel. The indicator light shall indicate the 4 stages of activation.

The driveline retarder shall disengage in pump mode or during an ABS event. The driveline retarder shall activate the brake lights.

**FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fuel Pro 382 fuel filter/water separator with a thermostatically controlled integral heater as a primary filter. The fuel filter shall have a see through cover to allow visual inspection of fuel and filter condition and a drain valve.

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

An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

**FUEL LINES**

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

**FUEL SHUTOFF VALVE**

A fuel shutoff valve shall be installed in the fuel draw line at the secondary fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

**FUEL TANK**

The fuel tank shall have a minimum capacity of sixty-eight (68) gallons and measure 35.00 inches wide X 17.00 inches high X 29.00 long. The baffled tank shall be made of 14 gauge aluminized steel. The tank exterior is painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The fuel tank shall be mounted 2.00 inch below the frame, behind the rear axle. The tank can be easily lowered and removed for service purposes.

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

Dual draw tubes and dual sender ports shall be installed. A 2.00 inch NPT fill ports shall be available for right or left hand fill. A 0.5 inch NPT drain plug shall be centered in the bottom of the tank.

**FUEL FILL PROVISIONS**

The fuel tank fill ports shall be offset with the left fill port located in the forward position extending across to the middle of the tank and the right fill port also located in the middle position on 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.

**FRONT WHEEL BEARING LUBRICATION**

The front axle wheel bearings shall be lubricated with clear 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 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 nine (9), 54.00 inch long and 4.00 inches wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

**STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column shall be a seven (7) position tilt and 2.25 inch telescopic type with an 18.00 inch steering wheel located on the left side of the cab designating the drivers position. The steering wheel shall be covered with black absorbite padding.

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

**POWER STEERING PUMP**

The hydraulic power steering pump shall be a Vickers 20V and shall be gear driven from the engine. The pump shall be a fixed displacement vane type.

**ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

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

**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.

**CHASSIS ALIGNMENT**

The chassis frame rails shall be cross checked to insure the length and to make sure each is square. The front and rear axles shall be laser aligned, additionally the tires and wheels shall be aligned and toe-in set on the front tires. The completed apparatus shall be rechecked for proper alignment once the chassis has been fully loaded.

**REAR AXLE**

The rear axle shall be a Meritor model RS-25-160. The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the industrys demands. The axle shall include rectangular shaped, hot-formed housings for extra strength and rigidity. The axles shall also include torsion flow axle shafts that feature a surface hardness which resists fatigue and a resilient core which absorbs shock. There shall be unitized pinion seals within the axle helping to prevent leakage and harmful road contaminants from entering the axle components. The axle shall include a rigid differential case for high axle strength and reduced maintenance.

The axle shall include single reduction gearing and shall have a rated capacity of 27,000 pounds.

**REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with oil.

**REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with oil.

**VEHICLE TOP SPEED**

The top speed of the vehicle shall be approximately 65 MPH +/-2 MPH at governed engine RPM.

**REAR SUSPENSION**

The single rear axle shall feature a Reyco 102AR air suspension with a single air bag on each side attached to a tapered forged drop leaf spring with one adjustable and one fixed torque rods.

The suspension shall feature dual air height control valves which shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. The suspension shall also include two premium shock absorbers, one each side.

The rear suspension capacity shall be rated at 21,000 to 27,000 pounds to meet the rear axle rating selected.

**REAR SHOCK ABSORBERS**

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

**FRONT TIRES**

The front tires shall be Michelin 365/70R-22.5 20PR "L" tubeless radial XZA highway tread.

The front tire stamped load capacity shall be 21,000 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 125 pounds per square inch.

The front tire US Fire Service Intermittent Usage load capacity shall be 22,500 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 130 pounds per square.

**REAR TIRES**

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XDN2 all weather tread.

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

The rear tire US Fire Service Intermittent Usage load capacity shall be 28,880 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

**TIRE PRESSURE INDICATOR**

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

**FRONT WHEELS**

The front wheels shall be Alcoa hub piloted, 10.50 inch X 22.50 inch polished aluminum wheels. The wheels shall feature one- piece hot forged strength, more payload capacity and brilliant good looks which last.

**REAR WHEELS**

The rear wheels shall be Alcoa hub piloted, 8.25 inch X 22.50 inch polished aluminum wheels. The wheels shall feature one- piece hot forged strength, more payload capacity and brilliant good looks which last.

**BALANCE WHEELS AND TIRES**

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

**WHEEL TRIM**

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons with cutouts for oil seal viewing (there shall be no cutout on front drive or IFS axles). The covers and baby moons shall feature a mirror shine finish and shall be shipped loose with the chassis for installation by the apparatus builder.

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats, also in a mirror shine finish, which shall be shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand, and constructed of 304L grade, non-corrosive stainless steel meeting D.O.T. certification standards.

**TIRE CHAINS**

Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 mph.

**TIRE CHAIN ACTIVATION**

The tire chain system shall include a locking switch on the dash to deter accidental activation. The light on the switch shall illuminate when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage when the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged.

**AUXILIARY LUBRICATION SYSTEM**

A Vogel centralized lubrication system shall be installed on the chassis. The system shall be capable of lubricating up to twenty-four (24) grease points on the chassis. A park brake interlock is incorporated into the ignition system to keep the system from operating while parked. The main line system shall be monitored via a pressure switch.

**BRAKE SYSTEM**

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

The rear axle spring brakes shall automatically apply in any situation when the air pressure loss below 25 PSI with a mechanical means for releasing the spring brake chambers exists. An audible alarm shall designate when 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.

Automatic traction control which shall be installed on the single rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

Additional handling capabilities shall include roll stability control which shall monitor the vehicles rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABS and ATC systems.

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

The electronic stability control unit (ESC) 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 vehicles motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicles lateral acceleration. The 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" vented rotors.

**REAR BRAKES**

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

**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 ACTUATION VALVE**

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

The parking brake actuation valve shall be mounted on the drivers dash within easy access.

**PARKING BRAKE ACTUATION VALVE**

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

The parking brake actuation valve shall be mounted on the center of the tunnel within easy access of both the driver and officer positions.

**FRONT BRAKE SLACK ADJUSTERS**

Front brake automatic slack adjusters shall be an integral part of the brake assembly and be supplied by the brake manufacturer.

**REAR BRAKE SLACK ADJUSTERS**

Rear brake automatic slack adjusters shall be an integral part of the brake assembly and be supplied by the brake manufacturer.

**AIR DRYER**

The brake system shall include a Wabco System Saver 1200 air dryer. 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 frame rail behind the officer 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 to provide and maintain air under pressure to operate devices in air brake systems. The brand provided shall be a Bendix BA-922 which shall be a twin-cylinder reciprocating compressor rated at 32.00 CFM. The compressor shall consist of a water-cooled cylinder head assembly and an integral air-cooled crankcase assembly.

The cylinder head assembly shall be made up of the cylinder head, cooling plate and valve plate assembly and shall use two sealing gaskets. Depending on the application, the cylinder head and cooling plate may be aluminum or cast iron. A cooling plate shall be located between the cylinder head and valve plate assemblies and assists in cooling. The valve plate assembly consists of brazed steel plates which have valve openings and passages for air and engine coolant to flow into and out of the cylinder head. The compressor's discharge valves shall be part of the valve plate assembly. The inlet reed valve/gasket shall be installed between the valve plate assembly and the top of the crankcase.

**AIR GOVERNOR**

An air governor which shall cut-in and cut-out pressures on the vehicle shall be provided and shall be adjusted so that the maximum pressure in the air system and the minimum cut-in pressure. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.

**AUXILIARY AIR RESERVOIR**

One (1) auxiliary air tank, 1200 cubic inch reservoir, 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.

**MOISTURE EJECTORS**

Manual drain valves shall be installed on all reservoirs of the air supply system. The drain valves shall have pull cables attached. The actuation pull cable shall be coiled and tied at the drain valve on the tank. The supplied lengths shall be sufficient to be extended to the frame rail to allow drains to be activated from the side of the chassis.

**AIR SUPPLY LINES**

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

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

**AIR INLET CONNECTION**

One (1) Kussmaul air automatic eject connection for the shoreline air inlet shall be installed on the left cab side above the wheel well.

**AIR INLET/ AUTO EJECT CONNECTION COVER**

The air auto eject connection shall be yellow in color.

**PLUMBING AIR INLET CONNECTION**

The cab mounted air inlet connector shall be plumbed to the air system with a check valve to prevent air from escaping through the inlet connector.

**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 which shall move the air tanks 1.50 inch 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**

The air reservoir located towards the rear of the chassis shall be installed parallel to the frame.

**WHEELBASE**

The chassis wheelbase shall be 203.00 inches.

**REAR OVERHANG**

The chassis rear overhang shall be 88.00 inches.

**FRAME**

The frame shall consist of double channel side rails and cross members forming a ladder style frame. The sides of the rails shall be constructed of "C" channel, 10.25 inches high X 3.5 inches deep X .38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and .38 inches thick, 110,000 psi minimum yield high strength low alloy steel. Each rail shall be considered on the following key items: Each rail 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 calculated by the radius method. The frame shall measure 35.00 inches in width.

RBM refers to the measure of stiffness of a cross section relative to the yield stress of the material the frame is manufactured from.

Every cross sectional profile of an object has a measure of its mechanical properties based on its shape. These properties of its shape can be broken down relative to the horizontal and vertical direction, represented as Ixx and Iyy. These act as a measure of the shapes resistance to bending.

The section modulus of mass of this profile takes into consideration the stresses imposed on this profile when a load is applied, by considering the maximum distance from the center of the profile to its outer most extremity. Section modulus is a method of measurement for the relative stiffness of a beam section and is based on the horizontal and vertical directional value plus the distance from the center of mass to the extremities of the cross section from the coordinate axis, such that Zyy = Iyy/Y and Zxx = Ixx/X.

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 engine mounting, body mounting, pump mounting or bumpers shall not be considered as a cross member. The cross members shall be attached using grade 8 flanged head bolts and flanged lock nuts. Each cross member shall be mounted to the frame rails a minimum of utilizing 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 holes for bolts shall be drilled into the frame rails, preventing fracture or fatigue. Each hole shall be custom placed relative to its component preventing unnecessary holes that present fatigue along each frame rail.

The frames proposed shall be custom drilled for each component and shall not include any unnecessary holes.

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

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall accompany the bid.

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

**FRAME WARRANTY**

The frame and cross members shall carry a lifetime warranty to the original purchaser.

**FRAME CLEAR AREA**

The chassis frame shall be left clear of chassis mounted components inside or outside the frame rails within the first 30.00 inches behind the cab to allow space for OEM installed components. Cross memebers may be installed in the clear area if required for proper frame or driveline configuration.

**FRAME PAINT**

The chassis under carriage consisting of frame, axles, driveline running gear, battery boxes, air tanks and other assorted chassis mounted components shall be painted the primary/lower cab color. Paint shall be applied prior to airline and electrical wiring installation.

**FRONT BUMPER**

The cab shall include a five (5) piece, structural channel front bumper. The bumper shall be constructed of ASTM A-36 steel; the bumper shall then be painted. The bumper shall include a .38 thick structural steel channel which shall be 12.00 inches high and 101.00 inch wide, with angled front corners.

**FRONT BUMPER EXTENSION LENGTH**

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

**FRONT BUMPER EXTENSION WIDTH**

The front bumper extension splayed frame rails shall include an overall width of 44.75 inches.

**FRONT BUMPER PAINT**

The front bumper shall include a finish topcoat painted the same as the lower cab color.

**FRONT BUMPER WINCH**

The front bumper winch shall include a Ramsey model RE12000 electric winch with 12,000 pound rated line pull, 12 volt electric winch shall be installed in the center of the front bumper. The winch shall be equipped with 125.00 feet of 0.38 inch cable, clevis hook and a 4 way roller fairlead. The winch shall be operated through a 25.00 foot pendant with a hand held control. The winch shall include a spring applied hydraulic released disc brake and counterbalance valve. It shall feature an easy to use spring loaded clutch with clutch engagement indicator light.

**FRONT BUMPER APRON**

The bumper extension shall include a bumper apron which consists of 0.19 inch thick aluminum tread plate constructed for an exact fit within the 21.00 inch bumper extension. 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 bumper flange.

**FRONT BUMPER COMPARTMENT CENTER**

The bumper apron shall include access provisions for a center mounted winch. The apron shall include an access cover constructed of 0.19 inch thick bright embossed aluminum tread plate to help protect the winch from water, dirt or debris.

**FRONT BUMPER COMPARTMENT COVER HARDWARE**

The front bumper compartment cover shall include gas cylinder stays which shall hold the cover open. The cover shall held in the closed position via a flush push button style latch.

**FRONT BUMPER GUIDE POLES**

The cab bumper sides shall include a 36.00 inch chromed poles on the driver and officer sides of the bumper. The poles shall be mounted so the top of the pole is approximately at the same height of the windshield. Each pole shall include an amber light at the top for improved night visibility. There shall be an electrical connection to allow for ease of removal and/or replacement.

**FEDERAL Q2B SIREN**

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123.00 decibels of sound at 10.00 feet. The siren shall produce a long distance warning siren which shall include a unique heavy duty caster clutch design which provides a longer coast down sound while reducing the amp draw requirements to (100) amps. The Federal Q2B™ siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep.

**SIREN LOCATION**

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

**AIR HORN**

The front bumper shall include two (2) Grover brand air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horn shall be a trumpet style and shall include a chrome finish.

**AIR HORN LOCATION**

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

**AIR HORN AIR RESERVOIR**

One (1) air tank, with a 1200 cubic inch reservoir, 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 SPEAKER**

The bumper shall include two (2) Cast Products Inc. model SA4301, 100 watt speaker which shall be recess mounted within the bumper fascia. The speaker shall include a flat mounting flange and be chrome in color.

**ELECTRONIC SPEAKER LOCATION**

The speakers shall be located one (1) on the drivers side and one (1) on the officers side of the bumper fascia, outboard of the frame rails.

**FRONT BUMPER TOW EYES**

The bumper shall include two (2) chrome plated tow eyes shall be installed through the front bumper. The eyes shall be fabricated from 0.75 inch thick #1020 ASTM-A36 hot rolled steel. The inside diameter of the eye shall be 2.00 inches and include a chamfered edge.

**CAB TILT SYSTEM**

The entire cab shall be capable of tilting 45 degrees to allow for easy maintenance of the engine and transmission.

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 hydraulic the 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" ball and be anchored to frame brackets with 1.25" diameter studs.

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

**CAB TILT CONTROL RECEPTACLE**

The cab tilt 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 6-pin Deutsch connector that includes a cap. The remote control pendant shall also include 20.00 feet of cable which also includes a mating connector.

**CAB WINDSHIELD**

The cab windshield shall have a maximum of 2808 sq. in. area and be of the wraparound design, 52.00 inches wide X 27.00 inches high for maximum visibility. The distance from the Driver or Officer to the front windshield shall be a minimum of 42.00 inches at the furthest seated position. This distance shall ensure the safety of the Driver and Officer from intruding objects in the unlikely event of a head on collision. All glass utilized for the windshield or windows shall include an automotive tint. The left and right windshield shall use the same interchangeable glass.

Each proposal shall include the left and right windshield shall be fully interchangeable thereby minimizing maintenance costs. All proposals offering windshields not in compliance with the minimum measurement of viewing area stated above and are not fully interchangeable shall not be considered.

**CAB GLASS FRONT DOOR**

The front cab doors shall include a window which is 26.00 inches wide X 31.00 inches high. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the door. The front cab door windows shall be mounted in a black anodized aluminum frame with lower drain slots.

There shall be a right angle triangular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches high, more commonly known as “cozy glass” ahead of the front cab door windows. These windows shall be mounted in a rubberized frame.

The glass utilized for these windows shall include a green automotive tint unless otherwise noted.

**WINDOW TINT FRONT**

The cab windshield shall have a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

The cab driver and officer door glass shall have a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

**GLASS REAR DOOR RIGHT HAND**

The rear right hand side door shall include a window which is 31.00 inches wide X 26.00 inches high. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. The glass utilized for this window shall include an automotive tint unless otherwise noted.

**WINDOW TINT OFFICER SIDE**

The officer side window shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

**GLASS REAR DOOR LEFT HAND**

The rear left hand side door shall include a window which is 31.00 inches wide X 26.00 inches high. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. The glass utilized for this window shall include an automotive tint unless otherwise noted.

**WINDOW TINT DRIVER SIDE**

The driver side window shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

**CAB GLASS SIDE MID OFFICER SIDE**

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

**WINDOW TINT MIDDLE OFFICER SIDE**

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

**CAB GLASS SIDE MID DRIVER SIDE**

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

**WINDOW TINT MIDDLE DRIVER SIDE**

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

**CAB INSULATION**

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

**ENGINE TUNNEL AND UNDER CAB INSULATION**

The exterior of the cab tunnel surrounding the engine shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the tunnel shall act as a noise barrier absorbing noise from the engine as well as assisting in sustaining the desired climate within the cab interior.

