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## **PROPOSAL SPECIFICATIONS**

*Spartan Motors USA, Inc. of Charlotte, MI and the authorized Dealership representing Spartan Emergency Response (ER) submit the following detailed proposal for your consideration.*

*The following items have been specifically addressed regardless of whether they are included in the published specifications.*

*The Spartan Emergency Response detailed proposal supersedes the published specifications and will be the specifications in which the apparatus will be designed and manufactured to, if awarded the contract.*

*Any mutually agreed changes made during a pre-construction meeting or build process, will become part of the contract and the build specification. Based on these processes any costs and/or credits will be applied to the final invoice.*

*Spartan Emergency Response is a wholly owned subsidiary of Spartan Motors USA, Inc. and has operated since 1902. Spartan of Charlotte, MI is a leading supplier to the fire service and has operated since 1975. They maintain a complete on-site parts department with same-day shipping provided for all necessary service parts.*

*Spartan Emergency Response is a U.S. based provider of fire apparatus. Spartan designs and manufactures fire and rescue apparatus which utilize the approach of complete product integration including the apparatus body and pump house structures. Engineering, assembly and testing all take place on Spartan owned premises only.*

*Each apparatus is quality control inspected with full documentation at each step of the manufacturing process.*

*The unit will be manufactured at a Spartan Emergency Response manufacturing facility. Spartan Emergency Response operates three (3) manufacturing facilities.*

- *An apparatus manufacturing facility located at 907 7th Avenue North, Brandon, South Dakota*
- *An aerial and apparatus manufacturing facility located at 64 Cocalico Creek Road, Ephrata, Pennsylvania*
- *A chassis and apparatus manufacturing facility located at 1541 Reynolds Road, Charlotte, Michigan.*

## **STANDARD SPARTAN EMERGENCY RESPONSE FEATURES PROVIDED**

*The unit will be designed and assembled so that all recommended daily maintenance checks can be performed easily by the operator without the need for hand tools.*



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*Apparatus components that interfere with removal or repair of other major components will be attached with fasteners and installed with normal hand tools. These components will not be welded or otherwise permanently secured into place.*

*A test data plate will be provided at the pump operator's position which gives the rated discharges and pressures, together with the speed of the engine as determined by the manufacturer's test for this unit.*

*A manufacturer's certification of GVWR and GAWR on a nameplate will be affixed to the completed vehicle.*

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

*A permanent plate mounted in the driver's area of the cab unless otherwise specified will be supplied. It will specify the quantity and type of the following fluids used in the vehicle: engine oil, engine coolant, chassis transmission fluid, pump transmission lubrication fluid, pump primer fluid (if used), and drive axle lubrication fluid.*

*A permanent plate in the driver's compartment will be installed, specifying the seating capacity of the included cab.*

*Signs that state "OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION" will be provided. They will be visible from each seated position.*

*An accident prevention sign will be located at the rear step area of the apparatus. The sign will warn personnel that standing on the step while vehicle is in motion; is prohibited.*

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

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

*The front to rear weight distribution of the fully loaded vehicle will be within the limits set by the chassis manufacturer. The front axle loads will be less than the maximum axle loads specified by the chassis manufacturer, under full load and all other loading conditions.*

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

*All manufacturers' operations and maintenance documents supplied with components and*

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*equipment installed on, or supplied with the completed vehicle will be provided with the completed unit.*

*The unit will be protected by permanent Anti-Freeze for operation between -30 degrees F to +235 degrees F.*

*All fluid levels and applicable pressures will be brought to proper levels and noted prior to final delivery.*

*The GAWR and GVWR of the chassis will be adequate to carry the fully equipped apparatus including water and other tanks filled, the specified hose load, unequipped personnel weight, ground ladders, and a miscellaneous equipment allowance per National Fire Protection Agency (NFPA 1901, current edition) criteria as well as additional equipment and personnel specified by the purchaser. Personnel are calculated at 250 lbs. per person.*

*The apparatus will be designed and constructed to follow the requirements of the following recognized standards unless otherwise specified by the customer:*

*NFPA 1901 Current edition (Loose equipment NOT REQUESTED is NOT INCLUDED)  
Federal Motor Vehicle Safety Standards (FMVSS)  
Department of Transportation (DOT)-Federal & State  
Interstate Commerce Commission (ICC)  
Society of Automotive Engineers (SAE)  
Underwriters Laboratories Incorporated (ULI)*

*The apparatus when fully loaded will be capable of the following performance on dry, level paved roads in good condition. Item (d) not included requiring an incline.*

*A continuous minimum ten (10) mile road test shall be conducted with the apparatus fully loaded.*

*The apparatus shall be inspected for any loss of power, overheating, noise from the transmission or drive lines, any vibrations and noise.*

*(a) From a standing start the vehicle will attain a true speed of 35 mph within 25 seconds.*

*(b) From a steady pace of 15 mph, the vehicle will accelerate to a true speed of 35 mph within 15 seconds. This will be accomplished without moving gear selector.*

*(c) The vehicle will attain a minimum top speed of 50 mph.*

*(d) The apparatus will be able to maintain a speed of at least 20 mph on any grade up to and including 6 percent.*

### **DELIVERY**

*To insure proper break-in of all components while still under warranty, the apparatus **shall be***

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**delivered under its own power.** *The unit will remain insured by the apparatus manufacturer until the department accepts the unit.*

### **SERVICE**

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

### **WARRANTY**

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

### **THE ZAHNEN COMPANIES STANDARD RESPONSIBILITIES**

*The Zahnren Companies operate as Zahnren Truck Service and Equipment and EVS of Michigan. They are the authorized sales and service representatives for Spartan ERV in the State of Michigan. They have represented Spartan ER since 1993.*

*The Zahnren Companies are located at and effectively provide coverage to the entire State of Michigan.*

**P.O. Box 335 (Mail)  
1650 Callaghan  
Greenville, MI 48838**

*EVS of Michigan provides 24/7/365 service in house and mobile services if required, with two (2) mobile service units. Average response time is 2 hours from receiving notification.*

### **CONTACT INFORMATION:**

*Michael Zahnren – 24/7/365*

**1-877-936-4539**

### **HOURLY RATES**

*In House: \$95.00 per hour  
You're Location: \$125.00 per hour  
Travel Charge: \$125.00 per hour*



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### **WARRANTY REPAIRS**

*The customer is responsible for the travel charge or getting the unit to our service facility for warranty repairs (If Drivable) starting the 31st day after the unit is put into service.*

*A copy of our Michigan Repair Facility License has been provided in our bid package.*

*A copy of our commercial liability insurance, garage keeper's liability insurance, automobile liability insurance policy binder and workman's compensation insurance policy binder has been provided in the bid package.*

**Service and Warranty repairs can also be provided by Spartan Motors, in Charlotte MI.**

### **BID/PROPOSAL DRAWING**

*For purposes of evaluation, Spartan Emergency Response shall provide a drawing illustrating, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus.*

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

*Other specified equipment shall be required to be included with the bidder's proposal package.*

### **PRE-CONSTRUCTION DRAWINGS**

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

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

### **SINGLE SOURCE MANUFACTURER**

*Spartan Emergency Response is defined as a single source apparatus manufacturer.*

*Spartan Emergency Response designs and manufactures our products utilizing an approach that includes complete product integration, including the apparatus Chassis, Chassis Cab, Pump Module and Body Module being constructed, assembled, and tested on company premises.*

*Warranties qualified to the Chassis, Pump Module and Body Module design construction (excluding vendor component warranties such as engine, axles, transmission, and pumps, etc.) will be from Spartan Emergency Response.*



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### **TAG-ON ORDERS-COOPERATIVE PURCHASING**

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

*(a) Changes - Spartan Emergency Response's intention is to make available to others, tag-on orders utilizing the same specification as the Apparatus and Equipment that is the subject of this Contract in order to provide favorable pricing and lead-times to other buyers due to having such specification fully engineered. Spartan Emergency Response recognizes however that each additional buyer may have unique requirements that must be accommodated; and in this regard, limited changes will be permitted. Such changes will be captured in the pre-construction meeting and the price of any tag-on unit adjusted accordingly.*

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

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

*(d) Acceptance – Spartan Emergency Response reserves the right to accept or reject any tag-on orders under this Contract.*

### **FINITE ELEMENT ANALYSIS AND TESTING**

*Finite Element Analysis has been utilized in evaluating and engineering the critical areas of the Spartan Emergency apparatus body and pump module.*

*Prototype bodies were subjected to rigorous testing over varied terrains simulating different environmental conditions.*

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

*There has been a minimum of three (3) different load cases (per DOT, FHWA, and TTMA recommended practice) applied and analyzed to properly display the different areas and levels of stresses that will be present under the various operating conditions of the apparatus. This is in addition to the static stress analysis. The analysis has included the weight of the structure plus an estimate of all the components that exist on a fully loaded apparatus (i.e. tank, water, hose load, equipment in compartments, etc.).*

*Analysis has also been conducted on the mounting system for the apparatus body and pump module.*



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## **SUPPLIED INFORMATION & EXTRAS**

*Spartan Emergency Response (ER) will supply two (2) copies of apparatus manuals with all manufactured apparatus.*

*One (1) to be a complete hard copy*

*One (1) to be a complete copy on a thumb drive*

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

*Included in the delivery of the unit, Spartan ER will also include spare hardware and extra fasteners, paint for touch-up, information regarding washing and care procedures, as well as other recommendations for care and upkeep of the general apparatus.*

*Spartan ER will also supply a manufacturer's record of apparatus construction details, including the following information:*

- *Owner name and address*
- *Spartan ER, model and serial number*
- *Chassis make, model, and serial number*
- *GAWR of front and rear axles*
- *Front tire size and total rated capacity in pounds*
- *Rear tire size and total rated capacity in pounds*
- *Chassis weight distribution in pounds with water (if applicable) and Spartan ER mounted equipment (front and rear)*
- *Engine make, model, serial number, rated horsepower, related speed and no load governed speed*
- *Type of fuel and fuel tank capacity*
- *Electrical system voltage and alternator output in amps*
- *Battery make and model, capacity in CCA*
- *Paint numbers*
- *Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full (if applicable) but without personnel, equipment, and hose)*
- *Written load analysis and results of the electrical system performance tests*
- *Transmission make, model, and type*
- *Pump to drive through the transmission (yes or no)*
- *Engine to pump gear ratio and transmission gear ratio used*
- *Pump make and model, rated capacity in gallons per minute, serial number, and number of stages*



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- *Pump manufacturer's certification of suction capability*
- *Pump manufacturer's certification of hydrostatic test*
- *Pump manufacturer's certification of inspection and test for the fire pump*
- *Copy of the apparatus manufacturer's approval for stationary pumping applications*
- *Pump transmission make, model and serial number*
- *Priming device type*
- *Type of pump pressure control system*
- *The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed*
- *Certification of water tank capacity*

### **ELECTRICAL SCHEMATICS**

*The apparatus manufacturer shall supply one (1) set(s) as-built wiring schematics, to include all line voltage schematics, with each apparatus.*

### **WARNING AND INFORMATION LABELS**

*All warning and informational labels (non-vendor specific) shall be provided in appropriate locations to alert the operator of potential hazards and operating instructions.*

### **ONLINE CUSTOMER INTERACTION**

*Spartan Emergency Response shall provide the capability for online access through the Spartan Emergency Response website.*

*The fire department shall be able to view digital photos of their apparatus in the specified phases of construction.*

*The following phases will be captured and displayed:*

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

*Website address: [www.spartanerv.com](http://www.spartanerv.com)*

### **LIABILITY INSURANCE COVERAGE**

*Spartan Emergency Response certificate of liability insurance coverage is included in this proposal, in the required amount of \$30 million.*





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## **GENERAL WARRANTY**

*A warranty shall be offered for each new fire apparatus manufactured by Spartan Emergency Response for a period of two (2) years from the date of delivery, except for a commercial chassis (if specified) and certain other components as noted in the next paragraph.*

*The warranty on the chassis, engine, transmission, tires, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the chassis manufacturer thereof and adjustments for the same are to be made directly with the chassis manufacturer.*

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

*We neither assume nor authorize any person to assume for us any liability in connection with the sales of our apparatus unless made in writing by Spartan Emergency Response.*

## **STRUCTURAL BODY WARRANTY**

*A structural Stainless Steel body warranty will be provided by Spartan Emergency Response, for products of its manufacture to be free from defects in material and workmanship under normal use and service, for a period of twenty (20) years.*

## **PAINT WARRANTY**

*A Non Prorated Paint Warranty shall be provided by Spartan Emergency Response for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years.*

## **PUMP WARRANTY**

*Waterous Co shall provide a limited manufacturer's pump warranty with total protection package (TTP-5) to be free from defects in material and workmanship, under normal use and service, for a period of five (5) years from the date placed into service.*

## **PLUMBING WARRANTY**

*A Stainless Steel Plumbing/Piping warranty will be provided by Spartan Emergency Response for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years.*

## **TANK WARRANTY**

*A lifetime tank warranty shall be provided by the tank manufacturer, UPF.*



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## **MULTI-PLEXED ELECTRICAL WARRANTY**

*A four (4) year limited (V-MUX) multiplex system warranty, of Weldon Technologies, Inc.; shall be provided by Spartan Emergency Response for parts and labor, while under normal use and service; against mechanical, electrical and physical defects from the date of installation.*

*The warranty shall exclude; sensors, shunt interface modules, serial or USB kits, transceivers, cameras, GPS, and electrical display screens, which shall be limited to a period of one a (1) year repair parts and labor from the date of installation.*

## **PUMP CERTIFICATION AND TESTING**

*The apparatus upon completion will be tested and certified by Underwriters Laboratories, Inc. The certification tests will follow the guide lines outlined in NFPA 1901, current edition, "Standard for Fire Apparatus".*

*There shall be multiple tests performed by the contractor and Underwriter's Laboratories when the apparatus has been completed. The manufacturer shall provide the completed Test Certificate(s) to the purchaser at time of delivery. The inspection services of Underwriters Laboratories are available to all bidders on an equal basis; therefore, no third party certification of testing results shall be acceptable.*

*The fire pump shall be mounted on the apparatus and shall have a minimum rated capacity of 250 gpm (1000 L/min) at 150 psi (1000 kPa) net pump pressure.*

*Where the apparatus is designed for pump in-motion operations, the vehicle drive engine and drive train shall be arranged so that the pump can deliver at least 20 gpm (76 L/min) at a gage pressure of 80 psi (550 kPa), while the fire apparatus is moving.*

*If the pumping system provided is rated at 3000 gpm (12,000 L/min) or less, the pump shall be capable of delivering the following:*

- (1) One hundred percent of rated capacity at 150 psi (1000 kPa) net pump pressure*
- (2) Seventy percent of rated capacity at 200 psi (1400 kPa) net pump pressure*
- (3) Fifty percent of rated capacity at 250 psi (1700 kPa) net pump pressure*

*If the pumping system provided is rated at greater than 3000 gpm (12,000 L/min), the pump shall be capable of delivering the following:*

- (1) One hundred percent of rated capacity at 100 psi (700 kPa) net pump pressure*
- (2) Seventy percent of rated capacity at 150 psi (1000 kPa) net pump pressure*
- (3) Fifty percent of rated capacity at 200 psi (1400 kPa) net pump pressure*



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*If the fire pump has a rated capacity of 750 gpm (3000 L/min) or greater, the pump shall be tested after the pump and all its associated piping and equipment have been installed on the apparatus.*

*The tests shall include at least the pumping test, the pumping engine overload test, the pressure control system test, the priming device tests, and the vacuum test.*

*A test plate shall be provided at the pump operator's panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve. The plate shall be completely stamped with all information at the factory and attached to the vehicle prior to shipping.*

### **Pumping Test:**

*The test site shall be adjacent to a supply of clear water at least 4 feet (1.2 m) deep, with the water level not more than 10 feet (3 m) below the center of the pump intake, and close enough to allow the suction strainer to be submerged at least 2 feet (0.6 m) below the surface of the water when connected to the pump by 20 feet (6 m) of suction hose.*

*Tests shall be performed when conditions are as follows:*

- (1) Air temperature: 0 degrees Fahrenheit to 110 degrees Fahrenheit (-18 degrees Celsius to 43 degrees Celsius)*
- (2) Water temperature: 35 degrees Fahrenheit to 90 degrees Fahrenheit (2 degrees Celsius to 32 degrees Celsius)*
- (3) Barometric pressure: 29 inches Hg (98.2 kPa), minimum (corrected to sea level)*

*Engine-driven accessories shall not be functionally disconnected or rendered inoperative during the tests.*

*The following devices shall be permitted to be turned off or not operating during the pump test:*

- (1) Aerial hydraulic pump*
- (2) Foam pump*
- (3) Hydraulically driven equipment (other than hydraulically driven line voltage generator)*
- (4) Winch*
- (5) Windshield wipers*
- (6) Four-way hazard flashers*
- (7) Compressed air foam system (CAFS) compressor*

*All structural enclosures, such as floorboards, gratings, grilles, and heat shields, not provided with a means for opening them in service shall be kept in place during the tests.*



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*All test gauges shall meet the requirements for Grade A gauges as defined in ASME B40.100, Pressure Gauges and Gauge Attachments, and shall be at least size 3 1/2 per ASME B40.100. The pump intake gauge shall have a range of 30 in. Hg (100 kPa) vacuum to zero for a vacuum gauge, or 30 in. Hg (100 kPa) vacuum to a gauge pressure of 150 psi (1000 kPa) for a compound gauge. The discharge pressure gauge shall have a gauge pressure range of 0 psi to 400 psi (0 kPa to 2800 kPa). All pilot gauges shall have a gauge pressure range of at least 0 psi to 160 psi (0 kPa to 1100 kPa). All gauges shall be calibrated in the month preceding the tests using a dead-weight gauge tester or a master gauge meeting the requirements for Grade 3A or 4A gauges, as defined in ASME B40.100, Pressure Gauges and Gauge Attachments, that has been calibrated within the preceding year.*

*The engine speed-measuring equipment shall consist of a nonadjustable tachometer supplied from the engine or transmission electronics, a revolution counter on a checking shaft outlet and a stop watch, or other engine speed-measuring means that is accurate to within  $\pm 50$  rpm of actual speed.*

*If the apparatus is equipped with a fire pump rated at 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 1/2 hour of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 1/2 hour of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.*

*If the apparatus is equipped with a fire pump rated at greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at 100 psi (700 kPa) net pump pressure, followed by 1/2 hour of continuous pumping at 70 percent of rated capacity at 150 psi (1000 kPa) net pump pressure and 1/2 hour of continuous pumping at 50 percent of rated capacity at 200 psi (1400 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.*

*If the apparatus is equipped with a fire pump rated at less than 750 gpm (3000 L/min), the pump shall be subjected to a 50-minute pumping test from draft consisting of 30 minutes of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 10 minutes of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 10 minutes of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 30-minute test at rated capacity, unless it becomes necessary to clean the suction strainer.*

### **Pumping Engine Overload Test:**

*If the pump has a rated capacity of 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the apparatus shall be subjected to an overload test consisting of pumping rated capacity at 165 psi (1100 kPa) net pump pressure for at least 10 minutes.*



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*This test shall be performed immediately following the pumping test of rated capacity at 150 psi (1000 kPa).*

*The capacity, discharge pressure, intake pressure, and engine speed shall be recorded at least three times during the overload test.*

### **Pressure Control System Test:**

*If the pump is rated at 3000 gpm (12,000 L/min) or less, the pressure control system on the pump shall be tested as follows:*

*(1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 150 psi (1000 kPa).*

*(2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 150 psi (1000 kPa)  $\pm$ 5 percent.*

*(3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.*

*(4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.*

*(5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.*

*(6) The discharge pressure gauge shall be reduced to 90 psi (620 kPa) by throttling the engine fuel supply, with no change to the discharge valve settings, hose, or nozzles.*

*(7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 90 psi (620 kPa)  $\pm$ 5 percent.*

*(8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.*

*(9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.*

*(10) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 250 psi (1700 kPa).*

*(11) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 250 psi (1700 kPa)  $\pm$ 5 percent.*

*(12) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.*

*(13) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.*



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*If the pump is rated at greater than 3000 gpm (12,000 L/min), the pressure control system on the pump shall be tested as follows:*

- (1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 100 psi (700 kPa).*
- (2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 100 psi (700 kPa) ±5 percent.*
- (3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.*
- (4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.*
- (5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.*
- (6) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 200 psi (1400 kPa).*
- (7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 200 psi (1400 kPa) ±5 percent.*
- (8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.*
- (9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.*

### **Priming System Tests:**

*With the apparatus set up for the pumping test, the primer shall be operated in accordance with the manufacturer's instructions until the pump has been primed and is discharging water. This test shall be permitted to be performed in connection with priming the pump for the pumping test.*

*The interval from the time the primer is started until the time the pump is discharging water shall be noted. The time required to prime the pump shall not exceed 30 seconds if the rated capacity is 1250 gpm (5000 L/min) or less. The time required to prime the pump shall not exceed 45 seconds if the rated capacity is 1500 gpm (6000 L/min) or more.*