Additionally, the entire underside of the cab shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the cab floor shall act as a noise barrier absorbing noise from the road as well as assisting in sustaining the desired climate within the cab interior.

**CLIMATE CONTROL**

The cab shall be equipped with a ceiling mounted combination defrost / heating and air-conditioning system mounted above the engine tunnel in a central location.

The system shall offer sixteen (16) adjustable louvers. Six (6) of the louvers shall face forward towards the windshield, offering 45,000 BTU of heat at 320 CFM for defrosting. The system shall include six (6) rearward facing louvers to direct air for the crew area and four (4) for driver and officer comfort. When in "Cabin Mode" the system shall be designed to produce 60,000 BTU of heat and 32,000 BTU of cooling. The HVAC cover shall be made of ABS plastic.

All auxiliary heating units (if optionally equipped) shall be plumbed in series independent of the heater/defroster system with one (1) seasonal shut-off valve at the front corner on the officer side of the cab.

The air conditioning system shall be capable of lowering the cab interior temperature from 100 degrees to 70 degrees within thirty minutes, with a relative humidity of sixty percent.

The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-Quip EZ-Clip fittings.

**CLIMATE CONTROL ACTIVATION**

The heating controls, and air conditioning if included, shall be located on the dash next to the driver panel, in a position which is easily accessible to the driver.

**A/C CONDENSER LOCATION**

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

**A/C COMPRESSOR**

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

**CAB CIRCULATION FANS FRONT**

The cab shall include two (2) individually switched all metal construction 6.00 inch windshield defogger fans which shall be installed in the front cab corners.

**INTERIOR TRIM FLOOR MAT**

The floor of the cab shall be covered with a multi-layer mat consisting of .25 inch sound absorbing closed cell foam and a .06 inch non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive with aluminum cornering trim. All exposed seam shall be sealed to reduce moisture and debris.

**INTERIOR TRIM VINYL**

The cab interior shall include trim on the front and rear crew ceiling, the cab walls and the rear wall of the cab. The trim shall be constructed of insulated vinyl over a hard board backing. The material shall be securely fastened to the interior of the cab utilizing snap style fasteners with a decorative fastener for a more appealing appearance.

**CAB INTERIOR TRIM HEADER ABS**

The cab interior shall include a header over the driver and officer dash which shall be vacuum formed ABS composite panel with robust styling grooves providing structural integrity. The header shall include (2) vents within the header which are directed at the windshield. Also included will be a drop down panel for access behind the header for service of electronic components, if necessary. The header shall include (2) cut outs, (1) over the driver and (1) over the officer to accommodate speakers and molded areas to accommodate the sun visors.

**INTERIOR TRIM SUNVISOR**

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

**TRIM LH DASH**

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

**CAB INTERIOR CENTER DASH**

The main center dash cover shall be constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The cover shall include three (3) panels within the dash which shall accommodate any additional gauges and controls. All gauges and controls within the panels shall be backlit for night vision and clearly identified representative of their specific function. The center panel shall be within comfortable reach of both the driver and officer.

**TRIM RIGHT HAND DASH**

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick, one hundred percent primary aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.63 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment, recessed 3.00 inches below the surface of the dash and measure 16.00 inches wide X 14.00 inches deep.

**ENGINE TUNNEL TRIM**

The cab engine tunnel shall be covered with .44 of an inch thick multi-layer mat consisting of .25 inch closed cell foam, .13 of an inch thick rubber and .06 inch thick non-slip pebble grain.

**POWER POINT DASH MOUNT**

The cab shall include one (1) 12 volt cigarette lighter type receptacle in the cab dash as a power source for additional portable or mobile items.

**STEP TRIM**

The cab steps shall include a 14 gauge 304 perforated stainless steel construction on the first step, the step closest to the ground. The stainless steel finish shall be a number 7 mirror. The step shall include a frame which is integral with the construction of the cab for rigidity and strength. The perforation shall allow water and other debris to flow through rather than becoming packed under the step. The middle step shall be integral with the cab in construction and shall be trimmed in 3003-H22 embossed aluminum tread plate which is 0.084 inches thick.

**INTERIOR DOOR TRIM**

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

**DOOR TRIM KICK PLATE**

The inner door panels shall include an aluminum tread kick plate which shall be fastened to the lower portion of the door panels.

**DOOR PANEL CUSTOMER NAMEPLATE**

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

**CAB DOOR TRIM REFLECTIVE**

A reflective chevron sign shall be installed on the lowest portion of the inner door panel, one (1) on each door. A stripe of reflective tape shall be installed at the outer edge of each door.

**INTERIOR GRAB HANDLE**

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

**INTERIOR GRAB HANDLE FRONT DOOR**

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish and provide ease of access 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 the full width of the door below the window glass and shall measure 30 inches in length. The handle shall assist personnel in exiting and entering the cab.

**CAB INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be gray in color.

**INTERIOR TRIM VINYL COLOR**

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

**INTERIOR ABS TRIM COLOR**

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

**CAB PAINT INTERIOR**

The interior metal surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

**CAB PAINT INTERIOR DOOR TRIM**

The inner door panel surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

**SWITCH PANEL GROUP**

The dash shall include three 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.

**SWITCH PANEL CENTER**

The center panel shall include twelve (12) switches, in a six (6) over six (6) switch combination on the driver side of the panel.

**SWITCH PANEL DRIVER**

The interior shall include a durable vacuum formed ABS composite switch panel which shall be located in the left side of the dash. The panel shall include seven (7) switches, four (4) across the top of the panel and three (3) centered underneath, which shall be appropriately labeled as to their specific function.

Proposals offering add-on style panel shall not be considered, all panels shall be designed for the specific chassis and shall match the interior for a more uniform and attractive appearance.

**SWITCH PANEL RH**

The interior shall include a Lexan panel which shall be located on the officer side of the dash. The panel shall not include any switches.

**SWITCH PANEL IGNITION**

The vehicle shall be equipped with a keyless ignition and master, with an “Off/ On” and a two switch for “Off/ Start”.

**SEATBELT WARNING SYSTEM**

A seatbelt warning system shall be installed for each seat within the chassis. The system shall provide visual and audible warning when any seat is occupied (sixty pounds minimum), the corresponding seat belt remains unfastened, and the park brake is released.

Once activated, the visual and audible indicators shall remain active until all occupied seats have the seat belts fastened.

**ROLLTEK ROLLOVER OCCUPANT PROTECTION SYSTEM**

The vehicle shall include the Spartan Chassis 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 roll over 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 on all seats excluding theatre flip-up style seating.
2. The air suspension on each seat shall be reduced to its lowest position, tightens belt around occupant and locking the seat in this position thereby providing more survivable space and minimizing head contact with the interior roof (available when air suspension seats are specified).
3. An inflatable curtain shall deploy which includes an air filled bag across the driver's and passenger's side windows which shall protect and cushion the head and neck of the occupant thereby reducing movement and the chance of head contact with the side of the vehicle. The inflatable curtain shall be applicable on all seats adjacent to the cab side excluding theatre flip-up style seating.

System Components Shall Include:

Integrated Roll Sensor **IRS** - detects an imminent rollover, activates protective devices and records crash events.

Integrated Belt Pretension **IBP** device (not available with air suspension seats) - tightens the seat belt around occupant, securing occupant in seat and positions occupant for contact with integrated head cushion.

Seat Pull-down System **S4S** (air suspension seats only) - locks seat to lowest position, increases survivable space, tightens belt around occupant, secures occupant in seat and positions occupant for contact with integrated head cushion.

Inflatable Head Cushion **IHC** - protects head/neck and shields occupant from dangerous surfaces. Remains inflated for 8-10 seconds. This device shall affect the driver, officer and adjacent seats to cab side excluding theatre flip-up style seating.

**SEAT MATERIAL**

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

**SEAT COLOR**

All seats supplied on the chassis shall be gray in color. This material shall be semi- resistant to UV rays and from being saturated or contaminated by fluids.

**SEAT BACK LOGO**

The seat back shall include a black and gray diamond logo which features a capital S in red located in the middle of the diamond. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

**DRIVER SEAT**

The driver's seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature two (2) way manual adjustments and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

There shall be a red, three-point shoulder harness with lap belt and an automatic retractor attached to the cab and available to the seat. The buckle portion of the seat belt shall be mounted on a rigid or semi-rigid stalk such that the buckle remains positioned in an accessible location. The seat belt assembly anchorages shall conform to the Federal Safety Standard (FMVSS) No. 210, “Seat belt assembly anchorages”.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches measured with the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel.

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

**DRIVER SEAT BACK**

The drivers seat shall include a standard seat back incorporating the all belts to seat feature (ABTS) as described above. The seat back shall feature a contoured, adjustable head rest.

**ROLLTEK ROLLOVER DRIVER POSITION**

The drivers position shall be equipped with the RollTek® Rollover Occupant Protection System.

**OFFICER SEAT**

The officer's seat shall be a H.O. Bostrom Firefighter series. 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 red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 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.

**OFFICER SEAT BACK**

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

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

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

**ROLLTEK ROLLOVER OFFICER POSITION**

The officers position shall be equipped with the RollTek® Rollover Occupant Protection System.

**REAR FACING OUTER SEAT QUANTITY**

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the driver seat and one (1) located directly behind the officer seat.

**REAR FACING OUTBOARD SEAT**

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

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

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

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.

**REAR FACING OUTBOARD SEAT BACK**

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

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

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

**SEAT MOUNTING REAR FACING OUTER**

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

**ROLLTEK ROLLOVER REAR FACING OUTBOARD POSITION**

The rear facing outboard seating position shall be equipped with the RollTek® Rollover Occupant Protection System.

**SCBA MASK POUCH REAR FACING OUTER**

The rear facing outer seat shall feature a pouch designed specifically to contain the mask attached to self contained breathing apparatus. This pouch shall keep the mask safe from scratches and abrasions while the breathing apparatus is contained within the seat back.

**SEAT BELT ORIENTATION**

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

**FORWARD FACING CENTER SEAT QUANTITY**

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

**FORWARD FACING CENTER SEAT**

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

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

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

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.

**FORWARD FACING CENTER SEAT BACK**

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

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

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

**SEAT MOUNTING FORWARD FACING CENTER**

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

**ROLLTEK ROLLOVER FORWARD FACING CENTER POSITION**

The forward facing center seating position shall be equipped with the RollTek® Rollover Occupant Protection System.

**SCBA MASK POUCH FORWARD FACING CENTER**

The forward facing center seat shall feature a pouch designed specifically to contain the mask attached to self contained breathing apparatus. This pouch shall keep the mask safe from scratches and abrasions while the breathing apparatus is contained within the seat back.

**FORWARD FACING SEAT FRAME**

The forward facing center seating positions shall include an enclosed seat frame which is located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep and shall be fully open offering storage within this area. There shall be (2) access points to this storage area, (1) via the driver side of the seat frame and (1) via the officer side of the seat frame. The seat frame shall be constructed of 5052-H32 Marine Grade, .190 inch thick, 100 percent primary smooth aluminum plate. The seat box shall be painted with the same color as the remaining interior.

**SEAT FRAME STORAGE ACCESS**

There shall be two (2) access points on the side of the storage area, one (1) on the driver side and one (1) on the officer side.

**CAB FRONT UNDERSEAT STORAGE ACCESS DOOR**

The left and right front under seat storage areas shall include a removable aluminum cover. The covers shall be painted to match the interior paint color.

**WINDSHIELD WIPER SYSTEM**

The cab shall include a parallel arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers, one (1) for the driver and one (1) for the officer, which shall be affixed to a rod style arm. The system shall include a single motor which shall initiate the arm in which both the driver and officer windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the drivers position.

**ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

The windshield washer fluid level shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

**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 FRP composite with a black matt finish. All doors shall include keyed alike locks that are designed to prevent accidental lockout.

The interior latches shall be black flush paddle type, which are incorporated into an upper door panel.

**DOOR LOCKS**

The entry doors shall include an independent manual door lock actuated through a toggle switch located on the interior of the cab door near the paddle handle or by using a Trimark key through the exterior of the door.

**CAB EXTERIOR GRAB HANDLES**

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

**REARVIEW MIRRORS**

Retrac West Coast style mirror heads model 1171HL-980-4 shall be provided and installed.

The mirrors shall be flange mounted to the driver and officer side doors via tubular stainless steel swing away arms

The flat glass shall measure 7.00 inches wide X 16.00 inches high. The flat glass shall be heated and remotely adjustable for increased visibility via four way actuators located within easy reach of the driver. The mirrors shall include a separate lower 8.00 inch round convex mirror for a wider field of vision.

The flat mirror glass shall be heated for defrosting in severe cold weather conditions. An on/off heating control switch shall be provided in the switch panel.

The mirror glass shall include the finest quality non-glare glass and shall be installed in a black plastic housing with a stainless steel back that comes complete with an amber colored marker light.

**REARVIEW MIRROR HEAT SWITCH**

The heated rearview mirrors shall be controlled through a rocker switch on the driver side dash.

**CAB FENDERS**

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. The two-piece liners shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

**MUD FLAPS FRONT**

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

**CAB MODEL IDENTIFICATION**

The cab shall include custom “Gladiator” nameplates on the front driver and officer side doors.

**CAB EXTERIOR FRONT & SIDE EMBLEMS**

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

**IGNITION**

The master starting system, ignition system shall include chrome thumb turn switch which shall be mounted on the driver side of the cab to the left of the steering wheel on the dash. Each switch will be accompanied by (1) green LED indication light which shall light when the ignition is in the “ON” position and (1) for the master battery switch when in the “ON” position. The thumb turn switches shall also be accompanied by a chrome push button which shall only operate when both the master battery and ignition thumb switches are in the “ON” position.

**BATTERIES**

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

**BATTERY BOXES**

The batteries shall be contained within two (2) black powder coated steel battery boxes which shall be located on the driver and officer side of the chassis, securely bolted to the frame rails. The boxes shall include drain holes in the bottom for sufficient drainage of water and shall include phenolic board battery hold downs and a durable, Dry-Deck in the bottom of the tray under each battery to allow for air flow and drainage.

**BATTERY CABLES**

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

**BATTERY JUMPER STUDS**

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

**ALTERNATOR**

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

**BATTERY CONDITIONER**

A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab behind the driver's seat.

**BATTERY CONDITIONER DISPLAY**

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the drivers door.

**ELECTRICAL INLET CONNECTION**

A Kussmaul 20 amp super auto-eject electrical receptacle shall be connected to the battery conditioner and the block heater. The super auto-eject will be installed on the drivers side of the cab above the wheel well. It shall automatically eject the plug when the starter button is depressed.

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

***Amp Draw Reference List:***
*Kussmaul 1000 Charger - 3.5 Amps*
*Kussmaul 1200 Charger - 10 Amps*
*Kussmaul 35/10 Charger - 10 Amps*
*1000W Engine Heater - 8.33 Amps*
*1500W Engine Heater - 12.5 Amps*
*120V Air Compressor - 4.2 Amps*

**AUTO- EJECT ELECTRICAL INLET COVER**

The Kussmaul Auto- Eject electrical inlet connection shall include a red cover.

**HEADLIGHTS**

The cab front shall include (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

The headlights shall be controlled through a rocker switch on the drivers dash.

**HEADLIGHT LOCATION**

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

**TURN SIGNALS**

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch LED programmable amber turn signals which shall be installed in the outboard position.

**SIDE MARKER/ TURN SIGNALS**

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

**MARKER AND ICC LIGHTS**

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

**GROUND LIGHTS**

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

**STEP LIGHTS**

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

The lights shall have 21 candle power of illumination and draw 1.5 amps.

**ENGINE COMPARTMENT LIGHT**

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

**BROW MOUNTED SCENE LIGHTING**

The front of the cab shall include two (2) Fire Research Focus model FCA800-S75 contour roof mount light mounted to the brow of the cab.

Each lamp head shall have one (1) quartz halogen 750 watt 120 volt bulb. The bulb will draw 6.3 amps and generate 19,600 lumens. The lamp head shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamp head shall be no more than 4 3/4" high by 11 /1/2" wide. The lamp heads and brackets shall be powder coated white.

**SCENE LIGHT ACTIVATION**

The front scene lights shall be pre-wired to be activated by the OEM.

**FRONT SCENE LIGHT LOCATION**

There shall be two (2) scene lights mounted to the front brow of the cab inboard of the outer front marker lights.

**INTERIOR CAB LIGHTING**

The cab shall include an incandescent dome lamp with a red and white lens located over each door. The dome lamps shall be rectangular in shape and shall measure 9.50 inches in length and approximately 5.00 inches wide including a black colored bezel. The white lamp shall be activated by its respective door when opened and both the red and white lamp shall be activated by an individual switch on the light.