*An additional 15 seconds shall be permitted in order to meet the requirements of 16.13.5.3 and 16.13.5.4 when the pump system includes an auxiliary 4 inches. (100 mm) or larger intake pipe having a volume of 1 foot<sup>3</sup> (0.30 m<sup>3</sup>) or more.*



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## **Vacuum Test:**

*The vacuum test shall consist of subjecting the interior of the pump, with all intake valves open, capped or plugged, and all discharge caps removed, to a vacuum of 22 inches/Hg (75 kPa) by means of the pump priming system.*

*At altitudes above 2000 feet (600 m), the vacuum attained shall be permitted to be less than 22 inches/Hg (75 kPa) by 1 inch/Hg (3.4 kPa) for each 1000 feet (305 m) of altitude above 2000 feet (610 m).*

*The vacuum shall not drop more than 10 inches/Hg (34 kPa) in 5 minutes.*

*The primer shall not be used after the 5 minute test period has begun and the engine shall not be operated at any speed greater than the governed speed during this test.*

## **Water Tank-to-Pump Flow Test:**

*A water tank-to-pump flow test shall be conducted as follows:*

- (1) The water tank shall be filled until it overflows.*
- (2) All intakes to the pump shall be closed.*
- (3) The tank fill line and bypass cooling line shall be closed.*
- (4) Hose lines and nozzles for discharging water at the rated tank-to-pump flow rate shall be connected to one or more discharge outlets.*
- (5) The tank-to-pump valve(s) and the discharge valves leading to the hose lines and nozzles shall be fully opened.*
- (6) The engine throttle shall be adjusted until the required flow rate  $-0/+5$  percent is established.*
- (7) The discharge pressure shall be recorded.*
- (8) The discharge valves shall be closed and the water tank refilled.*
- (9) The bypass line shall be permitted to be opened temporarily, if needed, to keep the water temperature in the pump within acceptable limits.*
- (10) The discharge valves shall be reopened fully and the time noted.*
- (11) If necessary, the engine throttle shall be adjusted to maintain the discharge pressure recorded as noted in 16.13.7.1(7).*



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*(12) When the discharge pressure drops by 10 psi (70 kPa) or more, the time shall be noted and the elapsed time from the opening of the discharge valves shall be calculated and recorded.*

### **Volume Discharge Calculation:**

*The volume discharged shall be calculated by multiplying the rate of discharge in gallons per minute (liters per minute) by the time in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 10 psi (70 kPa).*

*Other means shall be permitted to be used to determine the volume of water pumped from the tank such as a totalizing flowmeter, weighing the truck before and after, or refilling the tank using a totalizing flowmeter.*

*The rated tank-to-pump flow rate shall be maintained until 80 percent of the rated capacity of the tank has been discharge.*

### **Engine Speed Advancement Interlock Test**

*The engine speed advancement interlock system shall be tested to verify that engine speed cannot be increased at the pump operator's panel unless there is throttle-ready indication.*

*If the apparatus is equipped with a stationary pump driven through split-shaft PTO, the test shall verify that the engine speed control at pump operator's panel cannot be advanced when either of the following conditions exists:*

- (6) The chassis transmission is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.*
- (7) The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.*

*If the apparatus is equipped with a stationary pump driven through a transmission mounted PTO, front-of-engine crankshaft PTO, or engine flywheel PTO, the test shall verify that the engine speed control on the pump operator's panel cannot be advanced when either of the following conditions exists:*

- (1) The chassis transmission is in neutral, the parking brake is off, and the pump shift status in the driving compartment is disengaged.*
- (2) The chassis transmission is in any other gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" position.*

*If the apparatus is equipped with a pump driven by the chassis engine designed for both stationary pumping and pump-in-motion, the test shall verify that the engine speed control at pump operator's panel cannot be advanced when either of the following conditions exists:*





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- (1) *The chassis transmission is in neutral, the parking brake is on, and the pump shift status in the driving compartment is disengaged.*
- (2) *The chassis transmission is in any other gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the “Pump Engaged” or the “OK to Pump In-Motion” position.*

*If the apparatus is equipped with a stationary pump driven through transfer case PTO, the test shall verify that the engine speed control on the pump operator’s panel cannot be advanced when either of the following conditions exists:*

- (1) *The chassis transmission is in neutral, the transfer case is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.*
- (2) *The chassis transmission is in neutral, the transfer case is engaged, the parking brake is off, and the pump shift in the driving compartment is in the road position.*
- (3) *The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.*

### **LOW-VOLTAGE ELECTRICAL SYSTEM PERFORMANCE TESTING**

*The apparatus low-voltage electrical system will be tested and certified. Tests shall be performed when the air temperature is between 0 degrees Fahrenheit and 110 degrees Fahrenheit (-18 degrees Celsius and 43 degrees Celsius). The three tests defined in NFPA shall be performed in the order in which they appear. 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.*

#### **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.*

#### **Alternator Performance Test at Idle:**

*The minimum continuous electrical load shall be activated with the engine running at idle speed.*

*The engine temperature shall be stabilized at normal operating temperature.*

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*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.*

### **Alternator Performance Test at Full Load:**

*The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed.*

*The test duration shall be a minimum of 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 system required in NFPA 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system or 23.6 V dc for a 24 V nominal system, for more than 120 seconds, shall be considered a test failure.*

### **Low Voltage Alarm Test:**

*Following the above test, a Low Voltage Alarm Test will be performed in the manner prescribed.*

*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 has not yet sounded 140 seconds after the voltage drops to 11.70V for a 12 V nominal system or 23.4 V for a 24 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.*

### **MODEL**

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

### **MODEL YEAR**

*The chassis shall have a vehicle identification number that reflects a 2019 model year.*

### **COUNTRY OF SERVICE**

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



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

### **CAB AND CHASSIS LABELING LANGUAGE**

*The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in English.*

### **APPARATUS TYPE**

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

### **VEHICLE TYPE**

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

### **VEHICLE ANGLE OF APPROACH PACKAGE**

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

*NFPA1901 Angle of Approach definition:*

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



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## **AXLE CONFIGURATION**

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

## **GROSS AXLE WEIGHT RATINGS FRONT**

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

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

## **GROSS AXLE WEIGHT RATINGS REAR**

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

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

## **PUMP PROVISION**

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

## **WATER & FOAM TANK CAPACITY**

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

## **CAB STYLE**

*The cab shall be a custom, fully enclosed, MFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to eight (8) seating positions.*

*The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a*



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

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

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

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

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

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

*The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 51.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.*

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

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



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

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

### **OCCUPANT PROTECTION**

*The vehicle shall include the Advanced Protection System™ (APS) which shall secure belted occupants and increase the survivable space within the cab. The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.*

*The system components shall include:*

- *Driver steering wheel airbag*
- *Driver dual knee air bags (patent pending) with energy management mounting (patent pending) and officer knee airbag.*
- *Large driver, officer, and crew area side curtain airbags*
- *APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around the occupants, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries*
- *Heavy truck Restraints Control Module (RCM) - receives inputs from the outboard sensors, selectively deploys APS systems, and records sensory inputs immediately before and during a detected qualifying event*
- *Integrated outboard crash sensors mounted at the perimeter of the vehicle - detects a qualifying front or side impact event and monitors and communicates vehicle status and real time diagnostics of all critical subsystems to the RCM*
- *Fault-indicating Supplemental Restraint System (SRS) light on the driver's instrument panel*

*Frontal impact protection shall be provided by the outboard sensors and the RCM. In a qualifying front impact event the outboard sensors provide inputs to the RCM. The RCM activates the steering*



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*wheel airbag, driver side dual knee airbags (patent pending), officer side knee airbag, and advanced seat belts for each occupant in the cab.*

*Rollover, side impact, and ejection mitigation shall be provided by the outboard sensors and the RCM. In qualifying rollover or side impact events the outboard sensors provide inputs to the RCM. The RCM activates the side curtain airbags and advanced seat belts for each occupant in the cab. The RCM measures roll angle, lateral acceleration, and roll rate to determine if a rollover event or side impact event is imminent or occurring.*

*In the event of a qualifying offset or other non-frontal impact, the RCM shall determine and intelligently deploy the front impact protection system, the side impact protection system, or both front and side impact protection systems based on the inputs received from the outboard crash sensors.*

### **CAB FRONT FASCIA**

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

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

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

### **FRONT GRILLE**

*The front cab fascia shall include a classic box style, 304 stainless steel four (4) pieces front grille, specifically designed for the installation of a Roto-Rays warning light. The grill shall include mounting holes located on the top center section of the grille. The grille shall measure 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches.*

### **CAB UNDERCOAT**

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

### **CAB SIDE DRIP RAIL**

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



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## **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 followed by sealing the seams with SEM brand seam sealer.*

*The cab shall then be painted the specific color designated by the customer with 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 paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.*

## **CAB PAINT MANUFACTURER**

*The cab shall be painted with PPG Industries paint.*

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

*The primary/lower paint color shall be PPG FBCH 926234 red.*

## **CAB PAINT WARRANTY**

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

## **CAB PAINT INTERIOR**

*The visible interior cab structure surfaces shall feature a medium gray Spar-Liner spray on bedliner coating which shall mold to each surface of the cab interior. The Spar-Liner shall be environmentally friendly and chemically resistant.*





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## **CAB ENTRY DOORS**

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

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

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

## **CAB ENTRY DOOR TYPE**

*All cab entry doors shall be full length in design to fully enclose the lower cab steps. Entry doors shall include Pollak mechanical plunger style switches for electrical component activation.*

## **CAB INSULATION**

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

## **CAB TEST INFORMATION**

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

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

## **ELECTRICAL SYSTEM**

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



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## **MULTIPLEX DISPLAY**

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

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

## **LOAD MANAGEMENT SYSTEM**

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

## **DATA RECORDING SYSTEM**

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

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

*Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.*



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## **ACCESSORY POWER**

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

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

## **AUXILIARY ACCESSORY POWER**

*An auxiliary set of power and ground studs shall be provided and installed behind the electrical center cover with a 40 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 40 amp load switched with the master power switch.*

## **ADDITIONAL ACCESSORY POWER**

*An additional set of power and ground studs shall be provided and installed behind the rocker switch panel. The power and ground stud shall be circuit protected with a 15 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 15 amp ignition switched load.*

## **EXTRA ACCESSORY POWER**

*An auxiliary ten (10) position blade type fuse panel shall be installed behind the officer's seat. The fuse panel shall be protected by a 40 amp fuse located at the batteries. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.*