A fifth red and clear lamp shall be located in the headliner, over the engine tunnel.

**MAP LIGHTING**

A Sunnex gooseneck style instrument panel map light with switch at base shall be installed on the officer side of the dash panel within easy reach.

**HAND HELD SPOTLIGHT**

The officer position shall include a 12 volt Collins Pulsar 500 hand-held spotlight which shall be mounted to the right of the engine tunnel. The Collins spot light shall offer 500,000 candle power. The spot light shall have a coil style cord and a momentary switch.

**DO NOT MOVE APPARATUS WARNING**

The front headliner of the cab shall include a red flashing light, located in the center for greatest visibility. The light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.

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

**MASTER WARNING**

The optical warning system shall be controlled by a master switch which shall include all “ON” and all “OFF” capability via a rocker switch on the main panel. Any warning light switches left in the “ON” position shall activate when the master switch is activated. This switch shall be clearly labeled for identification.

**HEADLIGHT FLASHER**

An alternating high beam headlamp flashing system shall be installed into the high beam headlamp circuit which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled “On Scene” when the park brake is applied.

**ALTERNATING HEADLIGHT FUNCTION**

The flashing headlights shall be activated through a rocker switch on the main switch panel. The rocker switch shall be clearly labeled for identification.

**INBOARD FRONT WARNING LIGHTS MODEL**

The cab front fascia shall include dual Whelen series 600 Super LED warning lights which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the inboard position.

**INBOARD FRONT WARNING LIGHTS- COLOR**

The front warning lights mounted on the fascia for the inboard position shall be red.

**FRONT WARNING SWITCH**

The front warning lights shall be controlled via rocker switch on the main panel. This switch shall be clearly labeled for identification.

**INTERSECTION WARNING LIGHTS MODEL**

The chassis shall include two (2) Whelen series 600 Super LED intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

**INTERSECTOR FRONT WARNING LIGHTS COLOR**

The intersection lights shall be red.

**INTERSECTION WARNING LIGHTS LOCATION**

The intersection lights shall be mounted in the rear position on the side of the bumper.

**SIDE WARNING LIGHTS MODEL**

The cab sides shall include a Whelen series 600 Super LED 4”x6” warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

**SIDE WARNING LIGHTS MODEL**

The cab sides shall include a Whelen series 900 Super LED 9”x7” warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors

**SIDE WARNING LIGHTS- COLOR**

The warning lights located on the side of the chassis shall be red.

# Patterson Fire Department No. 1
## Rescue Pumper
### Build Specification

**SIDE WARNING LIGHTS- POSITION**

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

**SIDE WARNING LIGHTS- POSITION**

The warning lights on the side of the cab shall be mounted above the B pillar in the highest available position

**SIDE AND INTERSECTOR WARNING SWITCH**

The side and intersector warning lights shall be controlled via rocker switch on the main panel. This switch shall be clearly labeled for identification.

**ADDITIONAL FRONT WARNING**

The cab front shall include a Mars 888 model TB8-12**P** light featuring a gimbal mounted oscillating lamp. The stainless steel light head shall be 7.00 inches in diameter and shall generate a “figure eight” pattern which is clearly visible even in adverse conditions. The lens shall be clear in color. The light shall be pedestal mounted top center above the grill on an aluminum bracket painted cab color. Per NFPA this clear light will be disabled “On Scene” with park brake applied.

**ADDITIONAL FRONT WARNING CONTROLS**

The Mars front warning lights shall be separately controlled through a rocker switch on the main panel. This switch shall be clearly labeled for identification.

**AIR HORN SELECTOR SWITCH**

A rocker switch shall be installed in the switch panel between the driver and officer to allow control to either the air horn or the electric horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position which is in accordance with FMVSS requirement.

**AIR HORN ACTUATION**

The air horn actuation shall be accomplished by the steering wheel horn button and a right side officer's mounted Linemaster model SP491-S81 foot switch. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

**MECHANICAL SIREN ACTUATION**

The mechanical siren shall be actuated by a left side drivers mounted and a right side officers mounted Linemaster model SP491-S81 foot switch and shall include a red momentary siren brake rocker switch. The siren shall only be active when master warning switch is on.

**BACKUP ALARM**

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of not less than 107 dB. The alarm will automatically activate when the transmission is placed in reverse.

**INSTRUMENTATION**

An ergonomically designed instrument panel shall be provided. The gauges shall be backlit with red LED lamps. All gauges shall be driven by stepper motor movements. The instrumentation system shall be multiplexed and shall receive engine and transmission information over the J1939 data bus to reduce redundant sensors.

The instrument panel shall contain the following gauges:

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

One (1) electronic speedometer with an integral LCD odometer/ trip odometer and hour meter shall be included. The speedometer shall have a dual scale with miles per hour (MPH) as the dominant scale and kilometers per hour (KPH) on the minor scale. The speedometer scale shall read from 0 to 90 MPH (0 to 140 KPH). The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display up to 9,999.9 miles. The LCD screen shall also be capable of displaying certain diagnostic functions. The hour meter shall display engine hours of operation.

One (1) three function gauge with primary system, secondary system and fuel level shall be included. The scale on the air pressure gauges shall read from 0 to 140 pounds per square inch (PSI). The air pressure scales shall be non-linear to expand the scales in the region of normal operation. A red indictor light in the gauge shall indicate a low air pressure. The scale on the fuel level gauge shall read from empty to full. A yellow indicator light shall indicate low fuel at the quarter tank level.

One (1) four function gauge with engine oil pressure, coolant temperature, transmission oil temperature and a voltmeter shall be included. The scale on the engine oil pressure gauge shall read from 0 to 140 pounds per square inch (PSI). The engine oil pressure scale shall be non-linear to expand the scale in the region of normal operation. A red indicator light in the gauge shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 160 to 250 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high coolant temperature. The scale on the transmission oil temperature gauge shall read from 100 to 300 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high transmission oil temperature. The scale on the voltmeter shall read from 8 to 16 volts. A red indicator light shall indicate high or low system voltage.

The instrument panel shall contain an Enunciator Module that contains the following indicator lights. All indicator lights shall contain LED lamps.

RED LAMPS
Stop Engine - indicates critical engine fault. *(5)*
Park Brake - indicates park brake is set.
Volts - indicates high or low system voltage. *(4)*
Low Oil Press - indicates low engine oil pressure. *(4)*
High Coolant Temp - indicates excessive engine coolant temperature. *(4)*
High Trans Temp - indicates excessive transmission oil temperature. *(4)*
Low Air - indicates low air pressure in either system one or system two. *(4)*
Low Coolant Level - indicates low engine coolant level. *(1) (5)*
Air Filter - indicates excessive engine air intake restriction. *(5)*
Brake System Fault indicates a failure in the brake system (hydraulic brake systems only). *(5)*
Seat Belt Indicator indicates when a seat is occupied and corresponding seat belt remains unfastened.

YELLOW LAMPS
Check Engine - indicates engine fault. *(5)*
Check Trans - indicates transmission fault. *(5)*
Wait to Start - indicates active engine air preheat cycle. *(2) (5)*
ABS - indicates anti-lock brake system fault. *(5)*
Water in Fuel - indicates presence of water in fuel filter. *(1) (5)*
Check Message Center indicates there is a fault message present in the LCD digital display.
SRS indicates a problem in the RollTek supplemental restraint system. *(1) (5)*
DPF indicates a restriction of the diesel particulate filter. *(3) (5)*
HEST indicates a high exhaust system temperature. *(3) (5)*
MIL indicates an engine emission control system fault. *(3) (5)*
Low Fuel indicates low fuel. *(4)*

GREEN LAMPS
Left and Right turn signal indicators.
Aux Brake Active - indicates secondary braking device is active. *(1)*
High Idle - indicates engine high idle is active. *(1)*
ATC indicates low wheel traction for automatic tractions control equipped vehicles, also indicates mud/snow mode is active for ATC system. *(1) (5)*
OK to Pump indicates the pump engage conditions have been met. *(1)*
Pump Engaged indicates the pump is currently in use. *(1)*

BLUE LAMPS
High beam indicator.

The instrumentation system shall provide a constant audible alarm for the following situations:
Low air pressure.
Low engine oil pressure.
High engine coolant temperature.
High transmission oil temperature.
Low coolant level. *(1)*
High or low system voltage
Critical engine fault (Stop Engine).

The Check Message Center icon will illuminate and a message will be displayed in the LCD screen for the following situations:

Cab Ajar
Low Oil Level
Door Ajar
Engine Communication Error
Transmission Communication Error
ABS Communication Error
High Coolant Temp
Turn Signal Reminder
Low Fuel
Low Oil Pressure
Low Coolant Level
Low Battery Voltage
High Battery Voltage
Low Primary Air Pressure
Low Secondary Air Pressure
High Trans Temp

The instrumentation system will provide a continuous alarm for the following situations:

Stop Engine
Low Coolant Level *(1)*
Brake System Fault
Check Trans
Check Engine
ABS
Engine Communications Error
Transmission Communications Error
ABS Communications Error
Low Fuel
Low Primary Air Pressure
Low Secondary Air Pressure
Low or High Battery Voltage
High Trans Temp
Low Oil Pressure
High Coolant Temp

The instrumentation system will provide a 160mSec second alarm every 880mSec for the following situations:

Seat Belt
Air Filter
Water in Fuel *(1)*
Cab Ajar
Low Oil Level
Door Ajar

The instrumentation system will provide a 160mSec second alarm every 5Sec for the following situations:

Turn Signal Reminder

*(1) Feature only available when optionally equipped.*
*(2) Feature only available on engines with pre-heat capability.*
*(3) Feature only on vehicles with diesel particulate filter (DPF).*
*(4) Warning light is present in gauge.*
*(5) A message in the LCD screen will also be displayed.*

**REARVIEW CAMERA SYSTEM**

An Audiovox Voyager heavy duty rearview camera system, complete with an LCD display monitor, shall be supplied. One (1) camera shall be shipped loose for OEM installation in the body to afford the driver a clear view of the rear of the vehicle. The camera shall be wired to a 7.00 inch flip down monitor which shall include a color display and day and night brightness modes installed above the driver position. The rear camera display shall activate when the vehicles transmission is placed in reverse. The camera system shall include a one- way communication device that shall be an integral part of the rear camera for the use of voice commands directly to the driver.

**CAB EXTERIOR PROTECTION**

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

**FIRE EXTINGUISHER**

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

**ROAD SAFETY KIT**

The cab and chassis shall include one (1) emergency road side triangle kit.

**DOOR KEYS**

The cab and chassis shall include a total of six (6) door keys for the manual door locks.

**AS BUILT DIAGRAMS**

The cab and chassis shall include one (1) complete set of wiring schematics and option wiring diagrams.

**CHASSIS WARRANTY**

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twenty-four (24) months. The warranty period shall commence on the date the vehicle is delivered to the original purchaser and continue for twenty-four (24) months thereafter. The warranty shall include conditional items listed in the detailed warranty document which may be provided upon request.

**OPERATORS MANUAL AND PARTS LIST**

There shall be one (1) chassis operator's manual which includes a parts list including wiring and air plumbing diagrams provided and shipped loose with the vehicle. All standard wiring and plumbing diagrams shall be created specifically to the chassis model.

**ENGINE AND TRANSMISSION OPERATION MANUALS**

There shall be one (1) set of engine operation and maintenance manuals and one (1) set of transmission operation manuals specific to the models ordered included with the final vehicle in the ship loose items.

**ENGINE SERVICE MANUALS**

There shall be one (1) set of the following Detroit Diesel engine service manuals which shall be provided with the chassis.

Series 60 Service Manual, part number 6SE483
DDEC V / VI Trouble shooting Guide, part number 6SE497

**TRANSMISSION SERVICE MANUALS**

There shall be one (1) set of the following manuals included with the chassis relative to the Allison 4000 transmission:

Allison Parts Catalog, part number PC2809EN
Allison Service Manual, part number SM2457EN
Allison Technician Manual, part number GN2055EN
Electronic Controls Troubleshooting Manual, part number TS2973EN
Mechanics Tips, part number MT3004EN

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**CHASSIS MODIFICATIONS**

**LUBRICATION PLATE**

A permanent plate shall be installed in the Driver's compartment which indicates the type and quantity of the following fluids in the vehicle:

- Engine Oil
- Engine Coolant
- Transmission Fluid
- Drive Axle Fluid
- Air Conditioning Refrigerant, Air Conditioner Oil (if applicable)
- Power Steering Fluid
- Cab Tilt Fluid (if applicable)
- Transfer Case Fluid (if applicable)
- Pump Transmission Fluid (if applicable)
- Pump Primer Fluid (if applicable)
- Equipment Rack, Air Compressor, Generator, etc. . . . (If applicable)

**VEHICLE DATA PLATE**

A permanent plate shall be installed in the Driver's compartment which indicates the following:

- Filter Part Numbers for the Engine, Transmission, air and fuel systems
- Serial Number for the Engine and Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Code Brand and Code(s)
- Body Builder Project Number

**OVERALL HEIGHT PLATE**

There shall be a placard located in direct view of the Driver which shall indicate the overall height of the vehicle.

**ACCIDENT PREVENTION**

There shall be a placard in the cab seating area which reads, "ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".

**PERSONNEL CAPACITY**

There shall be a placard mounted in the Driver's compartment which specifies the maximum number of personnel the vehicle is design to carry per NFPA standards. The placard shall be located in clear view of the Driver.

**ACCIDENT PREVENTION**

If there is a rear bumper extension of 8" or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, "WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT".

# Patterson Fire Department No. 1
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**BUMPER COMPARTMENT**

The bumper extension shall have one (1) tool compartment on the streetside. The compartment shall be as large as room allows. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinge and single point lift/turn latches. The compartment door shall have a spring hold open device.

Rubber bumpers and chains shall be provided as required to prevent door from hitting cab.

**BUMPER COMPARTMENT**

The bumper extension shall have one (1) tool compartment on the curbside. The compartment shall be as large as room allows without interfering with the Q2B siren. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinge and single point lift/turn latches. Compartment door shall have a spring hold open device.

Rubber bumpers and chains shall be provided as required to prevent door from hitting cab.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

**BUMPER PRECONNECT**

The bumper extension shall have one (1) hose well on the curbside with a capacity of100' of 1-3/4" DJ hose and fog nozzle.

**FRONT WINCH RECEPTACLE**

The front winch control receptacle shall be located at curbside bumper tail with weather resistant cover. Note winch shall be provided by chassis manufacturer.

**WINCH CABLE**

Reel loaded with 100 feet of 3/8” diameter Surelift ™ (888-889-6666), or Equivalent, Dy-Pac® 6 High Performance Wire Rope, 6x25 RRL Construction. Nominal Breaking Load: 8.5 tons - End of cable shall be Flemish Spliced, thimble installed & swaged-on steel collar installed. Cable shall be furnished with “A W Direct” (800-243-3194) #ID-96B, Grade 80, 1/2 inch Clevlok™, or equivalent, Sling Hook.

**WINCH ACCESSORIES**

- One (1), A W Direct, 1SB-8A Gunnebo Johnson™, or equivalent, 8 ton, Snatch Block, 6" sheave.
- Two (2) 15 foot lengths of A W Direct, #ALCB, Grade 80, 3/8” Alloy Chain, with #ID-90B Grade 80, 3/8” Clevis Grab Hook on each end (total four (4).
- One (1), A W Direct, ADL-1C LiftAll®, or equivalent, Adjust-A-Link Sling. Capacity 12,600 lbs, double.

**EXHAUST SYSTEM (VERTICAL)**

The existing exhaust tailpipe shall be modified to a vertical exhaust pipe, extending above the body height. A Patterson Fire Department No. 1 supplied Plymovent adapter shall be installed after exhaust modification.
SHOP NOTES
Add FD supplied Plymovent adapter.

**RADIO INSTALLATION**

There shall be six (6) Patterson Fire Department No. 1 supplied radio(s) installed in the cab/chassis. Each radio shall be wired for with 12 volt power.

**FIVE (5) ANTENNAS - RAIL MOUNTED CAB ROOF**

There shall be one (1), radio antenna rail(s) provided and installed on the centerline of the roof of the cab/chassis. The rail(s) shall be constructed of aluminum, forming a two piece box design and shall be painted the upper cab color. The top section shall be removable for easy access to the individual antenna wiring. Total of five (5), antenna bases shall be provided and installed in each rail. The bases shall include a minimum of 20' of LMR195 cable. The antenna wiring shall enter the cab roof at a single point under the end of the rail. The end of each radio antenna shall be routed to a location determined by the Patterson Fire Department No. 1.

Due to multiple configurations of antenna whips, the Manufacturer shall provide the antenna base, and Patterson Fire Department No. 1 shall provide the whip.

**FLAT PLATE ENGINE TUNNEL COVER / MAP BOX**

There shall be one (1) flat plate engine tunnel cover bolted to the top of the entire engine tunnel to extend down the rear cab cab floor.

A map box shall be provided in the cab with an open top. The map box shall be securely fastened to the cab interior per NFPA 1901 standards. It shall be fabricated of 1/8" smooth aluminum and painted with a black or gray textured powder coat paint finish for durability and finished appearance.

The map box shall be designed to hold four (4) 1-1/2" 3-ring binders.

**OFFICER WORKSTATION**

A record book storage box with writing console/lid, shall be provided on the right hand side of the cab dash. Box shall be approximately 1 ½“ deep x 9.5" wide x 15.5" long constructed of aluminum brushed finish. Provide a tube type pen holder. Lid shall be hinged and include two (2) spring slips (full width) and latch. Bottom to have lip to hold an open binder. Box shall be illuminated by flexible neck light mounted on dash to the left hand side of the storag box. Final location subject to PFD approval.

**MUDFLAPS**

There shall be rubber mudflaps furnished and installed behind each set of tires.

**INTERIOR CABINET - COUNTER HEIGHT**

There shall be one (1) interior counter height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Each cabinet shall be approximately 40" wide x 14" deep x 42" high.

Demision of cabinet will be approximately 12" T X 16" D X 36" W Will have vertically mounted shelf track and cargo netting to cover front face.

NOTE: this cabinet will mount on top of the engine tunnel.

**INTERIOR CABINET - OVERHEAD**

There shall be two (2) overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray . Each cabinet shall be approximately (insert actual dimensions).

- One (1) 12 volt terminal block(s) installed in the curbside overhead cabinet to provide 12 VDC power for equipment supplied by the Patterson Fire Department No. 1.

SHOP NOTES
Locate in the curbside overhead cabinet

- One (1) 120 VAC, 20 amp duplex, straight-blade receptacle ( NEMA 5-20R ) installed in the streetside overhead cabinet to provide 120 VAC power for equipment supplied by the Patterson Fire Department No. 1.

SHOP NOTES
Locate in the streetside overhead cabinet

The above cabinet(s) shall have lift-up type door(s) with powder coated outer surface.

**FUEL FILL**

There shall be one (1) Cast Products fuel fill door located in the streetside exterior wheel well panel, behind the rear axle. The fill door shall have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

**BODY DESIGN**

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design. All Bidders shall be required to meet these minimum requirements.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum. Since such materials are available to all Manufacturers, the material specifications shall be strictly adhered to.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Patterson Fire Department No. 1 to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Patterson Fire Department No. 1 from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**EXTERIOR ALUMINUM BODY**

The fabrication of the rescue body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All seams in sheet metal below frame, and around the rear wheel well area shall be welded continuous to prevent moisture from entering compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

**ROOF CONSTRUCTION**

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body. A 2" rounded radius shall be provided along the body sides.

**BODY SUBFRAME**

To assure proper body alignment and clearance, the body subframe shall be constructed directly on the chassis.

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be crossmembers of 2" x 6" x 1/4" aluminum. These crossmembers shall extend the full width of the body to support the compartments. Crossmembers shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum crossmembers shall be located as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**BODY MOUNTING**

The body subframe shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 5/8" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

**10" REAR STEP BUMPER**

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" aluminum tread plate. Any stepping surface shall have a grip surface insert to meet NFPA requirements. The bumper shall extend from the rear vertical body panel 10" and provide a rear step with a minimum of 1/2" space at body for water drainage.

**REAR TOW EYES**

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the chassis frame and mounted above the rear bumper. The tow eyes shall be fabricated from 1" thick steel plate with radiused edges and shall have a red powder coat finish.
SHOP NOTES
Make sure inside eye is radius edge ( No Sharp Edge) to be used for rope rescue tie offs

These need to be powder coated red

**GROUND LIGHTS**

Two (2) OnScene Solutions 9" LED Nightstik ground lights shall be mounted below the rear bumper.

**WHEEL WELL EXTERIOR PANEL**

The exterior panel of the body wheel well enclosure shall be constructed from 1/8" aluminum smooth plate.

**STAINLESS STEEL BODY FENDERS**

The body wheel well openings shall be provided with round radius, polished stainless steel fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using a rubber gasket to reduce buildup of moisture and/or debris.

**WHEEL WELL LINERS**

The wheel wells shall be provided with an easily removable polymer, full depth circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

**SCBA BOTTLE COMPARTMENTS**

There shall be three (3) SCBA compartments located adjacent to the rear wheel. There shall be two (2) on the curbside of the apparatus and one (1) on the streetside. Each compartment shall be capable of storing three SCBA bottles (not more than 5-3/4" in diameter). Each compartment shall have a vertically hinged door and a positive catch latch installed on the exterior of the wheel well panel.

**ALUMINUM BODY PAINT SPECIFICATIONS**

**BODY PAINT PREPARATION**

After the body and components have been fabricated they shall be disassembled prior to painting so when the vehicle is complete there shall be finish paint beneath the removable components. The body shall be totally removed from chassis during the pain process to insure the entire unit is covered. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion. If the compartment interior is to be painted the interior shall be acid etched as described above then primed with an epoxy primer and all seams caulked.

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

**PAINT PROCESS**

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years.

The body shall go through an eight-stage paint process;

1. Clean bare metal using a solvent base wax & grease remover.
2. Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
3. Re-clean bare metal using a solvent base wax & grease remover.
4. Bare Metal Epoxy Primer Coat - PPG Delfleet® Evolution corrosion resistance epoxy primer to be applied at 1.0-2.0 mills DFT over clean abraded bare metal.
5. Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mils DFT after sanding.
6. Basecoat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Basecoat. Apply 1.0-3.0 mils DFT of basecoat color to achieve full hiding.
7. Clearcoat PPG Delfleet® Evolution polyurethane premium quality clearcoat with improved mar resistant finish. The clearcoat shall be applied to achieve a total dry film thickness of 2.0-3.0 mils.
8. Curing process of the painted body shall go through a force dry/bake cycle process. The painted components shall be baked 180 degrees for 2 hours to achieve a complete coating cure on the finished product.

**MACHINE POLISHED**

After the force dry/bake cycle and ample cool down time, the coated surface shall be sanded using 1,000, 1,500, and or 3,000 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed then polished to an extra high gloss smooth finish. Total dry film thickness of paint will average between 8.0-12.0 mils.

**PAINT - ENVIRONMENTAL IMPACT**

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

**PAINT FINISH - TWO COLOR**

The body shall be painted with a two-tone color of PPG Delfleet® Evolution paint as described above.

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, an isolation tape, or gasket shall be used to prevent damage to the finish painted surfaces. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nutserts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

Touch-up paint shall be provided with completed vehicle.

- Paint Color: Match cab/chassis supplied paint color.

**BODY UNDERCOATING**

The entire underside of apparatus body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas to retard corrosion under the apparatus.

**UNDERCOAT WARRANTY**

The undercoating shall be provided with a warranty by its manufacturer for the lifetime of the vehicle. The re-spray warranty shall be transferable between vehicle owners. Should the coating applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

**PAINT WARRANTY**

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

**COMPARTMENT INTERIOR FINISH**

The compartment interior (below exterior drip rail line) shall be painted with an epoxy primer then painted with a textured Zolotone paint finish. Paint color shall be gray.

**REFLECTIVE STRIPE**

All retroreflective materials shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed inASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.
SHOP NOTES
Need chevron on front bumper.

**REFLECTIVE STRIPE - CAB SIDE**

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 8 in. (203 mm) wide stripe or combination of stripes shallbe permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

There shall be a 2" Scotchcal reflective stripe located 1" above and a second 2" Scotchcal reflective stripe located 1" below the main stripe.

**CHEVRON STRIPE - CAB BUMPER**

A reflective stripe shallbe affixed to the front of cab. The stripe or combination of stripes shall shall be a minimum of 4 in. (100 mm) in total width.

The approximate 10" wide Chevron retroreflective stripe shall be affixed to at least 25 percent of the width of the front of the apparatus with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shallbe 6" width. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Scotchlite Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification forRetroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

- This reflective Chevron stripe shall alternate white and red in color.

**REFLECTIVE STRIPE - BODY SIDES**

A 8" minimum reflective stripe shall be affixed to the sides of the body.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be white in color.

The stripe shall extend straight back from the chassis and then, ahead of the rear wheels, it shall form a "Z" and then extend straight back to the rear of the body.

**CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS**

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shallbe 6" width.

The rear side panels only of the body shall have a Chevron style reflective stripe layout, and cover as much of the rear side panels as possible. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification forRetroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

- This reflective Chevron stripe shall alternate white and red in color.

**LETTERING**

The following lettering shall be furnished and installed on the completed unit:

**SIDE CAB DOOR LETTERING**

There shall be two (2) 18" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be white in color.

**UPPER BODY SIDE LETTERING**

There shall be eight (8) 9" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be white in color.

**REAR BODY LETTERING**

There shall be four (4) 16" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be white in color.

There shall be fifteen (15) 3" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be white in color.

**FRONT OF CAB LETTERING**

There shall be nine (9) 3" high 23K Gold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

Final design and layout shall be determined prior to construction.

There shall be four (4) 9" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be red in color.

**CUSTOM DECAL LOGO - 12" -18"**

Six (6) custom designed 12" - 18" Scotchcal type retroreflective logo(s) shall be provided on the completed vehicle, located on the. The exact layout shall be provided by the Patterson Fire Department No. 1 prior to completion.

**EXTERIOR COMPARTMENT DOORS**

**HINGED DOOR CONSTRUCTION**

The exterior compartment doors shall be custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

All vertically hinged compartment doors shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE. All horizontally hinged compartment door shall have a door check as specified with each door.

**ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)**

The apparatus shall be equipped with Robinson Series III roll-up exterior compartment doors. Robinson roll-up doors shall be complete with the following features;

- Doors shall be front roll with drum positioned at upper front portion of compartment to afford maximum clearances and head room for mounting equipment to ceiling of compartment
- There shall be a non-abrasive side brush seals
- Magnetic door ajar system must be integrated in lift bar handle and the retainer block to signal open door. No mechanical switches or switches interior to the compartment shall be used
- Every slat must have interlocking end shoes to prevent slat from moving side-to-side and binding the door
- Between each slat must be a co-extruded PVC inner seal to prevent metal-to-metal contact and to repel moisture. This inner seal is not visible to detract from appearance of door
- Slats are to have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects
- Slats to be double-wall extrusion 1.366" high by .315" thick. Exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation
- Latch system to be a full width one piece lift bar operable by one hand
- Two inch wide finger pull integrated into the bottom rail extrusion for easy one hand opening and closing
- Clip system that connects the curtain slats to the operator drum which allows for easy tension adjustment without tools
- Each roll-up door shall have a four inch diameter counterbalance operator drum to assist in lifting the door.
- Track shall be one-piece aluminum that has an attaching flange and finishing flange incorporated into its design
- Drip rail will have specially designed seal that prevents the seal from scratching the door
- Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door
- Bottom rail to have "V" shaped double seal to prevent water and debris from entering the compartment
- Standard replacement parts to be shipped from the United States and available in as little as 48 hours
- All doors shall be key coded to 1250

Each shutter door shall decrease the compartment door frame opening approximately 2.00" in width and approximately 4.50" in height for the bottom section of door assembly.
SHOP NOTES
Doors to key coded #1250

**EXTERIOR ROLL-UP DOOR FINISH - PAINTED**

The roll-up compartment doors shall be painted with a wet type paint application. The color choice shall be the same as the primary color specified for the body. The paint finish on the doors shall be an exact match in color and gloss.

The roll-up compartment door frames shall have a satin aluminum finish and shall not be painted to match the body color.
SHOP NOTES
Leave door frame for roll ups unpainted

The specified retroreflective stripe material shall be applied on the roll-up compartment doors. The stripe shall be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface .

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**BODY HEIGHT MEASUREMENTS**

The vertical body dimensions shall be as follows:

AHEAD OF REAR AXLE

| | Description | Dimension |
|---|---|---|
| A | Bottom of Subframe to Top of Body | 84.0" |
| B | Bottom of Subframe to Bottom of Body | 25.0" |
| C | Vertical Door Opening | |
| | -with roll-up door | 67.5" |
| | -with hinged door | 71.5" |

ABOVE REAR AXLE

| | Description | Dimension |
|---|---|---|
| D | Vertical Door Opening - Above Rear Wheel | |
| | -with roll-up door | 34.0" |
| | -with hinged door | 37.0" |

BEHIND REAR AXLE

| | Description | Dimension |
|---|---|---|
| E | Bottom of Subframe to Bottom of Body | 20.0" |
| F | Vertical Door Opening | |
| | -with roll-up door | 62.0" |
| | -with hinged door | 66.0" |

GENERAL

| | Description | Dimension |
|---|---|---|
| G | Bottom of Drip Rail to Top of Body | 33.5" |

(Dimensions are generic and subject to change during the actual design process)

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**UPPER BODY COMPARTMENTS**

There shall be four (4) compartments parallel to the sides of the body, two (2) on each side. Each of these compartments shall be 77.0" wide x 26.0" long x 33.5" deep. The side compartments shall be open under each door sill to allow for long equipment. Each compartment shall be integral with the body construction, and will not be bolted or add-on modules. The outside walls of each compartment will be double walled to prevent equipment from denting the outside painted surface.

Each compartment shall have a lift-up type compartment door hinged on the outboard side. Each door shall be fabricated from 3/16" aluminum tread plate with a pair of pneumatic type cylinders mounted to hold the door in both the opened and closed positions. Each door shall be mounted using a full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin. Each door shall have two (2) pneumatic spring devices, one (1) at each end, attached to cast aluminum brackets mounted to the interior surface of the door. The gravity-driven, sealed, ball-style switch shall be mounted to one of the cast aluminum mounting brackets to drive the door open indicator system and activate the interior compartment light. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion.

Each compartment door shall overlap a 2" vertical lip on the body roof to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Each compartment shall have a horizontally mounted OnScene Solutions LED Night Stik on the underside of the door that will be automatically activated when the door is opened and wired to the NFPA required hazard warning light provided in cab.

Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.

-

UPPER BODY COMPARTMENT STREETSIDE

- Two (2) Stokes baskets exact size & model TBD by PFD
- One (1) Water Rescue Jaws
- Various Rope Rescue & Ice/Water Rescue equipment types & quantities TBD by PFD
- Two (2) pinch bars 1 1/8” x 51”
- Two (2) poly boxes w/ various wedges/gussets

UPPER BODY COMPARTMENT CURBSIDE

- Various Hazmat equipment types & quantities TBD by PFD

UPPER WALKWAY

Bottom Left

- One (1) 6” x 6” x 16 lumber
  One (1) 2” x 6” x 16 lumber
  Two (2) 4” x 4” x 16 lumber
  Two (2) 2” x 4” x 16 lumber

Top Left

- Six (6) 2” x 12” x 12 lumber

**SIDE ROOF COMPARTMENT - SHELF TRAC**

There shall be four (4) roof compartment(s) provided with horizontally mounted Shelf Trac on front and rear walls for vertical partition installation.

**UPPER BODY WALKWAY**

A recessed walkway shall be provided recessed at the center of the roof area. The walkway shall be finished with NFPA compliant 3/16" aluminum tread plate with continuously welded seams to prevent moisture penetration into apparatus body. Drains shall be installed in the walkway to allow moisture to drain to the ground through flexible drain hose.

There shall be a minimum of two (2) OnScene Solutions 9" LED Night Stik lights provided to illuminate the upper body walkway area. The lights shall be activated when the parking brake is set.

There shall be a module provided in the upper body walkway for storage of one (1) Patterson Fire Department No. 1 supplied ladder and lumber. The module shall be designed per the sales drawing and include a hinged tread plate cover.
SHOP NOTES
Walkway storage module to include a hinged tread plate cover.

**ROOF ACCESS LADDER**

The top of the rescue body shall be accessible from the ground by a On Scene Solutions Folding Ladder.

**BODY WIDTH DIMENSIONS**

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be:

| Area Description | Dimension |
|---|---|
| Transverse Area:<br>- Above Top of Subframe | 95.5" |
| Compartment Depth:<br>- Below Top of Subframe<br>- Ahead of Rear Axle | 24.5" |
| Compartment Depth:<br>- Below Top of Subframe<br>- Behind the Rear Axle | 23.5"<br>(Eng. Note) |

(Dimensions are generic and subject to change during the actual design process)

**STREETSIDE COMPARTMENT - FRONT (S1)**

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 36" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails. This tray shall contain an adjustable vertical partition wall located within the tray.

SHOP NOTES
This tray will have a vertical partition wall located in the tray (adjustable)

- There shall be one (1) vertical compartment partition approximately 36" deep seperating compartment S1 from compartment C1.