## **EXTERIOR ELECTRICAL TERMINAL COATING**

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

## **ENGINE**

*The chassis engine shall be a Cummins L9 engine. The L9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.*

*The L9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2017 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.*



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*The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent 15W40 CK-4 low ash engine oil which shall be utilized for proper engine lubrication.*

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

### **CAB ENGINE TUNNEL**

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

### **DIESEL PARTICULATE FILTER CONTROLS**

*There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit. Each switch shall include a guard.*

### **ENGINE PROGRAMMING HIGH IDLE SPEED**

*The engine high idle control shall maintain the engine idle at approximately 1000 RPM when engaged.*

### **ENGINE HIGH IDLE CONTROL**

*The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate 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 be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indicator on the Vista display and control screen for the high idle speed control.*

### **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

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

### **AUXILIARY ENGINE BRAKE**

*A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The*



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*engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.*

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

### **AUXILIARY ENGINE BRAKE CONTROL**

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

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

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

### **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

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

### **FLUID FILLS**

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

### **ENGINE DRAIN PLUG**

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

### **ENGINE WARRANTY**

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



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### **REMOTE THROTTLE CONTROL**

*A Fire Research Pump Boss 400 governor with dual pressure sensors shall be provided for the electronic engine. It shall include a remote mountable control head.*

*The Pump Boss 400 shall regulate the pump pressure and monitor all essential engine parameters.*

*LED readouts shall display RPM, PSI, pump discharge and intake pressure, engine oil pressure, engine temperature, transmission temperature, and battery voltage. An audible alarm shall also be part of the system.*

### **REMOTE THROTTLE HARNESS**

*An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a FRC Pump Boss pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set. The harness shall be designed for a side mount pump panel.*

*An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate "Pump Engaged" and "OK to Pump" indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.*

### **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 750 rpm.*

### **ENGINE FAN DRIVE**

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



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

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

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

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

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

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

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

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



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## **ENGINE COOLING SYSTEM PROTECTION**

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

## **ENGINE COOLANT**

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

## **ENGINE 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.*

## **ELECTRONIC COOLANT LEVEL INDICATOR**

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

## **ENGINE PUMP HEAT EXCHANGER**

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

## **COOLANT HOSES**

*The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.*

## **ENGINE COOLANT OVERFLOW BOTTLE**

*A remote engine coolant overflow bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overflow rather than allow the fluid to drain on the ground. The overflow bottle provided on the cooling system shall only be a catch bottle and shall not return excess coolant back into the surge tank.*





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### **ENGINE AIR INTAKE**

*The engine air intake system shall include an ember separator air intake filter which shall be located behind the right hand side headlamp. This filter ember separator shall be designed to protect the downstream air filter from embers, using a combination of unique flat and crimped metal screens packaged in a corrosion resistant heavy duty galvanized steel frame. This multilayered screen shall be design traps embers and allows them to burn out before passing through the pack.*

*The engine air intake system shall also include a stainless steel air cleaner mounted to the frame and located beneath the cab on the right side of the vehicle. The air cleaner shall utilize a replaceable filter element designed to prevent dust and debris from being ingested into the engine. The air cleaner housing and connections in the air intake system shall be designed to mitigate water intrusion into the system during severe weather conditions.*

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

### **AIR INTAKE PROTECTION**

*A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame components.*

### **ENGINE EXHAUST SYSTEM**

*The exhaust system shall include an end-in end-out horizontally mounted single module after treatment device, downpipe from the charge air cooled turbo. The single module shall include four temperature sensors, diesel particulate filter (DPF), urea dosing module (UL2), and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be mixed and injected into the system through the between the DPF and SCR.*

*The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.*

*The single module after treatment through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.*

*The exhaust system after treatment module shall be mounted below the frame in the outboard position.*



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## **DIESEL EXHAUST FLUID TANK**

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

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

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

## **ENGINE EXHAUST ACCESSORIES**

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

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

## **ENGINE EXHAUST WRAP**

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

## **TRANSMISSION**

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

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

## **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.*



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## **TRANSMISSION FEATURE PROGRAMMING**

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

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

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

## **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

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

## **TRANSMISSION SHIFT SELECTOR**

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

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

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

## **TRANSMISSION COOLING SYSTEM**

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



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### **TRANSMISSION DRAIN PLUG**

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

### **TRANSMISSION WARRANTY**

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

### **PTO LOCATION**

*The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.*

### **DRIVELINE**

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

### **PUMP SHIFT CONTROLS**

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

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

### **PUMP SHIFT CONTROL PLUMBING**

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



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### **FUEL FILTER/WATER SEPARATOR**

*The fuel system shall have a Fleetguard FS1098 fuel filter/ water separator as a primary filter. The fuel filter shall have a drain valve.*

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

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

### **FUEL LINES**

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

### **FUEL SHUTOFF VALVE**

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

### **ELECTRIC FUEL PRIMER**

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

### **FUEL TANK**

*The fuel tank shall have a capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length.*

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

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

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



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## **FUEL TANK MATERIAL AND FINISH**

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

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

## **FUEL TANK STRAP MATERIAL**

*The fuel tank straps shall be constructed of #304 stainless steel. The fuel tank straps shall be powder coated black and then painted to match the frame components if possible.*

## **FUEL TANK FILL PORT**

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

*A 1.25 inch diameter hole shall be provided in the left and right frame rails for vent hose routing provisions. The holes shall be located adjacent to the fuel tank and 5.13 inches up from the bottom of each rail.*

## **FUEL TANK SERVICEABILITY PROVISIONS**

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

## **FUEL TANK DRAIN PLUG**

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

## **FRONT AXLE**

*The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle.*

## **FRONT WHEEL BEARING LUBRICATION**

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



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### **FRONT SHOCK ABSORBERS**

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

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

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

### **FRONT SUSPENSION**

*The front suspension shall include a ten (10) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include 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 which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.*

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

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

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

### **POWER STEERING PUMP**

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



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## **FRONT AXLE CRAMP ANGLE**

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

## **POWER STEERING GEAR**

*The power steering gear shall be a TRW model TAS 65 with an assist cylinder.*

## **CHASSIS ALIGNMENT**

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

## **REAR AXLE**

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

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

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

## **REAR AXLE DIFFERENTIAL LUBRICATION**

*The rear axle differential shall be lubricated with synthetic oil.*

## **REAR WHEEL BEARING LUBRICATION**

*The rear axle wheel bearings shall be lubricated with synthetic oil.*

## **REAR AXLE DIFFERENTIAL CONTROL**

*A driver controlled differential lock shall be installed on the rear axle. This feature shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH. The differential*





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*lock shall be controlled by a virtual button on the Vista display and control screen. The Vista display shall also indicate when positive engagement of the differential control has occurred.*

### **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 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.*

*The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.*

### **FRONT TIRE**

*The front tires shall be Goodyear 385/65R-22.5 18PR "J" tubeless radial G296 MSA mixed service tread.*

*The front tire stamped load capacity shall be 18,740 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.*

*The Goodyear Intermittent Service Rating maximum load capacity shall be 20,050 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.*

*The Goodyear Intermittent Service Rating maximum speed capacity shall be 18,740 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.*

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

### **REAR TIRE**

*The rear tires shall be Goodyear 12R-22.5 16LR "H" tubeless radial G182 RSD regional service tread.*

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

*The Goodyear Intermittent Service Rating maximum load capacity shall match the stamped load rating.*



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*The Goodyear Intermittent Service Rating maximum speed capacity shall match the nominal speed rating.*

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

### **TIRE PRESSURE INDICATOR**

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

### **FRONT WHEEL**

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

### **REAR WHEEL**

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

### **BALANCE WHEELS AND TIRES**

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

### **WHEEL TRIM**

*The front wheels shall include stainless steel lug nut covers and stainless steel baby moons shipped loose with the chassis for installation by the apparatus builder. The baby moons shall have cutouts for oil seal viewing when applicable.*

*The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats shipped loose with the chassis for installation by the apparatus builder.*



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*The lug nut covers, baby moons, and high hats shall be RealWheels<sup>®</sup> brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.*

### **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. All air reservoirs provided on the chassis shall be labeled for identification.*

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

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

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

*A virtual 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 shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.*

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



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## **FRONT BRAKES**

*The front brakes shall be Meritor 16.50 inch x 6.00 inch S-cam drum type.*

## **REAR BRAKES**

*The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type. The brakes shall feature a cast iron shoe.*

## **PARK BRAKE**

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

## **PARK BRAKE CONTROL**

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

*The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver.*

## **FRONT BRAKE SLACK ADJUSTERS**

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

## **REAR BRAKE SLACK ADJUSTERS**

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

## **AIR DRYER**

*The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.*



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## **FRONT BRAKE CHAMBERS**

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

## **REAR BRAKE CHAMBERS**

*The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 36 brake chamber has a 36.00 square inch effective area.*

## **AIR COMPRESSOR**

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

## **AIR GOVERNOR**

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

## **MOISTURE EJECTORS**

*Manual cable actuated drain valves shall be installed on all reservoirs of the air supply system. The actuation pull cables shall be coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.*

## **AIR SUPPLY LINES**

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

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

## **AIR INLET CONNECTION**

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



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## **AIR INLET LOCATION**

*The air inlet shall be installed in the left hand side middle front step in the rearward position.*

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

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

## **AUXILIARY AIR CONNECTION**

*An auxiliary air line shall be plumbed off the auxiliary air tank and routed inside the cab terminating under the driver dash area. A temporary mounted brass single port tee shall be supplied for the OEM usage, such as pump shift operator valves. If used for a pump shift control it shall be provided and installed by the OEM.*

## **AIR TANK SPACERS**

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

## **REAR AIR TANK MOUNTING**

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

## **WHEELBASE**

*The chassis wheelbase shall be 184.50 inches.*

## **REAR OVERHANG**

*The chassis rear overhang shall be 52.00 inches.*

## **FRAME**

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



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*and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.*

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

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

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

### **FRAME WARRANTY**

*Summary of Warranty Terms:*

*THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.*

*The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.*

### **FRAME PAINT**

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

- *Main frame "C" channel or channels*

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

- *Steering gear bracket*
- *Front splayed rails and fish plates*
- *Bumper extensions*
- *Cross members*
- *Cross member gussets*
- *Fuel tank mounting brackets*



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- *Fuel tank straps (unless material/finish is specified in 3130 subcat)*
- *Air tanks (unless color coded tanks are specified in 3205 subcat)*
- *Air tank mounting brackets*
- *Exhaust mounting brackets*
- *Air cleaner skid plate*
- *Radiator skid plate*
- *Battery supports, battery trays and battery covers*