SHOP NOTES
Add vertical partition wall to separate S1/C1 36" deep (to the mast cover)

- There shall be one (1) Zico ULLH walkaway type SCBA air pack bracket(s) provided with strap assembly.

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.

One (1) Task Force Tips PRO/pak Portable Foam System model UM12 or UM12-NF
· Two (2) Circle D Portable Lights model 163G or 164G
· Two (2) 50 lengths 1 ¾" hose
· One (1) Scott Air Pak Fifty 30-min SCBA
· Assorted hose fittings & adapters supplied by PFD
· One (1) Dry Chemical Extinguisher
· One Purple K Extinguisher
· One Pressurized Water Extinguisher
· One 8lb Flat head axe w/ fiberglass handle
· One 30" Pro-bar halligan
Various electrical adapters

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.

- One (1) Hannay ECR1618-17-18 cable reel(s) capable of storing 200' of 10/3 electric cable. The rewind switch for each reel shall be located adjacent to the reel it controls.

  - The cable reel shall equipped with 200' of 10/3 SEOOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.

  - One (1) Akron model EJB electrical junction box with yellow powder coat finish. The junction box shall include:

    - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:

      - One (1) L5-20 single twist lock receptacle

      - One (1) L5-20 single twist lock receptacle

      - One (1) 5-20 duplex straight-blade receptacle

      - One (1) 5-20 duplex straight-blade receptacle

  - One (1) EJB vertical apparatus mounting bracket - treadplate

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- The FRC FROG-D generator gauge panel located on the pump operators panel.

SHOP NOTES
Locate on pump panel.

- The controls for the specified light tower(s).

- There shall be one (1) air outlet connection to supply low pressure air for general maintenance. The outlet shall be located on the pump operators panel and shall terminate in a 1/4" NPT threaded port. The connector shall be supplied by the Patterson Fire Department No. 1.

SHOP NOTES
Locate low pressure air outlet to pump panel

The low pressure air supply shall come from the chassis air system. A system priority valve shall be provided to close off the primary portion of the chassis air system when air pressure is reduced to 80 psi.

- One (1) pump panel located in lower compartment area, below frame.

SHOP NOTES
Locate generator exciter kill switch in the pump panel.

- There shall be one (1) underbody slide-out step.

- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

- The 12 volt electrical distribution panel shall be located in the front transverse compartment above the subframe.

**STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)**

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.
SHOP NOTES
85% mu for custom body.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 250 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.

- There shall be one (1) vertical compartment partition dividing compartment into left and right sides located in compartment.

- There shall be one (1) transverse module(s). The module shall include an full length/width aluminum top and a stationary horizontal partition located per the sales drawing. The module shall be used to store the following long tools and equipment:

SHOP NOTES
Make entire top of plywood module aluminum flooring and add horizontal partition per sales drawing.

- The list of items to be stored in the transverse module shall be determined at the pre-construction meeting.

- Six (6) Patterson Fire Department No. 1 supplied 4' x 8' x 1" Finnform trench panels.

- Three (3) 3/4" thick, full 4' x 8' sheets of plywood without altering the size of the wood. **NO EXCEPTION**

SHOP NOTES
Add fixed horizontal partition in the plywood module

- There shall be one (1) air bag storage module(s). The make, model and exact dimensions of the air bags shall be provided during the pre-construction meeting.

  - There shall be two (2) OnScene Solutions cargo straps provided to secure the stored equipment.

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.
- One (1) air supply cart Super Can Industries Air Source Cart - #F-ASC-COM-FDN
- One (1) 20T air over hydraulic bottle jack Northern Tool Blackhawk model BH2208
- Air hoses for supplied air breathing apparatus quantity TBD by PFD
- Air hoses for pneumatic tool use quantity TBD by PFD
- One Paratech Air Bag Controller Kit TBD by PFD

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength. The floor of the compartment shall have a poly material to prevent wood sheeting from rubbing on compartment floor.

SHOP NOTES
Add poly material to compartment floor.

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- There shall be one (1) underbody slide-out step.

- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

**STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S3)**

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be two (2) adjustable shelf/shelves approximately 30" deep.

- There shall be one (1) spare SCBA cylinder rack(s). Each rack shall be manufactured using 6" diameter PVC tubing.

SHOP NOTES
Brand: _____

Diameter: _____"

Length: _____" (with valve)

- The SCBA bottle rack will be capable of storing fifteen (15) SCBA cylinders up to 6" diameter.

- There shall be one (1) spare SCBA cylinder rack(s). Each rack shall be manufactured using 8" OD PVC tubing.

- The SCBA bottle rack will be capable of storing four (4) SCBA cylinders up to 7.5" diameter.

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.
- One (1) Paratech 90 Air Hammer Kit model 22-550505
- One (1) Howell Quik Kut Kit
- One box w/ air shears, whizzer saw, air ratchet, air recip saw & accessories TBD by PFD

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- One (1) water tank(s).

**STREETSIDE COMPARTMENT - REAR (S4)**

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits.

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. Tray(s) shall be vertically adjustable.

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).

- Three (3) Hannay EF2016-17-18 hydraulic hose reel(s) capable of storing 100' of dual line hydraulic hose. The rewind button for each reel shall be located adjacent to the reel it controls.

  - The hydraulic reel shall be equipped with 100' of Amkus hydraulic hose. The hose shall be Red in color.

  - The hydraulic reel shall connect to the hydraulic pump with a 60' Amkus pigtail. The hose shall be Red in color.

  - The hydraulic reel shall be equipped with 100' of Amkus hydraulic hose. The hose shall be Blue in color.

  - The hydraulic reel shall connect to the hydraulic pump with a 60' Amkus pigtail. The hose shall be Blue in color.

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- One (1) Patterson Fire Department No. 1 supplied hydraulic power unit(s) and fuel can.

- Amkus supplied control pendent reel shall be located in compartment.

SHOP NOTES
Locate ECR 100 reel with 100' cable for control of Amkus Ultimate system to be located in this compartment

- Mounting provisions for four (4) Patterson Fire Department No. 1 supplied hydraulic ram(s) located on upper 400lbs. slide out tray.

SHOP NOTES
Make: AMKUSAMK-60R, AMK-40R, AMK-30R, AMK-20R.

Mount rams on the upper 400 lbs tray

- Mounting provisions for one (1) Patterson Fire Department No. 1 supplied hydraulic cutter(s) located on lower 400lbs. slide out tray.

SHOP NOTES
Make: AmkusAMK-22

Mount Spreader and Cutter vertically on lower 400lbs tray

- Mounting provisions for one (1) Patterson Fire Department No. 1 supplied hydraulic spreader(s) located on lower 400lbs. slide out tray.

SHOP NOTES
Make: AmkusAMK-30

Mount Spreader and Cutter vertically on lower 400lbs tray

**CURBSIDE COMPARTMENT - FRONT (C1)**

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 60" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.

SHOP NOTES
FD to supply dimensions of cribbing to go on pull out tray. Tray drawing to be sent back to FD prior to build for approval.

- There shall be one (1) module(s) for the following long tools and equipment:

  - The list of items to be stored in the module shall be for 6x6x36 inch lumber pitch floor up 2 degrees, add vertcal seat belt style strap to hold lumber in, also add poly to floor of module.

Cargo Net Over Opening
SHOP NOTES
All cargo netting to be secured with seat belt straps

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.

- The floor of the compartment below the frame rails shall have a 2" slope from the front of the compartment to the rear to alllow for storage of Patterson Fire Department No. 1 supplied cribing. The floor of the compartment shall have a poly material to prevent cribbing from rubbing on compartment floor and cargo netting of 1-1/2" nylon webbing provided at the door opening with easy release automotive style latches at the top and sides.

SHOP NOTES
Pitch floor below frame level 2" for cribing storage cover with UPF poly, netting to cover all cribbing to be latched with seat belt style.

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- One (1) 120/240 volt load center located on the forward wall of the compartment above the level of the frame rails..

SHOP NOTES
LOCATE ABVOVE FRAME LEVEL ON FORWARD WALL

- The FROG-D generator monitoring panel.

SHOP NOTES
MOVE FROG D LOCATION TO PUMP PANEL

- There shall be one (1) underbody slide-out step.

- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

**CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)**

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.
SHOP NOTES
85% mu for custom body.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 250 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.

- There shall be one (1) transverse module(s) for long tools and equipment which extends to the opposite side of the body.

- There shall be four (4) removable UPF brand plastic tool box(s) with handholes for carrying.

SHOP NOTES
(2) poly boxes to be placed in this compartment and (2) to be shipped loose

- One (1) Lista Drawer Cabinet model HS-0450-04LM-NB-RG-LG-IDL.

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.
- One (1) lockout-tag kit
· One (1) 10lb maul w/ fiberglass handle
· Two (2) bolt-cutters (one 36”, one 18”)
· One (1) “Trench bucket” w/ assorted tools quantity TBD by PFD
· One (1) “Collapse” kit w/ assorted tools quantity TBD by PFD
· Tarps & Blankets size & quantity TBD by PFD
· Two (2) Paslode cordless framing nailers w/ nails, batteries, fuel, etc.
· Assorted tools, tool belts, nails, accessories - quantity TBD by PFD

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- There shall be one (1) underbody slide-out step.

- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

**CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C3)**

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.
- Two ( 2) Rotary saws Partner or Cutters Edge model TBD by PFD
· One (1) Cutters Edge Vent saw model CE2171
· One (1) Chain saw make & model TBD by PFD
· Two (2) metal safety cans w/ fuel mix
· Kit w/ tools, spare blades, chains, bar oil, etc.
· One (1) Milwaukee Electric Sawzall model 6519-22
· One (1) Milwaukee Cordless Sawzall model 0719-22
· One (1) Milwaukee Cordless Hammer Drill model 0724-20
· One (1) Milwaukee Cordless Circular Saw model 0730-22
· One (1) Milwaukee Electric Portable Bandsaw model 6230

- The floor of the compartment shall have a poly material installed to prevent equipment from rubbing on compartment floor.

- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

**CURBSIDE COMPARTMENT - REAR (C4)**

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with the exterior aluminum slats painted the same color as the primary exterior body color.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

SHOP NOTES
Body roll up doors key coded to 1250

- One (1) nylon strap shall be provided to assist in closing the door.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) vertical compartment partition dividing compartment into left and right sides located in compartment.

- A storage hopper shall be provided in this compartment for approximately 150 pounds of "Floor-Dry". The hopper shall be loaded from the upper body compartment and shall dispense through a flex tubing stored inside the body. A PVC 1/4-turn valve shall be provided in the lower section of the body compartment to control floor-dry flow. The hopper shall include a seperate cover inside of the upper body compartment.

SHOP NOTES
The storage hopper in the upper rear curbside storage compartment will have an independent lid inside the upper body compartment

- Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.
- One (1) Supervac HF164E Fan with tilt base
· Stack of plastic 5 gallon buckets, 1 filled w/ speedy dry - quantity TBD by PFD
· Brooms/shovels - quantity TBD by PFD
· One (1) Torch Set w/ spare fuel & O2 type and quantity TBD by PFD
· Brooms/Shovels types and quantity TBD by PFD

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).

- The floor of the compartment below the frame rails shall have a poly material to prevent equipment from rubbing on compartment floor.

SHOP NOTES
Add poly material to compartment floor.

- Two (2) Hannay EF2016-17-18 hydraulic hose reel(s) capable of storing 100' of dual line hydraulic hose. The rewind button for each reel shall be located adjacent to the reel it controls.

- One (1) Amkus AMK-R100-ER hydraulic hose reel(s) w/ 100' of Black dual line hydraulic hose. The rewind button for each reel shall be located adjacent to the reel it controls.
  - The hydraulic reel shall connect to the hydraulic pump with a 60' Amkus pigtail. The hose shall be Black in color.
  - The hydraulic reel shall be equipped with 100' of Amkus hydraulic hose. The hose shall be Yellow in color.
  - The hydraulic reel shall connect to the hydraulic pump with a 60' Amkus pigtail. The hose shall be Yellow in color.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

SHOP NOTES
Ensure OSS lights full length in compartments.

- One (1) Patterson Fire Department No. 1 supplied hydraulic power unit(s).
- Mounting provisions for two (2) Patterson Fire Department No. 1 supplied hydraulic cutter(s), pre-connected to the HPU and located on the back wall of the compartment.

SHOP NOTES
Make: AmkusAMK-21A

Make AMKUS Model: Speedway Cutter

Spreader and Cutter are pre connected

Speedway cutter on rear wall

- Mounting provisions for one (1) Patterson Fire Department No. 1 supplied hydraulic spreader(s), pre-connected to the HPU and located on the floor of the compartment.

SHOP NOTES
Make: AmkusAMK-24

Spreader and Cutter are pre connected

- Mounting provisions for one (1) Patterson Fire Department No. 1 supplied hydraulic combination tool(s) located on the forward wall of the compartment.

SHOP NOTES
Make: AmkusAMK-25C

Clarify combi tool will be mounted to forward wall

**REAR COMPARTMENT - CENTER (RC1)**

The rear center compartment shall be closed to both side rear compartments.

The rear center compartment shall start at the bottom of the body and shall be as high as the body permits. The frame shall extend at least 20" into the Rear Center Compartment to allow for the spring mounts.

The interior useable compartment width shall be approximately 45.0" wide.

The compartment door opening shall be approximately 38.0" wide.

This compartment shall have vertically hinged box pan style doors fabricated of 1/8" thick smooth aluminum capable of opening past 90 degrees. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. A liner of poly material shall be installed on the inner door surface to prevent equipment from rubbing on door surface. The door exterior shall be painted job color.
SHOP NOTES
Ensure doors can open past 90 degrees and add poly liner to interior door surface.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
SHOP NOTES
Body doors key coded to 1250

The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 56" deep and as wide as the compartment layout or door opening permits located below the level of the chassis frame rails.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with a OnScene Solutions base with interior deminsion 56" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
- There shall be one (1) module(s) for storing long lumber in upper section of compartment.

SHOP NOTES
Lumber compartment design to be approved by FD prior to build.

(Divided 8”H x 32”W x 198”D and 8”H x 8”W x 80”D (right side to water tank fill tower)
Right side
- Two (2) Paratech Rescue Struts, 72” closed
- One (1) Elevator Poling tool

Left side
- Eight (8) 4” x 4” x 16 lumber
- Three (3) 6” x 6” x 16 lumber
- Three (3) 2” x 6” x 16 lumber

# Patterson Fire Department No. 1
## Rescue Pumper
### Build Specification

# Patterson Fire Department No. 1
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- There shall be one (1) Rescue Strut rack(s). Each rack shall be manufactured using 6" diameter PVC tubing.
  - The rack will be capable of storing fourteen (14) struts up to 6" diameter.
- There shall be one (1) removable UPF brand plastic tool box(s) with handholes for carrying.

-Mounting for following Patterson Fire Department No. 1 supplied equipment. Final location and mounting shall be determined at pre- construction meeting.

- Eight (8) 1” x 42-48” steel pickets
- Fourteen (14) Paratech Rescue Struts, various sizes ranging from 12” to 48” closed
- Two (2) poly boxes containing Paratech strut bases sizes TBD by PFD
- One (1) poly box or tool box containing shackles various sizes & quantities TBD by PFD
- Four (4) nylon slings (2 10 & 2 20) model TBD by PFD
- One (1) Pelican box for Strut Controllers & accessories size TBD by PFD
- One (1) poly box containing chains various lengths & quantities TBD & PFD
- One (1) poly box containing ratchet straps - various lengths & quantities TBD & PFD
- Two (2) chain binders model Crosby L-140
- Two (2) come-a-longs model
- Two (2) Griphoist model Tu-32 Rescue Kits
- One (1) Carrying Reel, 60 of 5/8” wire

- Two (2) vertically mounted OnScene Solutions LED Nightstiks. One (1) additional 9" OnScene Solutions LED Nightstik shall be added to the lower compartment area, under the extended floor.

SHOP NOTES
Ensure OSS lights full length in compartments. One additional 9" light added to lower compartment under floor area.

**PLASTIC FLOOR AND SHELF TILE**

All compartment floors, shelves, and trays shall be covered with Dri-Dek plastic interlocking grating.

- The plastic floor tile shall be black.

**SIDE BODY PROTECTION - RUB RAIL**

There shall be side rub rails provided below the compartment door openings on both the streetside and curbside. The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body. The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

- 3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be red/white in color.

**ROLL-OUT AWNING STREETSIDE**

One (1) Girard G-2000 Automatic Retractable Lateral Arm Awning shall be recess mounted, on the streetside.

The cassette housing is made of corrosion-resistant, powder-coated extruded aluminum with components made of stainless steel. The housing box to be powder coated to match the upper body white.