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

- *Suspension components*
- *Front and rear axles*

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

*The chassis under carriage components which are not galvanized shall be painted the primary/lower cab color. Paint shall be applied prior to airline and electrical wiring installation.*

### **REAR MUD FLAP**

*The unit shall be equipped with a temporary wooden fender and mud flap assembly for transport to the body manufacturer.*

### **FRONT BUMPER**

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

*The bumper shall be primed and painted as specified.*

### **FRONT BUMPER EXTENSION LENGTH**

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

### **FRONT BUMPER PAINT**

*The front bumper shall be painted the same as the lower cab color.*





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## **FRONT BUMPER TRIM**

*The bumper shall include a reflective tape chevron with red and yellow stripes.*

## **FRONT BUMPER SUCTION PROVISION**

*The bumper apron shall include a 5.00 inch stainless steel pipe intended for use as a suction intake for the pump. The suction pipe shall be routed from the right hand front bumper area to the area rear of the front axle near the back of the cab.*

*The front of the suction pipe shall be designed to extend vertically 2.00 inches above the top surface of the bumper in the right hand outboard position.*

*The forward end of the suction pipe shall be finished with a 5.00 inch National Pipe Thread (NPT). The rear of the suction shall include a Victaulic groove for connecting to the pump plumbing. The suction pipe shall also include a 0.50 inch NPT port intended as a primer assist connection.*

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

## **FRONT BUMPER APRON**

*The 24.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.*

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

## **FRONT BUMPER COMPARTMENT CENTER**

*The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape.*

## **MECHANICAL SIREN**

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



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## **MECHANICAL SIREN LOCATION**

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

## **AIR HORN**

*The chassis shall include two (2) Hadley brand E-Tone air horns which shall measure 24.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.*

## **AIR HORN LOCATION**

*The air horns shall be recess mounted in the front bumper face on the left side of the bumper in the inboard and outboard positions relative to the left hand frame rail.*

## **AIR HORN RESERVOIR**

*One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.*

## **ELECTRONIC SIREN SPEAKER**

*There shall be one (1) Cast Products Inc. model SA2401, 100 watt speaker provided. The speaker shall measure 7.50 inches tall X 7.50 inches wide X 4.83 inches deep. The speaker shall include a polished aluminum trim bezel.*

## **ELECTRONIC SIREN SPEAKER LOCATION**

*The electronic siren speaker shall be located on the front bumper face on the right side outboard of the frame rail in the inboard position.*

## **FRONT BUMPER TOW EYES**

*The bumper shall include two (2) painted plated tow eyes shall be installed above the front bumper. The eyes shall be fabricated from 0.75 inch thick #1020 ASTM-A36 hot rolled steel. The inside diameter of the tow eye shall be 3.00 inches and shall include inside/outside chamfered edges. The tow eyes shall be painted to match the lower cab color.*

## **CAB TILT SYSTEM**

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



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

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

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

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

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

### **CAB TILT AUXILIARY PUMP**

*A manual cab tilt pump module shall be attached to the cab tilt pump housing.*

### **CAB TILT LIMIT SWITCH**

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

### **CAB TILT CONTROL RECEPTACLE**

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

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

### **CAB TILT NOISE DAMPENER**

*In an effort to reduce the amount of noise created by the cab tilt lock down system, sound dampening spray-on materials shall be utilized to insulate contact points in the system to help prevent metallic sounds from occurring while traversing rough roads.*



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## **CAB TILT LOCK DOWN INDICATOR**

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

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

## **CAB WINDSHIELD**

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

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

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

## **GLASS FRONT DOOR**

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

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

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

*Each front door window shall include patent pending heated glass technology to reduce fogging. The heated glass shall activate with activation of the heated mirrors.*

## **GLASS TINT FRONT DOOR**

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



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### **GLASS REAR DOOR RH**

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

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

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

### **GLASS REAR DOOR LH**

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

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

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

### **GLASS SIDE MID RH**

*The cab shall include a window on the right side behind the front and ahead of the crew door 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.*

### **GLASS TINT SIDE MID RIGHT HAND**

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

### **GLASS SIDE MID LH**

*The cab shall include a window on the left 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.*



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### **GLASS TINT SIDE MID LEFT HAND**

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

### **GLASS REAR WALL OUTER UPPER**

*The rear wall of the cab on the left and right sides shall include a window which shall measure 8.00 inches in width X 26.00 inches in height. These windows shall be fixed within this space and shall be rectangular in shape. The windows shall be mounted using black self locking window rubber.*

### **GLASS TINT REAR WALL OUTER UPPER**

*The windows located in the rear wall of the cab on the left and right outer upper corners shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.*

### **CLIMATE CONTROL**

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

*The air delivery plenums provide targeted airflow directly to the vehicle occupants. Six (6) adjustable louvers will provide comfort for the front seat occupants and ten (10) adjustable louvers will provide comfort for the rear crew occupants.*

*The system shall be capable of producing up to 12 FPM of air velocity at all occupant seating positions. Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122° F (+/- 3° F) to 80° F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.*

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

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



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

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

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

***\*\*Spartan Motors Inc. recommends that the overall climate system performance be based off third-party testing in accordance to Society of Automotive Engineering standards as a complete system.***

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

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

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

### **CLIMATE CONTROL DRAIN**

*The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.*

### **CLIMATE CONTROL ACTIVATION**

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

### **HVAC OVERHEAD COVER PAINT**

*The overhead HVAC cover shall be painted with a multi-tone silver gray texture finish.*



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### **A/C CONDENSER LOCATION**

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

### **A/C COMPRESSOR**

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

***\*\*Spartan Motors Inc. recommends that the overall climate system performance be based off third-party testing in accordance to Society of Automotive Engineering standards as a complete system.***

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

*Freon Compressor displacement: 19.1 cubic inches per revolution.*

### **CAB CIRCULATION FANS FRONT**

*The cab shall include two (2) all metal 6.00 inch air circulation fans installed in the outer front cab corners. Each fan shall be controlled by an individual toggle switch on each fan. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.*

### **UNDER CAB INSULATION**

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

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

*The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.*

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





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### **INTERIOR TRIM FLOOR**

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

### **INTERIOR TRIM**

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

### **REAR WALL INTERIOR TRIM**

*The rear wall of the cab shall be trimmed with aluminum sheet metal coated with a customer specified interior paint or protective coating.*

### **HEADER TRIM**

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

### **TRIM CENTER DASH**

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

### **TRIM LH DASH**

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

### **TRIM RH DASH**

*The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick 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 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.*



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### **ENGINE TUNNEL TRIM**

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

### **ENGINE TUNNEL ACCESSORIES**

*The engine tunnel shall feature a fabricated aluminum console which shall include a large storage bin with dividers and a map compartment. There shall be two (2) cup holders included in the console.*

### **POWER POINT DASH MOUNT**

*The cab shall include two (2) dual universal serial bus (USB) charging receptacles in the cab dash switch panel to provide a power source for USB chargeable electrical equipment. Each dual USB receptacle shall include two ports and shall be capable of up to a 5 Volt 2.1 amp output. Port 1 is optimized for fast charging at 1 amp. Port 2 is optimized for fast charging up to 2.1 amps, when used individually. The receptacles shall be wired battery direct.*

### **STEP TRIM**

*Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5052 H32 aluminum Grip Strut® grating with angled outer corners. The grating shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed in 0.08 inch thick 3003-H22 embossed aluminum tread plate.*

### **STEP TRIM KICKPLATE**

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

### **UNDER CAB ACCESS DOOR**

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

### **INTERIOR DOOR TRIM**

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



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## **DOOR TRIM CUSTOMER NAMEPLATE**

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

## **CAB DOOR TRIM REFLECTIVE**

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

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

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

## **INTERIOR GRAB HANDLE FRONT DOOR**

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

## **INTERIOR GRAB HANDLE REAR DOOR**

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

## **INTERIOR SOFT TRIM COLOR**

*The cab interior soft trim surfaces shall be gray in color.*

## **INTERIOR TRIM SUNVISOR**

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

## **INTERIOR FLOOR MAT COLOR**

*The cab interior floor mat shall be gray in color.*



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## **CAB PAINT INTERIOR**

*The inner door panel surfaces shall feature a medium gray Spar-Liner spray on bedliner coating.*

## **HEADER TRIM INTERIOR PAINT**

*The metal surfaces in the header area shall feature a medium gray Spar-Liner spray on bedliner coating.*

## **TRIM CENTER DASH INTERIOR PAINT**

*The entire center dash and any accessory pods attached to the dash shall feature a medium gray Spar-Liner spray on bedliner coating.*

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

*The left hand dash shall feature a medium gray Spar-Liner spray on bedliner coating.*

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

*The right hand dash shall feature a medium gray Spar-Liner spray on bedliner coating.*

## **ENGINE TUNNEL ACCESSORIES PAINT**

*The engine tunnel accessories shall feature a medium gray Spar-Liner spray on bedliner coating.*

## **REAR WALL INTERIOR PAINT**

*The rear wall of the cab shall be trimmed with aluminum sheet metal which shall feature a medium gray Spar-Liner spray on bedliner coating.*

## **DASH PANEL GROUP**

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

## **SWITCHES CENTER PANEL**

*The center dash panel shall include no rocker switches or legends.*

## **SWITCHES LEFT PANEL**

*The left dash panel shall include one (1) windshield wiper/washer control switch located in the left hand side of the panel. The switch shall have backlighting provided.*



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## **SWITCHES RIGHT PANEL**

*The right dash panel shall include one (1) rocker switch.*

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

## **SEAT BELT WARNING**

*A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s), an indicator light in the instrument panel, and an audible alarm.*

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

## **SEAT MATERIAL**

*The Bostrom Firefighter seats shall include a covering of extra high strength, wear resistant fabric made of durable Durawear Plus™ 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. Durawear Plus™ meets or exceeds specification of the common trade name Imperial 1800. The material meets FMVSS 302 flammability requirements.*

## **SEAT COLOR**

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

## **SEAT BACK LOGO**

*The seat back shall include the "Spartan" logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.*

## **SEAT DRIVER**

*The driver's seat shall be an H.O. Bostrom 500 Series Firefighter Sierra model seat. The seat shall feature eight-way electric positioning. The eight positions shall include up and down, fore and aft with 8.00 inches of travel, back angle adjustment and seat rake adjustment. The seat shall feature integral springs to isolate shock.*



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*The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.*

*The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.*

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

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

### **SEAT BACK DRIVER**

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

### **SEAT MOUNTING DRIVER**

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

### **OCCUPANT PROTECTION DRIVER**

*The driver's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.*

*The driver's seating area APS shall include:*

- *Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the driver, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.*
- *Large side curtain airbag - protects the driver's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the driver in a qualifying event by covering the window and the upper portion of the door.*



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- *Dual knee airbags (patent pending) with energy management mounting (patent pending) - protects the driver's lower body from dangerous surface contact injuries, acceleration injuries, and from intrusion as well as locks the lower body in place so the upper body shall be shall be slowed by the load limiting seat belt.*

*Steering wheel airbag - protects the driver's head, neck, and upper torso from contact injuries, acceleration injuries, and contact points with intrusive surfaces as a result of a collision.*

### **SEAT OFFICER**

*The officer's seat shall be an H.O. Bostrom 500 Series Sierra model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.*

*The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.*

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

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

### **SEAT BACK OFFICER**

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

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

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



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

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

### **SEAT MOUNTING OFFICER**

*The officer's seat shall offer a special mounting position which is 2.00 inches rearward of the standard location offering increased leg room for the occupant.*

### **OCCUPANT PROTECTION OFFICER**

*The officer's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.*

*The officer's seating area APS shall include:*

- *Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the officer, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.*
- *Large side curtain airbag - protects the officer's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the officer in a qualifying event by covering the window and the upper portion of the door.*

*Knee airbags - protects the officer's lower body from dangerous surface contact injuries, acceleration injuries, and from contact points with intrusive surfaces as a result of a collision as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.*

### **POWER SEAT WIRING**

*The power seat or seats installed in the cab shall be wired directly to battery power.*

### **SEAT BELT ORIENTATION CREW**

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





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### **SEAT FORWARD FACING CENTER LOCATION**

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

### **SEAT CREW FORWARD FACING CENTER**

*The forward facing center seat shall be a H.O. Bostrom 500 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position. The seat and cushion shall be hinged and compact in design for additional room. The seat shall include a "Fold and Hold" feature so that the cushion shall remain in the seated position and simply touched to flip up.*

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

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

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

### **SEAT BACK FORWARD FACING CENTER**

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

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



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

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

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

### **OCCUPANT PROTECTION FFC**

*The forward facing center seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.*

*Each forward facing center seating position APS shall include:*

- *APS advanced seatbelt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.*

*Side curtain airbag - provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to crew seating with an airbag custom designed for each cab configuration.*

### **SEAT FRAME FORWARD FACING**

*The forward facing center seating positions shall include an enclosed seat frame located and installed on the rear wall. The seat frame shall measure 48.00 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted the same color as the remaining interior.*

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

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



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### **SEAT MOUNTING FORWARD FACING CENTER**

*The forward facing center seats shall offer a special mounting. The seats shall be installed as far apart as possible offering the most available room for each occupant.*

### **CAB FRONT UNDERSEAT STORAGE ACCESS**

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

### **SEAT COMPARTMENT DOOR FINISH**

*All underseat storage compartment access doors shall feature a medium gray Spar-Liner spray on bedliner coating.*

### **WINDSHIELD WIPER SYSTEM**

*The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers; each shall be affixed to a radial arm. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.*

### **ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

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

### **CAB DOOR HARDWARE**

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

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

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

*The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.*



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## **DOOR LOCKS**

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

## **GRAB HANDLES**

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

## **AUXILIARY GRAB HANDLE**

*There shall be two (2) 7.00 inch molded stainless steel grab handle with a bright finish attached to the front fascia of the cab one (1) each side of center below the windshield. The handle installation shall include a stainless steel scuff plate behind each grab handle to protect the painted surface and a steel reinforcement behind the front cab fascia.*

## **REARVIEW MIRRORS**

*Retrac Aerodynamic West Coast style single vision mirror heads model 613285 shall be provided and installed on each of the front cab doors.*

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

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

*The mirror backs shall be constructed of vacuum formed chrome plated ABS plastic housings that are corrosion resistant and shall include an amber marker light. The mirrors shall be manufactured with the finest quality non-glare glass.*

## **REARVIEW MIRROR HEAT SWITCH**

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



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## **EXTERIOR TRIM REAR CORNER**

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

## **CAB FENDER**

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

## **MUD FLAPS FRONT**

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

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

*The cab shall include three (3) Spartan emblems and two (2) Advanced Protection System shield emblems. The emblems shall be included in the cab shipped loose components for installation by the body builder.*

## **IGNITION**

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

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

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

## **BATTERY**

*The single start electrical system shall include six (6) Harris BCI 31 925 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.*

## **BATTERY TRAY**

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



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

### **BATTERY BOX COVER**

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

### **BATTERY CABLE**

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

### **BATTERY JUMPER STUD**

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

### **ALTERNATOR**

*The charging system shall include a 360 amp Niehoff 12 volt alternator. The alternator shall include an ignition excited external regulator.*

### **STARTER MOTOR**

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

### **BATTERY CONDITIONER**

*A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.*

### **BATTERY CONDITIONER DISPLAY**

*A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in front of the left side door just below the windshield.*

### **ELECTRICAL INLET**

*A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.*



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

## **ELECTRICAL INLET LOCATION**

*An electrical inlet shall be installed in the left hand side lower front step in the mid position.*

## **ELECTRICAL INLET CONNECTION**

*The electrical inlet shall be connected to the battery conditioner.*

## **ELECTRICAL INLET COLOR**

*The electrical inlet connection shall include a yellow cover.*

## **HEADLIGHTS**

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

## **FRONT TURN SIGNALS**

*The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed in a chrome bezel outboard of the front warning and above the headlamps.*

## **HEADLIGHT LOCATION**

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

## **SIDE TURN/MARKER LIGHTS**

*The sides of the cab shall include two (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) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.*

## **HEADLIGHT AND MARKER LIGHT ACTIVATION**

*The headlights and marker lights shall be controlled via a virtual button on the Vista display and control screen. The headlights and marker lights shall also be activated when the engine is*



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running. There shall be a virtual dimmer control on the Vista display and control screen to adjust the brightness of the dash lights.

### **GROUND LIGHTS**

Each door shall include an NFPA compliant LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the door on the respective cab side, when the parking brake is set and through a virtual button on the Vista display and control screen, and when the transmission is placed in reverse.

### **LOWER CAB STEP LIGHTS**

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

### **INTERMEDIATE STEP LIGHTS**

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

### **UNDER BUMPER LIGHTS**

There shall be two (2) 4.00 inch round LED NFPA compliant ground lights mounted under the bumper. The lights shall include a polycarbonate lens, a housing which is vibration welded, and LEDs which shall be shock mounted for extended life. The under bumper ground lighting shall activate with the ground lights.

### **ENGINE COMPARTMENT LIGHT**

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

### **LIGHTBAR PROVISION**

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by Spartan Chassis. The light bar installation shall include mounting and wiring to a control switch on the cab dash.





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## **CAB FRONT LIGHTBAR**

*The lightbar provisions shall be for one (1) Whelen brand Freedom IV LED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72.00 inches in length. The lightbar shall feature twelve (12) red LED light modules and two (2) clear LED light modules. The entire lightbar shall feature a clear lens. The clear lights shall be disabled with park brake engaged. The cable shall exit the lightbar on the right side of the cab.*

## **LIGHTBAR SWITCH**

*The light bar shall be controlled through the master warning switch.*

## **FRONT SCENE LIGHTS**

*The front of the cab shall include one (1) HiViz model FireTech FT-B-46 LED scene light installed on the brow of the cab.*

*The housing shall be powder coated white.*

## **FRONT SCENE LIGHTS ACTIVATION**

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

## **FRONT SCENE LIGHT LOCATION**

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

## **SIDE SCENE LIGHTS**

*The side of the cab shall include two (2) Firetech model FT-GESM Guardian Elite LED scene lights, one (1) each side which shall be surface mounted with a chrome bezel.*

## **SIDE SCENE LIGHT LOCATION**

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

## **SIDE SCENE ACTIVATION**

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



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### **INTERIOR OVERHEAD LIGHTS**

*The cab shall include a two-section, red and clear Weldon LED dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening any door and via the multiplex display and both the red and clear portion can be activated by individual push lenses on each lamp.*

*An additional two-section, red and clear Weldon LED dome lamp shall be provided over the engine tunnel which can be activated by individual switches on the lamp.*

### **DO NOT MOVE APPARATUS LIGHT**

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

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

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

### **MASTER WARNING SWITCH**

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

### **HEADLIGHT FLASHER**

*A modulating high beam headlight flashing system shall be installed into the high beam headlight circuit which shall allow the high beams to flash concurrently. The headlights shall be set to flash one hundred and sixty (160) flashes per minute.*

*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.*

### **HEADLIGHT FLASHER SWITCH**

*The flashing headlights shall be activated through a virtual button on the Vista display and control screen.*



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## **INBOARD FRONT WARNING LIGHTS**

*The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel. The lights shall be programmed to emit the "Comet Flash 75" Diagonal flash pattern*

## **INBOARD FRONT WARNING LIGHTS COLOR**

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

## **BUMPER FACE WARNING LIGHT**

*The front bumper face shall include two (2) Whelen series 600 4.00 inch tall X 6.00 inch wide Super LED® warning lights located between the frame rails in the left and right side outboard positions. The warning lights shall feature fourteen (14) flash patterns plus a steady burn for solid colors and twenty (20) flash patterns plus a steady burn for split colors. The lights shall be surface mounted within a chrome bezel.*

## **BUMPER FACE WARNING LIGHT COLOR**

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

## **FRONT WARNING SWITCH**

*The front warning lights shall be controlled through the master warning switch.*

## **INTERSECTION WARNING LIGHTS**

*The chassis cab shall include two (2) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The light shall be programmed to emit the "Comet Flash 75" Diagonal flash pattern*

## **INTERSECTION WARNING LIGHTS COLOR**

*The intersection lights shall be red with a clear lens.*

## **INTERSECTION WARNING LIGHTS LOCATION**

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



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## **SIDE WARNING LIGHTS**

*The cab sides shall include two (2) Whelen 600 series Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel. The lights shall be programmed to emit the "Comet Flash 75" Diagonal flash pattern*

## **SIDE WARNING LIGHTS COLOR**

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

## **SIDE WARNING LIGHTS LOCATION**

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

## **SIDE AND INTERSECTION WARNING SWITCH**

*The side warning lights shall be controlled through the master warning switch.*

## **REAR WARNING LIGHTS**

*The cab shall be prewired and contain a cutout for a Whelen TACTL5 control head within the center dash switch panels for body builder installation of the controller.*

*The Prewire shall provide power and ground for the controller behind the center dash.*

## **ROTO-RAYS WARNING LIGHT**

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

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

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

*The Roto-Rays® front warning light(s) shall be controlled through the master warning switch. When the parking brake is engaged the light shall stop rotating.*