The unit shall measure eighteen (18) feet by 5-1/4" (deep), 7-3/8" (high). The awning shall project outward nine (9) feet nine (9) inches and will be mounted slightly lower in the rear to add in drainage. An LED “rope” type of lighting shall be incorporated to the outboard /underside to illuminate the work area. It shall be controlled by a switch next to the deployment/retracting switch and shall only operate when the awning is deployed.

The G-2000 will deploy and retract using a 110V AC motor with manual override (to retract awning in the event of a power failure) the power controls shall be located in compartments L-1 for the left awning and R-1 for the right awning.

The awning shall feature an automatic retraction system that will operate when wind speeds exceeds the adjustable factory settings (using a wind sensor to be located forward on the roof) or via an interlock if the parking brake is disengaged. The G-2000 has a Limited Lifetime Warranty.

**AWNING HOUSING**

The case color will be the standard, Polar White and re-painted to match body color.

- The awning fabric shall be Firesist HUV, Ivory (88054).

**COMPARTMENT COMPONENTS DESCRIPTIONS**

All interior compartment components shall be fabricated as follows:

**ADJUSTABLE SHELVING HARDWARE**

Adjustable shelving hardware shall be provided indicated in the numbered compartment list.

The shelving hardware shall include a minimum of four (4) aluminum shelf tracs mounted vertically on compartment side walls or vertical partitions. There shall be one (1) cast aluminum shelf bracket per vertical shelf trac to mount each shelf,

tray, or adjustable storage module. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

**ADJUSTABLE SHELF/SHELVES**

Adjustable shelf/shelves shall be provided in exterior compartment as indicated in the numbered compartment list.

Shelves shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate with a 2" vertical flange along the front and rear edges. Shelves shall be designed to be used with flanges either in the upward position to hold various equipment on shelf, or in the downward position for sweep-out shelf surface.

All shelves shall be fully adjustable, from top to bottom of the compartment. There shall be at least four (4) vertical mounting channels and shelving hardware, two (2) each side of compartment. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

**SLIDE-OUT EQUIPMENT TRAY - (400 # CAPACITY)**

Slide-out equipment tray(s) shall be provided in exterior compartment, as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Trays shall be built with a 3" vertical lip, with welded corners, to form a box type tray surface. Sliding tracks shall be Accuride 502 series. The length shall be per numbered compartment list and the extension shall be 100% of the slide length. Slides shall be constructed of formed steel with ball bearings mounted in triple track rails.

Tray(s) shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.

**HEAVY DUTY 100% EXTENSION EQUIPMENT SLIDE - (1,000# CAPACITY)**

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Trays shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum distributed load of 1,000# and a 500# end load.

**HEAVY DUTY EQUIPMENT TRAYS - SLIDE OUT AND DOWN ( 250 # CAPACITY)**

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Each tray shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a two extrusion rail design utilizing four (4) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with molded on urethane cover. The roller shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed position. The slide shall be rated for a maximum distributed load of 250#.

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**COMPARTMENT PARTITIONS**

Vertical compartment partitions shall be provided as indicated in the numbered compartment list. Partitions shall be fabricated of 3/16" thick (.188) smooth aluminum with 1" "L" outer edge. Bolted angles shall be provided at top and bottom of partition to secure partition in place, but allow future removal without cutting of partition.

**AIR BAG MODULE**

An air bag module rack shall be supplied in the exterior compartment located as indicated in the numbered compartment list.

The module shall be fabricated of 1/8" (.125) smooth aluminum plate with individual sections for each air bag.

Circular notches shall be provided along the front edge for ease of removing air bags with gloved hand. Modules shall be large enough for specified air bag and matching plywood panels. Exact size and layout shall be approved prior to construction.

**SCBA CYLINDER RACK**

A spare SCBA cylinder storage rack shall be provided and located as indicated in the numbered compartment list.

The rack shall have a shell fabricated of 1/8" (.125) thick smooth aluminum. There shall be a 2" slope in the rack to keep the bottles from sliding out. The air bottle storage tubes shall be fabricated of PVC tube. There shall be rubber matting installed inside each storage tube for bottle protection.

**REMOVABLE TOOL BOX - (PLASTIC)**

Removable tool box(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

The tool box(s) shall be fabricated of 1/2" (.50) thick polypropylene and shall have handhold cut-out at each end. Exact dimensions and layout of the tool box shall be determined at the pre-construction meeting.

**LISTA DRAWER CABINET**

Lista Drawer Cabinet(s), model HS450-04LM, shall be provided in exterior compartment as indicated in the numbered compartment list.

The drawer cabinet(s) shall be 21 3/4" high x 40-1/4" wide x 22-1/2' deep. The cabinet shall have four (4) individual locking drawers. The drawers shall have usable heights as follows: one (1) 2", one (1) 3", one (1) 4", and one (1) 5". The cabinet shall be Light Gray in color.

**COMPARTMENT LIGHTING**

OnScene Solutions LED Nightstik shall be provided with 12 LEDs per 18” light section. The following are minimum lighting requirements:

- Full Height Compartments 54” Section ( 36 LEDs )
- Wheel well Compartments 36” Section ( 24 LEDs )
- Rear Rescue Compartment 54” Section ( 36 LEDs )
- Low Compartments 18" Section ( 12 LEDs )
- Low Compartments - Horizontal 36" Section ( 24 LEDs )

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

# Patterson Fire Department No. 1
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### Build Specification

**BUILT-IN HYDRAULIC RESCUE TOOL SYSTEM SPECIFICATIONS**

Intent

It is the purpose and intent of these specifications to describe a chassis mounted central hydraulic drive system designed and engineered specifically for the simultaneous operation of high pressure rescue tool supply circuits and low pressure hydraulic system. Under these specifications and contract, body and tool manufacturers shall provide associated drive components and control systems required for complete operation of such systems.

Any and all parts or accessories not specifically mentioned herein but necessary to furnish a complete unit shall be supplied by the body manufacturer. The following specifications indicate the minimum requirements including all parts, accessories, equipment and safety features, whether mentioned herein or not.

Scope and General Description

The apparatus shall be equipped with an on-board AMKUS Ultimate hydraulic rescue tool system capable of powering specified tool circuits and powering the specified low pressure hydraulic system on an individual or simultaneous basis. The system shall be designed for 10,500 PSI nominal operating pressure and shall be compatible with AMKUS hydraulic oil.

The primary hydraulic pump system shall include, but not be limited to, a power take(PTO), hydraulic pump, hydraulic control valve assembly, reservoir, filtration system, hydraulic oil cooler, and electrical control system. This system shall provide all necessary hydraulic requirements and controls to properly operate the secondary stage high-pressure intensifiers. All system component flow rates and pressure requirements shall be balanced and matched so that volumetric and overall efficiency is maximized at times of simultaneous component operation.

Compliance to NFPA Standards

All system components shall meet or exceed pressure drop, flow velocity, maximum operating pressure and torque safety margin factors as recommended by NFPA, JIC, SAE, and ISO standards organizations. The furnished hydraulic rescue portable and fixed rescue equipment shall be in full compliance to applicable NFPA standards.

The furnished hydraulic rescue portable equipment shall be in full compliance to applicable NFPA standards. The fixed installation of the rescue hydraulic system shall also be in compliance to applicable NFPA standards.

Performance

The hydraulic system shall be designed to provide near-constant hydraulic flow up to the maximum operating pressure of 10,500 PSI for each hydraulically independent tool circuit and allowing the low-pressure hydraulic system to operate a full rated capacity. The operating conditions, such as tool force, tool direction, or hose length, of any circuit shall not affect the performance of any of the other circuits or the low-pressure hydraulic system operations .

Variable Engine Speed Compatibility

The fixed hydraulic rescue tool system shall be capable of providing constant output at variable engine speeds. The engine RPM range shall be subject to many variable factors such as other hydraulically driven equipment and fire pump. The exact operating RPM shall be determined prior to installation by engineering and shall be subject to available horsepower, gearing and other critical design factors.

Hydraulic Fluid Reservoir

A 35-gallon AMKUS Model HRG-120 5000-07-0074 hydraulic fluid reservoir shall be provided for the tool system and hydraulic generator system. The reservoir shall be constructed of a minimum of eight (8) gauge steel and a minimum of two internal flow baffles for proper oil circulation. A 3/4" IPT drain boss and plug and clean out/ strainer access cover shall be installed. All return lines shall be discharged hydraulic fluid directly into tank, through filter assembly, not less than six (6) inches below normal operating fluid level. Volumetric capacity of reservoir shall be such as to provide for proper flow velocity, cooling and deaeration of oil. Assembly shall be flex mounted if attached to chassis frame rail.

The reservoir shall also be equipped with dual suctions, combination pressurized fluid filler assembly with removable five hundred micron strainer, combination fluid level, sight gauge and thermometer, cooling system temperature control switch .

Hydraulic Fluid Filtration

The hydraulic system shall be equipped with fluid filters on the return lines and high pressure filters on the discharge side of the tool and low-pressure hydraulic system. The hydraulic system shall be provided with suction side strainers. The hydraulic system shall include a spin on cartridge , suction line filter with a minimum of ten (10) micron filtering capacity. Filter flow capacity shall provide for minimum restriction of return flow. Filter assembly shall include an integral 15 PSI bypass valve and be equipped with a filter condition indicating device. Note: a pressure gauge shall not be acceptable . Top mounted inside tank, cartridge insert return filters shall be provided.

The hydraulic filters and strainers shall be equipped with shut-off valves or provisions to prevent loss of hydraulic fluid from the system during changing of such devices. The installer shall provide adequate clearance and accessibility for filter maintenance, as well as hydraulic oil filling and drainage.

Hydraulic Fluid Cooling Systems

Two (2) HEA-40-20 5000-07-0028 high capacity air to hydraulic fluid coolers shall be installed to cool hydraulic fluid for the tool system and low pressure hydraulic system. The cooler system shall be of sufficient BTU per hour cooling capacity to provide for a maximum system oil temperature of ambient air plus 30 degrees Fahrenheit when all component systems are in simultaneous and continuous operation. Cooling system core shall be of sufficient flow capacity so that pressure drop across cooler headers (inlet to outlet) does not exceed 30 PSI at required flow. Pressure and flow bypass valving shall be provided to prevent over pressurization of assembly.

An integrally mounted 12-volt electric or hydraulic motor driven fan assembly of required CFM flow capacity shall provide airflow. Mounting of cooling systems requiring airflow supply provided by chassis engine cooling system fan is not acceptable. Fan motor shall be thermostatically controlled to provide for a minimum operating oil temperature of 90 degrees Fahrenheit and maximum as stated. The cooling system shall provide for automatic on/off control of fan with hydraulic system engagement or shutdown (operator control not required).

The cooler flow core and fan drive assembly shall be independently flex cushion mounted and located on chassis to provide for minimum airflow restriction and shall not be effected by engine heat or exhaust system heat inclusion.

Hydraulic System Plumbing, Hoses, and Fittings

The hydraulic system for the four (4) tool system and low pressure hydraulic system shall be equipped with high pressure hydraulic hoses rated at 125% of working pressure of the designed system. The hoses shall be installed with sweep-type low friction loss corrosion resistant female swivel connections. The hoses shall be installed with mechanical and abrasion protection coverings and clamps.

All hydraulic hoses shall meet or exceed the following specifications: Each hose assembly (hose with hose end fittings), except for pump section hose, shall be fitted with JIC 37 degree swivel fittings located at each point of hose and component connection. All pressure line hoses shall comply with SAE 100 R9 specifications. Suction line hose shall be a minimum of 2" nominal inside diameter and comply with requirements under SAE 100 R4. All hydraulic hoses shall be fully installed and ready for operation.

All fittings and adaptors to be of the steel type designed for hydraulic system use. All pipe thread fittings are to be coated with liquid Teflon pipe sealer before assembly. Use of Teflon tape shall not be acceptable. Hydraulic quick check disconnect fittings of the valved type as manufactured by Parker Hannifin Corporation or approved equal shall be installed in the main pressure inlet section and outlet work ports of the valve assembly for diagnostic testing.

Valve Plate Assembly

The four (4) tool system shall be provided with a complete valve plate mounting assembly. The compact assembly shall incorporate valve controls, intensifiers, and requirement equipment. The unit shall include four (4) Amkus VPA-4 5000-07-0040 valve plate assemblies; including tubing fittings check valves to pre-assemble valve, and intensifier skid unit.

Control Valve Assembly

The system shall be provided with a four (4) tool Amkus Model SPSV-351 5000-07-0001 control valve assembly. All required hydraulic control functions of the intensifier drive circuits shall be supplied within a single multi closed center control valve assembly. Assembly shall be of the modular integrated, screw in cartridge valve/manifold circuit design having stackable control sections for each drive circuit, and shall be designed to provide for additional drive circuit installations with only minor system modification.

The valve assembly shall consist of four control sections for intensifier operation. Each section of the assembly shall be fully post pressure compensated to provide proper flow and pressure regulation to each drive circuit independent of the operating requirements of other circuits in simultaneous operation. Each section, when stacked to make a complete assembly, shall provide all pressure inlet, tank return, load sense network, drive circuit porting, and control functions required.

Each of the intensifier control sections shall provide electric solenoid operated oncontrol, automatic pressure sequenced dual set flow controls with fully adjustable flow and pressure settings and intensifier pre-charge control valving. The regulated flow output shall be post (after directional valve) pressure compensated by means of cartridge valve assembly and shall have internal load sense logic network controls required.

High Pressure Intensifier

The secondary oil supply system shall be driven by the primary pump and control valve central hydraulic system and shall consist of four (4) Amkus Model HPP 5000-03-0017 high pressure oil to oil type intensifiers. Each intensifier shall consist of an axial piston motor drive group with a direct interconnecting axial rotational force plate ramp supplying force and drive requirements of the axial piston high pressure pump group.

The intensification pressure ratio shall be approximately 4:1 and be capable of developing a continuous intensified flow up to a maximum normal operating pressure of 12,500 PSI. The flow transmission factor shall be approximately 0.21:1 with a normal primary system drive flow rate of 7.5 GPM. Intensified (secondary oil supply output) flow rate shall be automatic high/low flow sequence controlled by system pressure/force requirements and shall be fully adjustable to supply a wide range of tool operating cycle speeds and high/low step-down initiation pressures.

Each intensifier shall be a single unitized assembly consisting of the motor drive and high pressure pump piston rotational groups, internal fill and output valving on each pump piston, internal high pressure piston precharge fill network, high pressure system adjustable relief valve, reverse connection protection valving, case over pressurization protection and all required intensifier component parts. Intensifiers of the motor/pump close coupled type or of the reciprocating differential area piston type are not acceptable. This unit shall be designed to supply a smooth, uninterrupted intensified oil flow output for rapid cycle operational speeds and predictable force characteristics of the rescue tool.

Electrical Control System

An Amkus Model EDP-351-4AUX 5000-07-0134, 12-volt relay power distribution system, shall provide the control of the four (4) tool hydraulic system electrical valves, auxiliary power system, and components . All relays and control system switching circuits shall be fused and arc suppression protected.

The installer or chassis manufacturer shall provide an electronic controlled variable set constant speed engine governor control system. Unit shall be set to automatically raise and hold constant the engine RPM required for proper hydraulic pump output to ensure intensifier drive output as the number of circuits and their loads change. Control module for governor shall be chassis mounted in a readily accessible location.

“On-Off” Control

The main control panel shall be equipped with an AMKUS RMC-300 5000-07-0092, “on-off” switch for tool operation. The switch shall be labeled on instructions intended use and function.

Pendent Control

The control of the four (4) intensifier drive circuits, low pressure hydraulic system, and cable reel shall be provided by an Amkus Model EPC-400T 5000-07-0123 remote hand held pendant control module. The control cable shall be of the high abrasion, oil, chemical, weather, and flame resistant polymeric jacket type to meet or exceed requirements of UL1277, IEEE383 and ICEA specifications.

Pendant Control Cable Reel and Cable

The hydraulic tool system shall be provided with a Hannay ECR-100 electric rewind reel for the storage of pendant control cable. The installer shall provide a rewind control shall be located adjacent the reel and wiring to the electronic control panel.

One hundred (100) feet of multi-conductor control cable for pendant control connection. The control cable shall be of the high abrasion, oil, chemical, weather, and flame resistant polymeric jacket type to meet or exceed requirements of UL1277, IEEE383 and ICEAspecifications.

Dual Flow -- Low Pressure Auxiliary Hydraulic System

The Amkus model RTK-100 auxiliary tool circuit control valve shall be designed to provide electric solenoid ”on-off” control and a dual adjustable flow control setting with full pressure compensation and integral load sense network.

A pilot operated pressure relief valve cartridge, pre-set for 2000 PSI differential operating pressure at tool inlet/outlet shall be provided downstream of flow controls and pressure compensator valve section.

The outlet flow can be selected for 7 or 12 GPM with a single inlet and single outlet. Circuit outlet shall be through panel mounted HTMA series 1/2" ported quick disconnect. All solenoid valve electrical connections shall be fully sealed and of the DIN 43650 type.