## **INTERIOR DOOR OPEN WARNING LIGHTS**

*The interior of each door shall include one (1) 15.87 inch long X 0.73 inch tall amber Weldon LED warning light. The light shall be located on the upper portion of the door frame to be visible when a person is standing in front of the door while entering or exiting the cab. Each light shall activate*



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*with a scrolling directional flash pattern which moves from inside to outside when the door is in the open position. This shall serve as a warning to oncoming traffic.*

### **SIREN CONTROL HEAD**

*A Federal PA4000 electronic siren control head shall be provided and flush mounted in the in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, wail, radio broadcast, public address, yelp, priority tones and a noise cancelling microphone.*

### **HORN BUTTON SELECTOR SWITCH**

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

### **AIR HORN ACTIVATION**

*The air horn activation shall be accomplished through the steering wheel button for the driver and by a single right hand side lanyard cable accessible to the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.*

### **MECHANICAL SIREN ACTIVATION**

*The mechanical siren shall be actuated by a Linemaster model SP491-S81 foot switch mounted in the front section of the cab for use by the driver and a black push button in the switch panel on the dash. A red momentary siren brake rocker switch shall be provided in the switch panel on the dash.*

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

### **BACK-UP ALARM**

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

### **INSTRUMENTATION**

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

*A twenty eight (28) icon lightbar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 999,999.9 miles. The trip odometer shall display*



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9,999.9 miles. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

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

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

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature shall be included. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds PSI with a red line zone indicating critical levels of oil pressure. A red indicator light in the gauge and audible alarm shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (°F) with a red line zone indicating critical coolant temperatures. A red indicator light in the gauge and audible alarm shall indicate high coolant temperature. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red indicator light in the gauge and an audible alarm shall indicate high or low system voltage. The low voltage alarm shall indicate when the system voltage has dropped below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The scale on the transmission temperature gauge shall read from 100 to 300 degrees °F with a red line zone indicating critical temperatures. A red indicator light in the gauge and an audible alarm shall indicate a high transmission temperature.

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

### **RED INDICATORS**

Stop Engine - indicates critical engine fault

Air Filter Restricted - indicates excessive engine air intake restriction

Park Brake - indicates parking brake is set

Seat Belt - indicates a seat is occupied and corresponding seat belt remains unfastened

Low Coolant - indicates critically low engine coolant

Cab Tilt Lock - indicates the cab tilt system locks are not engaged.



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## **AMBER INDICATORS**

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

## **GREEN INDICATORS**

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

## **BLUE INDICATORS**

- High Beam indicator*

## **AUDIBLE ALARMS**

- Air Filter Restriction*
- Cab Tilt Lock*
- Check Engine*
- Check Transmission*
- Open Door/Compartment*
- High Coolant Temperature*
- High or Low System Voltage*
- High Transmission Temperature*
- Low Air Pressure*
- Low Coolant Level*
- Low DEF Level*
- Low Engine Oil Pressure*
- Low Fuel*
- Seatbelt Indicator*
- Stop Engine*



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*Water in Fuel  
Extended Left/Right Turn Signal On  
ABS System Fault*

## **BACKLIGHTING COLOR**

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

## **CAMERA**

*An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) camera with a teardrop shaped chrome plated housing shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.*

*The camera shall be wired to a single Weldon Vista display. The camera shall activate when the transmission is placed in reverse and by a button on the Vista display.*

## **CAB EXTERIOR PROTECTION**

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

## **FIRE EXTINGUISHER**

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

## **ROAD SAFETY KIT**

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

## **DOOR KEYS**

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

## **DIAGNOSTIC SOFTWARE WELDON V-MUX**

*The cab and chassis shall include diagnostic software for the Weldon VMUX system shipped loose with the vehicle. The software kit shall include the following.*

- *One (1) carrying case*
- *One (1) USB Transceiver*
- *One (1) on one (1) cable for mini node*
- *One (1) on one (1) cable for Hercules node*
- *One (1) Deutsch wire removal tool, 14.00 to 16.00 gauge wire (blue)*





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- One (1) Deutsch wire removal tool, 18.00 to 20.00 gauge wire (red)
- One (1) cable, RS232 9 pin serial PC to transceiver
- One (1) cable, RS485 transceiver to VMUX
- One (1) cable which shall troubleshoot Hercules outputs
- One (1) cable which shall trouble shoot mini node outputs
- One (1) downloader manual
- One (1) diagnostics manual

The system shall support PDF and USB diagnostic kits for Windows 2000, XP, Vista, and Windows 7.

### **DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION**

Diagnostic software for the Spartan Advanced Protection System shall be available for free download from the Spartan Chassis website to Spartan authorized OEMs, dealers and service centers, as well as the vehicle owner.

The software has been validated to be compatible with the following RP1210 interface adapters:

- Dearborn Group DPA4 Plus
- Noregon Systems JPRO<sup>®</sup> DLA+
- Cummins INLINE5
- Cummins INLINE6
- NexIQ<sup>™</sup> USB-Link<sup>™</sup>

The software and adapter utilize the SAE J1939-13 heavy duty nine (9) pin connector which is located below the driver's side dash to the left of the steering column.

### **WARRANTY**

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.



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### **CHASSIS OPERATION MANUAL**

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

### **ENGINE AND TRANSMISSION OPERATION MANUALS**

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

*(1) Hard copy of the Engine Operation and Maintenance manual with CD*

*(1) Digital copy of the Transmission Operator's manual*

*(1) Digital copy of the Engine Owner's manual*

### **ENGINE SERVICE MANUALS**

*There shall be one (1) printed hard copy set of Cummins ISC/ISL engine service reference manuals which shall be provided with the chassis.*

### **TRANSMISSION SERVICE MANUALS**

*There shall be one (1) printed hard copy set of Allison 3000 transmission service manuals included with the chassis.*

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

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

### **AS BUILT AIR PLUMBING DIAGRAM**

*The cab and chassis shall include one (1) digital copy of the as built air plumbing system and option air plumbing diagrams.*

### **AS BUILT FUEL PLUMBING DIAGRAM**

*The cab and chassis shall include one (1) digital copy of the as built fuel system plumbing diagram.*

### **EXHAUST HEAT SHIELD**

*There shall be an exhaust heat shield added to the chassis provided exhaust. The shield shall run the full length of the exhaust system, terminate past the front compartment and shall incorporate a*



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*heavy duty spray on insulation under R1. With this shield the temperature of the front compartment shall not exceed the ambient temperature.*

### **EMS STORAGE COMPARTMENT**

*There shall be one (1) EMS compartment, fabricated out of .125 inch (3.18 mm) smooth aluminum installed behind the Driver's seat in the chassis cab.*

*The compartment dimensions shall be approximately 20.00 inches wide by 18.00 inches deep. The interior of the compartment shall feature a natural aluminum finish.*

*Vertically mounted Unistrut shall be installed inside the EMS storage compartment to accommodate the installation of shelving.*

*The height of the EMS compartment shall be approximately 30.00 inches tall, dependent on cab configuration.*

### **EMS COMPARTMENT NETTING**

*A cargo net, black in color, shall be provided and installed on the opening of the EMS compartment. The cargo net enclosure shall be secured along the lower edge. The net shall drop out of the way for easy cabinet access.*

*The cargo net covering the EMS compartment shall include side push clip style fasteners along the top of the cabinet for ease of entry.*

### **EMS COMPARTMENT LIGHTING**

*One (1) LED Tube light model #RX-15T16-5050 shall be installed in accordance with the compartment height to offer the best lighting in the EMS cabinet.*

### **EMS COMPARTMENT LIGHTING ACTIVATION**

*The light(s) in each compartment shall be on a separate circuit, turning on only when the park brake is set.*

### **EMS COMPARTMENT SHELF**

*There shall be one (1) shelf in the cab EMS compartment. The shelf shall be fabricated of .188 inch (4.76 mm) thick aluminum sheet material with the outside and inside edges flanged up to prevent equipment from sliding off. The shelf shall be as wide as possible to allow proper attachment to unistrut channels and shall be adjustable up and down.*

*The shelf shall feature a natural finish.*



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### **EMS STORAGE COMPARTMENT**

*There shall be one (1) EMS compartment, fabricated out of .125 inch (3.18 mm) smooth aluminum installed behind the Officer's seat in the chassis cab.*

*The compartment dimensions shall be approximately 20.00 inches wide by 18.00 inches deep. The interior of the compartment shall feature a natural aluminum finish.*

*Vertically mounted Unistrut shall be installed inside the EMS storage compartment to accommodate the installation of shelving.*

*The height of the EMS compartment shall be approximately 30.00 inches tall, dependent on cab configuration.*

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*The shelf shall feature a natural finish.*

### **EMS COMPARTMENT EXTERIOR FINISH**

*The exterior of each EMS compartment shall feature a painted medium gray speedliner finish.*



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## **HOSE RESTRAINTS**

*There shall be two (2) Velcro strap type hose hold down installed above the hose well. The hold down will be used to hold the hose in place during transit.*

## **CHASSIS REQUIRED LABELING**

*Signs that state "Occupants must be seated and belted when apparatus is in motion" shall be provided.*

*They shall be visible from each seating position.*

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

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

## **APPARATUS INFORMATION LABEL**

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

*The label shall indicate the following specified information.*

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

## **CAB TILT CONTROL**

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

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

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



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

*There shall be manual pull air tank drain cables provided with the apparatus. The air lines shall be extended to the outer edge of the apparatus to facilitate draining moisture from the chassis air tanks. A label shall be affixed indicating "Air Tank Drain".*

### **HEAT EXCHANGER**

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

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

### **HELMET RESTRAINTS**

*Four (4) Ziamatic UHH-1 Universal Helmet Holders shall be provided and shipped loose with the apparatus.*

### **MUD FLAPS**

*Heavy-duty rubber mud flaps shall be provided behind the rear wheels. The mud flaps shall be black rubber type and be bolted in place.*

### **PUMP COMPARTMENT**

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

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

*The pump compartment module shall be approximately 74.00 inches (1.88 m) in width measured laterally across the apparatus.*

### **VIBRA-TORQUE™ PUMP MODULE MOUNTING SYSTEM**

*The entire pump module assembly shall be mounted so that it "floats" above the chassis frame*



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*rails exclusively with Vibra-Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable pump module mounting system.*

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

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

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

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

### **PUMP COMPARTMENT HEATER**

*One (1) 30,000 BTU auxiliary heater shall be provided and installed inside the pump compartment. The heater shall be connected to the engine cooling system with gated valves located inside the pump compartment. Silicone type hoses shall be used. The gated valves shall be labeled.*