**UNDERBODY SLIDE-OUT STEP**

There shall be underbody slide-out step(s) furnished and installed. Each platform shall be constructed from 9" deep "Diamond Back" non-slip vented aluminum stair treads. Step slide shall be securely held in both out and stored position, utilizing a heavy duty pneumatic cylinder. Each pneumatic cylinder shall be designed to have an over center location which will assist the step in both extension and retraction. Each step shall be designed to hold 500 lbs., and reinforced to prevent flexing or damage.

**STEP / GROUND LIGHTS**

Step and ground lights shall be OnScene Solutions 9" LED Nightstik and be placed at any entry door and step where personnel climb on or descend from the apparatus to ground level. OnScene LED lights shall have 6 LED lights per 9” light, and shall be rated at 100,000 hours of service. On Scene Solutions LED lights shall be have a 5 year free replacement warranty.

All of the required step and ground lights shall be activated when the parking brake is set.

**12 VOLT ELECTRICAL SYSTEM**

The apparatus shall be equipped with a heavy duty 12 volt wiring system installed with proper devices for the fire service. The system shall include all components necessary for complete operation. The low voltage electrical system shall meet or exceed current NFPA 1901 Standards and SAE J1292 requirements.

System wiring shall be stranded copper conductors of a gauge rated to carry 125% of the maximum current for which the circuit is protected. All wiring shall be Type GXL, XLP Cross-Linked Polyethylene, conductors with function identification at least every 3" by color coding and permanent marking with circuit identification. Identification shall correspond with schematics provided with the vehicle. Wiring shall be mounted in high temperature protective loom secured to body with bolted on clips with nylon wire ties. The XLP wiring shall have an operating temperature range of -60°F/-51°C to 257°F/125° C. Cross-linking changes thermoplastic polyethylene to a thermosetting material which has greater resistance to environmental stress cracking, cut-through, ozone, solvents and soldering than either low or high density polyethylene.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Wiring shall be protected against heat, liquid contamination and damage. Electrical connections shall be with double crimp water-tight heat shrink connectors. Wire nut, insulation displacement, or insulation piercing connections shall NOT BE ACCEPTABLE.

All 12 volt wiring running from front to back of apparatus body shall be run in full length electrical wiring raceway down each side of body.

All 12 volt circuits shall be protected with properly rated low voltage over current devices. Such devices shall be readily accessible and protected against overheating, mechanical damage, and water spray. All switches, relays, terminals and connectors shall have a rating of 125% of maximum current for which the circuit is protected.

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

A low voltage final test certification shall be provided with delivered apparatus.

**12 VOLT DIAGNOSTIC RELAY CONTROL CENTER**

The 12 volt power distribution shall be conveniently located with easy access for service. All relays and circuit breakers shall be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers shall be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel shall utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board shall be provided with twelve (12) heavy duty independent switching relays. Each relay shall have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel shall be located in apparatus body within a protected enclosure with removable or hinged cover.

**ROCKER SWITCH PANEL**

The 12 volt control switch panel shall be supplied and installed by the cab/chassis manufacturer.

**ELECTRICAL SYSTEM MANAGER**

The chassis shall contain an electrical system manager for:

- Monitoring chassis battery voltage
- Shedding pre-determined electrical circuits
- Sequencing pre-determined electrical circuits
- Automatically controlling chassis engine fast-idle
- Monitor master switch and parking brake applications
- Automatically control warning light modes ("Calling-For" and "Blocking Right of Way")
- Provide low voltage alarm
- Programmable control circuits
- Remote system status indicator panel

System manager shall perform all electrical functions required by current NFPA 1901 Standards.

The electrical system manager shall be supplied and installed by the cab/chassis manufacturer.

**BATTERY SYSTEM**

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. The cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

**BATTERY SWITCH**

One (1) battery "On/Off" switch with green "BATTERY ON" indicator shall be installed in cab within easy reach of Driver to activate the battery system. The switch and switch solenoid shall be supplied and installed by the cab/chassis manufacturer.

**BATTERY SOLENOID**

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

**ENGINE COMPARTMENT LIGHT**

Engine compartment light(s) shall be supplied and installed by the cab chassis manufacturer for illumination during service and maintenance.

**CAB HAZARD WARNING LIGHT**

A red "HAZARD" warning light shall be supplied and installed by the cab/chassis manufacturer. Light shall illuminate automatically to warn the Driver of the following when the apparatus parking brake is not fully engaged:

- Any passenger or compartment door is open
- Equipment rack is not in stowed position
- Light tower is extended

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

**BACK-UP ALARM**

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

**AUTOMATIC BRAKING DEVICE**

The apparatus shall be provided with a "BACKSTOP" rubber bumper automatic braking device attached at the rear bumper. The backstop shall be air operated and instantly apply brakes on a reversing vehicle with just the slightest pressure. The unit shall only activate when the vehicle is backing and the brakes can only be released after the vehicle is placed in a forward gear or neutral.

**REAR VIEW CAMERA**

The cab chassis provided rear view camera shall be installed on the rear of the body.

**TAIL LIGHTS**

Rear body tail lights shall be vertically mounted per Federal Motor Vehicle Safety Standards. The following lights shall be furnished:

- Two (2) Whelen amber LED 600 Series 60A00TAR turn signal lights
- Two (2) Whelen red LED 600 Series 60R00XRR stop/tail lights
- Two (2) Whelen halogen 600 Series 60J000CR back-up lights with clear lens
- Two (2) Whelen warning lights as detailed in the warning light section

Two (2) Whelen CAST-4V, 4-light polished aluminum bezels shall be provided, one (1) each side vertically mounted on the rear of the apparatus body for the above tail lights.
SHOP NOTES
Tail lights must stay on order as listed in spec.

**MIDSHIP MARKER/TURN SIGNAL**

Two (2) Whelen LED midship body clearance marker/turn signal lights (T0A00MAR) shall be installed. There shall be one (1) light on each side of the body, in the wheel well, ahead of the rear axle. Both lights shall have an amber lens and operate with the chassis clearance marker and turn signals.

**MARKER LIGHTS**

The apparatus body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) regulations. All body clearance lights shall be LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

**REAR BUMPER MARKER LIGHTS**

Two (2) Britax L427 dual face flexible mounted rear bumper markers shall be located, one (1) each side lower rear corner of body visible from driver mirrors.
SHOP NOTES
Mount on side of cast bezel tail lights

**STEP LIGHTS / GROUND LIGHTS**

There shall be four (4) OnScene Solutions 9" LED Nightstik light(s) installed on the apparatus. Lights shall be placed at each entry door and step where personnel climb on or descend from the apparatus to ground level. All of the ground lights shall be activated when the parking brake is set.

The location of each light shall be determined at the preconstruction meeting.

# Patterson Fire Department No. 1
## Rescue Pumper
### Build Specification

**LICENSE PLATE MOUNTING BRACKET**

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

**ELECTRONIC SIREN**

One (1) PowerCall model DX5200 electronic siren control with standard hard wired microphone and air horn button switch. Siren to be installed in cab within easy access of Driver.

**SIREN SPEAKER**

The siren speaker(s) shall be supplied and installed by the cab/chassis manufacturer.

**SIDE SCENE LIGHTS**

There shall be four (4) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (90C0ENZR) provided on the upper body. Each light will have twenty-four LED diodes that draw a total of 4.0 amps, with 3000 Lumens. The light shall be a 8-32 degree gradient lens and chrome flange. They will be equally divided between the curbside and streetside.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be switched at the 12 volt control panel in the cab.

**REAR SCENE LIGHTS**

There shall be one (1) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (90C0ENZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft × 10 ft (3 m × 3 m) square. Each light will have twenty-four LED diodes that draw a total of 4.0 amps, with 3000 Lumens. The light shall be a 8-32 degree gradient lens and chrome flange.

The lights shall be switched at the 12 volt control panel in the cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

**TRAFFIC DIRECTIONAL LIGHT**

One (1) Whelen TA4470L-PFD Super LED eight (8) lights, split two-piece housing, traffic directional warning device with 30' control cable shall be located on upper rear body. The control head shall be located in the cab within easy reach of Driver.

- The traffic directional light shall be surface mounted on upper rear body.

**DAVID CLARK INTERCOM SYSTEM**

The following David Clark intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. System shall have the following major components as minimum;

- One (1) U3800 Master Station
- Two (2) U3801 Remote Headset Station Intercom Only
- Two (2) U3811 Remote Headset Station and Radio Interface Module PTT (Provides PTT for Driver/Officer)
- One (1) C3820 Power Cable 20
- One (1) C3821 21 Radio Cable
- Five (5) C38-12 12 Jumpers
- Six (6) H3332 Dual Ear Over head Headsets

**WARNING LIGHT PACKAGE**

The following lighting package includes all of the minimum warning light requirements to comply with the most recent NFPA 1901 Fire Apparatus Standard.

**UPPER WARNING LIGHT SYSTEM**

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Delta Independence DI8HLPFD 84" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

| UPPER SECTION | INTERNAL COMPONENTS | COLOR |
|---|---|---|
| 1 | - One (1) 175 RPM Rotator | Red |
| | - One (1) Diagonal Mirror | |
| | - One (1) 400 Series Linear LED | |
| 2 | - Two (2) 400 Series Linear LED | Red |
| 3 | - One (1) 400 Series Linear LED | Clear |
| | - One (1) 400 Series Linear LED | Red |
| 4 | - One (1) 400 Series Linear LED | Red |
| | - One (1) 400 Series Linear LED | Clear |
| 5 | - Two (2) 400 Series Linear LED | Red |
| 6 | - One (1) 175 RPM Rotator | Red |
| | - One (1) Diagonal Mirror | |
| | - One (1) 400 Series Linear LED | |

| LOWER SECTION | INTERNAL COMPONENTS | COLOR |
|---|---|---|
| 1 | - One (1) Side Facing Linear LED | Clear |
| | - Two (2) Corner Facing Linear LEDs | Red |
| | - One (1) Front Facing Linear LED | Clear |
| | - One (1) Front Facing Linear LED | Red |
| 2 | - Two (2) 500 Series Linear LED | Red |
| 3 | - One (1) 500 Series Linear LED | Clear |
| | - One (1) 500 Series Linear LED | Red |
| 4 | - One (1) 500 Series Linear LED | Red |
| | - One (1) 500 Series Linear LED | Clear |
| 5 | - Two (2) 500 Series Linear LED | Red |
| 6 | - One (1) Front Facing Linear LED | Red |
| | - One (1) Front Facing Linear LED | Clear |
| | - Two (2) Corner Facing Linear LEDs | Red |
| | - One (1) Side Facing Linear LED | Clear |

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar shall be separately switched at the 12 volt control panel in the cab.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red linear Super-LED lights provided, one (1) each side.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red linear Super-LED lights provided, one (1) each side.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Linear Strobe lights (902000AU) provided, one (1) each side. Each light shall have a Amber lens and chrome flange. The power supply for the lights shall be Whelen 4 outlet 75 watt (UPS64LXA).

The lights shall be switched at the 12 volt control panel in the cab.

There shall be two (2) Whelen 900 series (9" x 7") linear Super-LED lights provided, one (1) each side.

**LOWER LEVEL WARNING LIGHTS**

ZONE A - FRONT WARNING LIGHTS

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY WHEELWELL AREA)

There shall be two (2) Whelen 500 series (5" x 2") TIR6 Super-LED lights (50R03ZRR) provided, one (1) each side. Each light shall have a red lens and chrome finished flange.

The lights shall be switched at the 12 volt control panel in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen 500 series (5" x 2") TIR6 Super-LED lights (50R03ZRR) provided, one (1) each side. Each light shall have a red lens and chrome finished flange.
SHOP NOTES
Mount on side of 600 series chrome bezel for tail lights - see pre con sales drawing

The lights shall be switched at the 12 volt control panel in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") Linear Strobe lights (602000??) provided, one (1) each side. Each light shall have a amber lens and chrome finished flange. The power supply for the lights shall be Whelen 4 outlet 75 watt (UPS64LXA)

The lights shall be switched at the 12 volt control panel in the cab.

**LINE VOLTAGE SYSTEM**

**ONAN HYDRAULIC GENERATOR**

An Onan model CMHG 25000, hydraulic driven generator set shall be installed on the apparatus. The generator shall be rated at 25,000 watts at 120/240 volts. Current frequency shall be stable at 60 hertz.

The power generating unit shall be modular unit, housed in stainless steel with an acoustical material added for maximum sound dampening. The module shall consist of the hydraulic motor, generator, blower, cooler, and all other necessary components.

For ease of maintenance, the only part of the system that shall require accessibility shall be the oil reservoir which shall be located as to facilitate periodic checks and the adding of hydraulic fluids.

**GENERATOR MONITORING PANEL**

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours.

**WARRANTY PERIOD**

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the CMHG SERIES Hydraulic Generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

**GENERATOR MOUNTING**

The generator shall be mounted in an upper roof compartment on rubber vibration isolators. The compartment shall be reinforced where necessary to hold weight of generator. A valve shall be provided on the generator oil drain outlet and piped to underside of generator compartment with flexible hose and plug. The drain shall be located where easily accessible for generator service.

**MANUALS AND SCHEMATICS**

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

**POWER-TAKE-OFF GENERATOR DRIVE**

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO opening of the chassis. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM. speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

**The engagement of the PTO shall be via a rocker switch and red pilot light to note engagement of the PTO in the chassis cab with a secondary rocker switch and red pilot light located on the pump operator's panel in compartment S1.**

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.
SHOP NOTES
Add secondary PTO switch to pump panel.

**GENERATOR MONITORING PANEL**

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This unit shall be manufactured by FRC model FROG-D and **mounted on the pump operators panel**. This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours and the monitoring of engine oil temperature. Generator hours and oil temperature shall be displayed at the push of a button.
SHOP NOTES
Add FROGG-D display to pump panel.

**LOADCENTER**

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied.

The loadcenter shall be UL / CSA listed, **NO EXCEPTIONS** will be allowed.

**OUTLETS AND CIRCUITS**

The generator shall supply the electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

- Two (2) 120 volt exterior outlets, one (1) each side near rear wheel well area.
  - The receptacle shall be 20 amp, twist-lock ( NEMA L5-20R ).
- Two (2) 120 volt exterior outlets, street side rear of body.
  - The receptacle shall be 20 amp, twist-lock ( NEMA L5-20R ).

**ELECTRICAL SYSTEM GENERAL DESIGN 120/240 VAC SYSTEM**

General

Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 5 cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures shall conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

Grounding

Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC.

Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

Operation

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation.

The control shall be marked to indicate when it is correctly positioned for power source operation.

A power source specification label shall be permanently attached to the apparatus near the operators control station.

Portable generator installations shall comply with Article 445 (Generators) of the NEC.

Overcurrent Protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144 inches in length.

For fixed power supplies, all conductors in the power supply assembly shall be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit.

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit.

Wiring Methods

Fixed wiring systems shall be limited to either Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit or Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit.

Electrical cord or conduit shall be supported within six (6) inches of any junction box and at a minimum of every 24 inches of continuous run.

Supports shall be made of nonmetallic materials or corrosion protected metal.

All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Wiring Identification

All line voltage conductors located in the main panel board shall be individually and permanently identified.

The identification shall reference the wiring schematic or indicate the final termination point.

When pre-wiring for future power sources or devices, the non-terminated ends shall be labeled showing function and wire size.

Wet Locations

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location shall be not less than 24 inches from the ground. Receptacles on off-road vehicles shall be a minimum of 30 inches from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

Dry Locations

All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30 inches above the interior floor height.

All receptacles shall be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps.

If the receptacles are direct current, or other than single phase, they shall be so marked.

Listing

All receptacles and electrical inlet devices shall be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards.

Receptacles used for direct current voltages shall be rated for the appropriate service.

**120/240 VOLT WIRING SYSTEM**

The complete wiring and electrical installation shall conform to present National Electrical Code and the National Fire Protection Association standards.

The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture, and severe continuous usage. The following electrical components and wire shall be the minimum acceptable standard for this type of apparatus.

**Wiring:** All electrical wiring shall be fine stranded copper type THHN. The wire shall be sized to load and circuit breaker rating. Wiring shall be color coded and printed with function every 3" for easy identification.

**Conduit:** All 120/240 volt wiring in the apparatus body shall be through flexible moisture resistant reinforced conduit, with proper seal tight connectors and hardware.

**Labeling of Equipment:** All circuit breakers shall be labeled to indicate purpose. Metal engraved or plastic coded labels shall be provided for all exterior and interior outlets indicating output amperage.

**Schematic:** An "As-Built" electrical wiring diagram schematic will be supplied with the completed apparatus.

**120/240 VAC SCENE LIGHTING**

**FRONT CAB-MOUNTED SCENE LIGHT(S)**

One (1) quartz floodlight(s) shall be provided on the front of the cab by the cab/chassis manufacturer. Each light shall be mounted in a brow-style mounting flange.

Each light shall be wired directly to the electrical generator system with Carflex conduit and stranded copper wire. The floodlights shall be protected with circuit breakers rated at the proper amperage and wire size.

- There shall be one (1) switch(es) to control the above scene lights. The switch(es) shall be located in the cab, within reach of the Driver and/or Officer.

**SIDE UPPER RECESSED SCENE LIGHTS**

Four (4) Havis-Shields Magnafire 3000, model KR-1939, recessed light(s) shall be installed. They shall be equally divided between the curbside and streetside. The rectangular die cast light fixture shall measure 13-1/2" wide by 5-5/16" high by 4-7/8" deep and have a white powder coat finish. The lamp head shall have one (1) quartz halogen HIR 900 watt 240 volt bulb. The bulb shall be accessible through the front.

A cast aluminum housing designed for recess mounting of a Magnafire series light into the body shall be supplied. The housing shall be configured with a depth of 2-1/2" and a 0 degree downward light angle projection. A polished finish shall be applied to the housing.
SHOP NOTES
Make:Havis-Shields
Model: Magnafire 3000
P/N: KR-1939

All scene lights are to be set at zero degree instead of ten degrees

- The lights shall be controlled by switch(es) in the lower portion of the front compartment.

**REAR UPPER RECESSED SCENE LIGHTS**

One (1) Havis-Shields Magnafire 3000, model KR-1939, recessed light(s) shall be installed. They shall be equally divided between the curbside and streetside. The rectangular die cast light fixture shall measure 13-1/2" wide by 5-5/16" high by 4-7/8" deep and have a white powder coat finish. The lamp head shall have one (1) quartz halogen HIR 900 watt 240 volt bulb. The bulb shall be accessible through the front.

A cast aluminum housing designed for recess mounting of a Magnafire series light into the body shall be supplied. The housing shall be configured with a depth of 2-1/2" and a 0 degree downward light angle projection. A polished finish shall be applied to the housing.
SHOP NOTES
Make:Havis-Shields
Model: Magnafire 3000
P/N: KR-1939

All scene lights are to be set at zero degree instead of ten degrees

- The lights shall be controlled by switch(es) in the lower portion of the front compartment.

**REAR TRIPOD SCENE LIGHTS**

Two (2) Fire Research Focus, model FCA642-S75, tripod telescopic light shall be provided. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall extend 16" and rotate 360 degrees. An internal brake shall slow the extension pole during lowering. The outer pole shall be a grooved aluminum extrusion. The folding legs shall be anodized aluminum tubing with plastic endcaps. The fully extended tripod system shall exceed a height of 6' and be less than 3 1/2' when collapsed. Wiring shall extend from the pole bottom with a 4' retractile cord.

The lamphead shall have one (1) quartz halogen 750 watt 120 volt bulb. The bulb shall draw 6.3 amps and generate 19,600 lumens. The bulb shall be accessible through the front. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall incorporate heat-dissipating fins and be no more than 5" deep by 3 3/8" high by 10" wide.

A weatherproof on-off toggle switch shall be mounted in a switchbox below the lamphead.

A wire guard shall be furnished to protect the lamphead glass.

A tripod truck mount bracket set shall be provided for each light. Each set shall include a lower base plate, an upper lock with a quick release spring loaded locking pin, and a shim set.
SHOP NOTES
Make:Fire Research
Model: Focus
P/N: FC642-S75-ON-6F3

All scene lights are to be set at zero degree instead of ten degrees

**TELESCOPING LIGHT MAST**

The apparatus shall be equipped with one (1) pneumatic powered telescoping floodlighting tower(s). The mast shall utilize air from the chassis brake system. Air to operate the telescoping mast must be drawn from a drier system and be regulated to 20 psig and shall have a back pressure protection valve.

A red flashing warning light will be visible to the driver to warn when a light tower is out of roof nested position.

A pneumatic kit to raise and lower the mast shall include air control valve, 0-160 psig air gauge, regulator, 0-30 psig air gauge.

The mast shall be of a free standing design (non-guyed) and use high strength, heat treated aluminum alloy tubes and collar. Each mast section (tube) shall have two full length external keys and nominal .095" wall thickness collars with matching keyways to maintain directional azimuth.

Each mast section and collar shall be of the low friction synthetic bearings for smooth operation and longer life. Bumpers shall be supplied to reduce shock on extension and retraction. All exterior aluminum surfaces shall be anodized and sealed. Fasteners and fittings shall be plated steel or stainless steel for corrosion resistance.

Mast shall be mounted using an internal roof mounting kit.

One (1) maintenance and instruction manual will be provided for the towers on delivery. Wiring schematic, air piping schematic and installation diagrams shall be provided with the manual. Manufacturer's blueprint of tower, complete parts list and bill of materials for towers provided with manuals.

**TELESCOPING LIGHT MAST**

**MODEL 5-20 SPECIFICATIONS**

| | |
|---|---|
| Nested height tower only: | 5'-4" |
| Extended height tower only: | 19'-11" |
| Normal payload capacity: | 70 lbs. |
| Number of sections: | 6 |
| Tube diameter range: | 5" - 2.5" |
| Mast volume: | 1.26 cu.ft. |
| Collar type: | Non-locking |
| Maximum operating pressure: | 20 psi |

The operational envelope of the mast shall be automatically illuminated by a lookup light whenever the mast assembly is being raised as required by NFPA .

**RCP DIRECTIONAL SYSTEM AND FLOOD LIGHTS**

The light tower shall use a 12 volt DC powered Remote Control Positioner (RCP) attached to the top of the mast to allow full rotation and tilt of the light fixtures at any vertical height to ensure total scene coverage above or beside the vehicle. Safety features include a 50watt DC lookup light to illuminate any obstruction above the mast as its raised and a mast extension warning kit with two red flashing lights. The light tower functions, including “auto stow” are operated by a hardwired pistol grip remote that is supplied with the tower.

Four (4) 1,500 watt, 240 volt, quartz halogen floodlights shall be provided attached to RCP unit for a total of 6,000 watts per tower.

# Patterson Fire Department No. 1
# Rescue Pumper
## Build Specification

**WATER SYSTEM**

The following equipment shall be furnished and installed to supply water to the emergency scene:

**FIRE PUMP SYSTEM**

The pump system shall be a power-take-off driven Hale model CBP-250 single-stage centrifugal water pump with a rating of 250 GPM @ 150 PSI. The pump body & transmission case shall be alloy cast iron with bronze fittings.

Pump body inlet shall be 3" NPT flange with a single 2-1/2" NPT discharge flange.

**PUMP DRIVE SYSTEM**

The water system pump shall be driven by a Chelsea "Hot-Shift" transmission PTO and shall be mounted directly to the transmission of the chassis. The drive line shall be hollow tube type, with heavy duty universals and splined shaft, to allow movement of the chassis components and pump.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to a neutral position transmission switch to prevent engagement unless the vehicle is in neutral with the parking brake set.

Two (2) green indicator lights shall be supplied in the chassis cab. One (1) light shall be energized when the chassis transmission is in neutral and shall be labeled "OK TO PUMP", the second light shall engage when the pump drive (PTO) has been engaged and shall be labeled "PUMP ENGAGED".

One (1) green indicator light shall be supplied at the Pump Operator's panel adjacent to the engine hand throttle. The green light shall be energized when both the chassis transmission is in neutral and the pump drive (PTO) has been engaged. Green light shall be labeled "OK TO PUMP".

**MASTER DRAIN VALVE**

There shall be one (1) ***Class 1*** manifold type drain valve(s) installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled adjacent to the pump panel. The control shall be a hand wheel knob marked "open" and "closed". Each drain port shall be completely independent where the master drain valve will not allow water or air flow between any two (2) inlet ports.

**PRIMING SYSTEM**

The priming system shall include an electrically driven rotary vane priming pump rigidly attached to the pump transmission. The priming pump shall be self lubricating and shall not require an external oil reservoir. The pump, when dry, shall be capable of taking suction and discharging water with a lift of 10' in not more than 30 seconds through 20' of suction hose through the steamers.

**PRIMER CONTROL**

There primer shall be activated by an electric push button control valve.

**DISCHARGE RELIEF VALVE**

There shall be one (1) HALE P25F pressure relief valve(s) on the discharge side of the pump. Relief pressure is operator set at the pump panel and discharges to the suction side of pump. An amber pilot light is provided at the control to indicate when the relief valve is open.

**INTAKE RELIEF VALVE**

An Elkhart model 40-41 intake relief valve shall be provided at the pump intake. It shall discharge to the underside of the apparatus. The dump valve shall have an adjustable pressure relief from 50 to 165 PSI and cast brass construction. There shall be a permanent label adjacent to the intake relief valve outlet which reads, "DO NOT CAP".

**PUMP RECIRCULATING LLINE**

A 5/8" recirculating line shall be installed between the pump and the water tank to cool the pump.

**PLUMBING SPECIFICATIONS**

All auxiliary inlet, discharge and pre-connect plumbing shall be fabricated with 304 stainless steel pipe and fittings or high pressure hose with stainless steel couplings. All plumbing shall be sized to provide sufficient water flow for each inlet or discharge.

**INTAKE(S)**

The completed apparatus shall have the following intake(s);

**STREETSIDE INTAKE**

There shall be one (1) 2-1/2" gated intake(s) located on the streetside of the apparatus. Each 2-1/2" intake shall terminate with a 2-1/2" NSTF chrome plated swivel adapter. There shall be one (1) 2-1/2" NSTM chrome plated plug and chain for each intake.

There shall be one (1) ***Class 1*** manual type drain valve(s) installed for the above plumbing item. The drain valve shall be a 3/4" ball valve style. There shall be a 1/4 turn control to manually open the drain valve when the line is under pressure. The valve shall be located at the pump panel and shall be plumbed to drain the lowest point in the plumbing.

- One (1) Elkhart, 2-1/2" valve(s)
    - This valve shall be controlled with a lever directly attached to the valve.

**TANK TO PUMP CHECK VALVE**

There shall be a check valve between the pump suction and the booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.

**TANK TO PUMP VALVE**

A 2.5" full flow ball valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. The valve shall be flanged to bolt directly to the pump and shall incorporate a chromium plated bronze ball. The remaining internal moving parts shall be stainless steel for years of dependable service. A non collapsible flexible hose 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.

The tank to pump valve shall be controlled from the pump operator's panel.

- One (1) Elkhart, 2.5" valve(s)

- This valve shall be controlled with a 12 volt electric actuator connected to the valve. The electronic control shall be located on the pump operator's panel.

**DISCHARGE(S)**

The completed apparatus shall have the following discharge(s):

**FRONT DISCHARGE(S)**

There shall be two (2) 2" gated discharge(s) located in this area. Each discharge shall terminate with a downsweep elbow with NSTM threads. Each discharge shall include:

- Two (2) Elkhart, 2" valve(s)
  - This valve shall be controlled with a 12 volt electric actuator connected to the valve. The electronic control shall be located on the pump operator's panel.
- Two (2) Class 1 automatic type drain valve(s).
  - Two (2) Class 1 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
  - The above gauge shall have a range from 0 to 400 psi.

**MISCELLANEOUS DISCHARGE(S)**

**TANK REFILL**

There shall be one (1) 1" pump to tank fill line(s).

- One (1) Elkhart, 1-1/2" valve(s)
  - This valve shall be controlled with a 12 volt electric actuator connected to the valve. The electronic control shall be located on the pump operator's panel.

**PUMP PANEL**

The pump controls shall be mounted on an aluminum control panel which shall have a black powder coat painted finish. The panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

**PUMP PANEL LOCATION**

The pump control panel shall be located as per the itemimized compartment list.

The pump panel shall include the following items;

**PUMP PANEL ACCESS**

The pump panel shall be open to the side of the truck. The Pump Operator shall NOT be required to open a compartment door to access the pump control panel.

**PRESSURE GOVERNOR and MONITORING DISPLAY**

Fire Research PumpBoss model PBA100-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8" wide by 1 3/4" deep. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:
- CHECK ENGINE and STOP ENGINE warning LEDs
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Engine OIL PRESSURE; shown on an LED bar graph display in 10 psi increments
- Engine TEMPERTURE; shown on an LED bar graph display in 10 degree increments
- BATTERY VOLTAGE; shown on an LED bar graph display in 0.5 volt increments
- PSI / RPM setting; shown on a dot matrix message display
- PSI and RPM mode LEDs
- THROTTLE READY LED

A dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator.

The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:
- High Engine RPM
- High Transmission Temperature
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Battery Voltage
- Low Engine Oil Pressure
- High Engine Coolant Temperature

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 control knob that uses optical technology shall adjust pressure or RPM settings. It shall be 2" in diameter with no mechanical stops, a serrated grip, and have a red idle push button in the center.

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

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

**MASTER DISCHARGE GAUGE**

There shall be one (1) Class 1 3-1/2" liquid filled gauge(s) which shall display the Master Discharge Pressure.

**MASTER INTAKE GAUGE**

There shall be one (1) Class 1 3-1/2" liquid filled gauge(s) which shall display the Master Intake Pressure.

- This gauge(s) shall have a white background with black text.

- The above gauge(s) shall have a range from -30" to 400 psi.

**UPF POLY WATER TANK**

The water tank capacity shall be approximately 230 U.S. gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.

The UPF Poly-Tank ® IIE shall be constructed of 1/2" thick PT2E™ polypropylene sheet stock. This material shall be a noncorrosive stress relieved thermoplastic, natural in color, and U.V. stabilized for maximum protection.

The booster tank shall be of a specific configuration and shall be so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removal.

The transverse swash partitions shall be manufactured of 3/8" PT2E™ polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.

There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of 1/2" polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump to pre-vent air from being entrained in the water while pumping.

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.

The tank lid shall be constructed of 1/2" thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped 1/2" x 13" to accommodate the lifting eyes.

The UPF Poly-Tank IIE shall rest on the body cross members in conjunction with such additional cross members, as required by the tank manufacturer.

The tank shall be isolated from the cross members through the use of hard rubber strips with, a minimum Rockwell Hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation.

Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restraints to minimize movement during vehicle operation.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The tank shall have a lifetime warranty from UPF.

**TANK FILL / VENT**

The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of 1/2" PT2E polypropylene and shall be a minimum dimension of 8" x 8" at the outer perimeter. The fill tower shall be designed to be flush with the upper body floor.

The tower shall be located in the left front corner of the tank. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E polypropylene hinged-type cover. Inside the fill tower, approximately 4" down from the top, shall be fastened a combination vent overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe that is designed to run through the tank, and shall be piped behind the rear wheels so as to obtain maximum traction.

There shall be an auxiliary tank vent piped to the rear of the tank to void trapped air and allow filling the tank to the maximum when filling on un level surfaces.

**UPF TANK OVERFLOW**

The tank shall be equipped with a minimum of a 6" schedule 40 polypropylene overflow / air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.
SHOP NOTES
Fill tower to be flush with upper body floor.

**WATER TANK LEVEL GAUGE**

There shall be one (1) Class 1 Intelli-tank water tank level gauge(s) for indicating water tank level. The tank level gauge shall indicate the liquid level on an easy to read display and show increments of 1/20 of a tank.
Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

**HOSE/LADDER STORAGE AREA**

Hose and ladder storage area shall be located over water tank and body, and shall exit at the rear of the apparatus. The interior of storage area shall be free from all projections such as nuts, sharp angles, or brackets that may damage equipment.

The storage deck shall be constructed from 3"x3/4" hollow aluminum extrusions welded into a one-piece grid to allow ventilation and water drainage. The extrusions shall have an anodized radiused ribbed top surface. The deck will be completely removable for easy access to the booster tank. The booster tank fill tower shall be protected as necessary to prevent damage from equipment located in the storage area.

One (1) adjustable aluminum hose bed partition(s) shall be provided in the hose storage area. The partition(s) shall be 3/16" smooth aluminum with split aluminum tubing welded to the top and rear edges.

# Patterson Fire Department No. 1
## Rescue Pumper
### Build Specification

**EQUIPMENT**

The following equipment shall be furnished with the completed apparatus;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.

- There shall be two (2) NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.

  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.

**STREAMLIGHT LITEBOX FLASHLIGHTS**

Six (6) Customer Supplied Streamlight Litebox Vehicle Mounting Systems shall be provided by customer. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. The flashlights shall be wired to batter direct unless otherwise specified by the customer.

- Six (6) Streamlight Fire Vulcan Vehicle Mounting Systems shall be provided. Each flashlight shall be orange in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall utilize high intensity LED lights and reflector. The flashlights shall be wired to batter direct unless otherwise specified by the customer.

  - The flashlight(s) shall be mounted on the completed unit, locations as per the Patterson Fire Department No. 1.