*Dual 12 volt electric fans shall be installed and controlled with single toggle switch and a LED indicator light on the operator's pump control panel.*

*The switch shall be of a weather resistant type and be clearly labeled for ease of identification.*

### **HEAT PAN**

*There shall be a heat pan enclosure provided and installed under the apparatus fire pump.*

*The heat pan assembly shall be fabricated of .188 inch aluminum. The top portion shall be bolted in place. The bottom trays shall be held in the place with mechanical style latch devices. The enclosure may include slide out tray(s) on either side of the apparatus for ease of service and maintenance.*

*The heat pan shall have one (1) 3.00 inch hole under the relief valve for drainage.*



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## **DRAIN HOLE**

*The heat pan shall have one (1) 2.00 inch hole centered on each side for drainage.*

## **PUMP COMPARTMENT WORK LIGHT**

*Two (2) LED 9.00 inch Tube lights model #RX-15T16-5050-21CM shall be installed in the pump compartment module to illuminate the piping and plumbing components.*

*The lights shall be horizontally installed in the upper portion of the pump house (above the upper side panels) one (1) each side.*

*A weather resistant toggle switch shall be provided at each light.*

## **LEFT SIDE OPERATORS PANEL & PUMP PANEL**

*The pump operator's panel shall be located on the left side of the apparatus pump compartment. The panel shall be split into an upper and lower section.*

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

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

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

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

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

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

## **PUMP PANEL LIGHTS**

*There shall be adequate illumination provided at the side pump panels with the installation of two*





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*(2) brushed stainless steel shielded light assemblies, one (1) on the left and one (1) on the right side pump compartment.*

*Each shield shall contain the maximum number of lights permitted in the space available for TecNiq E10 LED strip lights.*

### **PUMP PANEL LIGHT ACTIVATION**

*The pump panel lights and right side panel lights shall be activated by the ground light switch in the cab and the setting of the park brake.*

### **PUMP COMPARTMENT SERVICE ACCESS**

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

### **PUMP COMPARTMENT WIDTH**

*The width of the pump compartment (front to back) shall be 44.00 inches (1.12 m).*

### **RIGHT SIDE PUMP PANELS STYLE**

*There shall be two (2) pump panels on the right side of the pump compartment, one (1) upper and one (1) lower. Each panel shall be accessible by a quick-release mechanical type latch, closing against a door seal. Both panels shall be easily removed for access to the pump for service.*

### **RIGHT & LEFT SIDE BRUSHED STAINLESS STEEL PANELS & OVERLAYS**

*The panels for the pump compartment on the left and right side shall be made from 14 gauge "Brushed Stainless Steel" capable of withstanding the conditions and effects of extreme weather and temperature changes.*

*The tubular structure shall be overlaid on each side of the pump compartment underneath the access panels and shall be made of "Brushed Stainless Steel".*

### **RUNNING BOARDS**

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

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



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*surface where applicable.*

### **EMBOSSSED ALUMINUM DIAMOND PLATE OVERLAYS**

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

### **APPARATUS PLUMBING LABELING**

*The apparatus shall be descriptively tagged with color coded metal labels.*

*The labels shall be applied near the apparatus features that require a user function description. Wherever necessary, the labels shall be color coded to differentiate controls and their respective functions to simplify and clarify complex configurations.*

### **PRESSURE GOVERNOR**

*The Pressure Governing System provided with the chassis shall be installed on the pump operator's panel.*

### **PRESSURE RELIEF VALVE**

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

*For corrosion resistance the cast aluminum valve shall be a hardcoat anodized with a powder coat interior and exterior finish. The valve shall meet NFPA 1901, current edition, requirements for pump inlet relief valves. The unit shall be covered by a five year warranty. The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere via the unloader pipe and shall dump on the opposite side of the pump operator.*

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

*The relief valve shall have no stainless steel plumbing extension installed.*

### **MASTER GAUGES**

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



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*The gauges shall be model FA-LFP-410.*

### **GAUGE SCALE**

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

### **GAUGE FACE COLOR**

*Each gauge shall have black markings on a white face.*

### **TESTING PORTS**

*Test port connections for pressure and vacuum shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold side of the pump. They shall have 0.25 in. standard pipe thread connections and be manufactured of non-corrosive polished stainless steel or brass plugs.*

### **TANK LEVEL GAUGE**

*A Fire Research TankVision model WLA300-A00 tank indicator kit shall be installed at the pump operator's panel location. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.*

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

*The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the water tank near the bottom. No probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.*

### **AIR HORN BUTTON**

*There shall be an air horn activation red push button furnished and installed on the pump operator's gauge panel. The air horn button shall be of weather resistance type and labeled "AIR HORN".*

### **PUMP COMPARTMENT TOP OVERLAY**

*The top cap of the pump compartment shall be overlaid with materials of a non slip .188 inch (4.76*

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*mm) embossed aluminum diamond plate.*

### **DUNNAGE AREA**

*A single wall .188 inch (4.76 mm) aluminum diamond plate dunnage area shall be provided above the pump house compartment for equipment mounting and storage space.*

*The dunnage area shall be as wide as possible from side to side, and as deep as allowed with the available space.*

### **MIDSHIP PUMP**

*The pump shall have a capacity of 1500 gallons per minute, measured in U.S. Gallons.*

*The pump shall be a Waterous model CXSCC20, single stage midship pump.*

*The pump shall be painted "GRAY" in color.*

### **PUMP CASING:**

*Two-piece; vertically-split high-tensile close-grained gray iron.*

### **IMPELLER:**

*Bronze impeller specifically designed for the fire service, Double hub bed to eliminate axial thrust, and accurately balanced for vibration-free running.*

*The Impeller shall have flame-plated hubs for extreme wear resistance.*

### **WEAR RINGS:**

*Replaceable bronze wear rings to increase pump life and keep maintenance costs at a minimum.*

### **IMPELLER SHAFT:**

*Stainless steel, heat treated, precisely ground to size, and polished under shaft seal, supported by oil-lubricated ball bearings.*

### **BEARINGS:**

*All bearings are oil or grease lubricated, ball-type, located outside the pump casting to accurately align and support the impeller shaft assembly. Bearings are deep groove type designed to carry both radial and axial thrust.*

*Certification*

*The pump will perform and meet the following tests:*



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100% rated capacity @150 PSI  
100% rated capacity @ 165 PSI  
70% rated capacity @ 200 PSI  
50% rated capacity @ 250 PSI

### **MASTER DRAIN VALVE**

*A Trident Brand manifold type drain valve shall be installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled from the left side lower pump house sill. The control shall be a hand wheel knob marked "open" and "closed".*

*The drain shall be located such that it shall not interfere with pumping operations or function such as soft suction hoses, etc. nor shall it protrude past the outer edge of the apparatus, to prevent damage to the valve.*

*In some cases, it is necessary to locate the master drain in a secondary location to ensure proper function, such as draining, or if no lower or vertical sill exists. In this event, the drain shall be located below the bottom outside edge of the hose body near the forward most corner on the driver's side hose body. The drain shall not protrude past the outer edge of the body, thus preventing damage to the valve.*

### **PUMP SEALS**

*The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner that they will remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.*

### **PRIMING SYSTEM**

*The priming system shall include an electrically driven rotary vane priming pump separately mounted in the pump compartment area. 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 feet in not more than 30 seconds through 20 feet of suction hose through the steamers. Priming pump shall be built by the manufacturer of the fire pump.*

### **PRIMER CONTROL**

*There shall be one (1) push button control to simultaneously actuate the primer control valve and the primer motor at the operator's panel.*

### **DISCHARGE AND INLET MANIFOLDS**

*A 6.00 inch (152mm) pump manifold inlet shall be provided on each side of the pump. The inlets shall protrude up to 2 inches (50mm) away from the side panels and maintain a low connection*



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*height. A discharge manifold shall also be added to the pressure side of the pump to feed the specified discharge waterways.*

*The main pump inlets shall have National Standard Threads and include removable screens designed to provide cathodic protection for reducing deterioration in the pump.*

### **MAIN PUMP INLET-LEFT SIDE**

*A 6.00 inch (150 mm) pump manifold inlet shall be provided on the left side of the pump. The inlet shall protrude up to 2.00 inches (50 mm) away from the side panel and maintain a low connection height.*

*The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.*

### **MAIN PUMP INLET-RIGHT SIDE**

*A 6.00 inch (150 mm) pump manifold inlet shall be provided on the right side of the pump. The inlet shall protrude up to 2.00 inches (50 mm) away from the side panel and maintain a low connection height.*

*The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.*

### **PUMP ANODES**

*Two (2) pump anodes shall be installed in the plumping system, one (1) on the discharge side and one (1) on the suction side, to prevent damage from galvanic corrosion within the pump system.*

### **STAINLESS STEEL PLUMBING**

*All auxiliary suction and discharge plumbing related fittings, and manifolds shall be fabricated with schedule 10 stainless steel pipe; brass or high pressure flexible piping with stainless steel couplings. Galvanized components and/or iron pipe shall NOT be accepted to ensure long life of the plumbing system without corrosion or deterioration of the waterway system. Where waterway transitions are critical (elbows, tees, etc.), no threaded fittings shall be allowed to promote the smooth transition of water flow to minimize friction loss and turbulence. All piping components and valves shall be non-painted, unless otherwise specified. All piping welds shall be wire brushed and cleaned for inspection and appearance.*

*The high pressure flexible piping shall be black SBR synthetic rubber hose with 300 PSI working pressure and 1200 PSI burst pressure for flexible piping sizes 1.5 inches through 4 inches. Sizes 3/4 inch, 1 inch and 5 inches are rated at 250 PSI working pressure and 1000 PSI burst pressure. All sizes are rated at 30 in HG vacuum. Reinforcement consists of two plies of high tensile strength tire cord for all sizes and helix wire installed in sizes 1 inch through 5 inches for maximum performance in tight bend applications. The material has a temperature rating of -40 degrees*



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*Fahrenheit to +210 degrees Fahrenheit.*

*The stainless steel full flow couplings are precision machined from high tensile strength stainless steel. All female couplings are brass. Mechanical grooved and male 3/4 inch and 1 inch couplings are brass. A high tensile strength stainless steel ferrule with serrations on the I. D. is utilized to assure maximum holding power when fastening couplings to hose.*

### **PUMP HOUSE LINE PROTECTION**

*All drain lines for the discharges, suction, ABS discharge gauge lines and any other appropriate connections in the pump house area shall have a protective cover provided on the lines in the required areas of the lines to prevent the lines from rubbing on any other components in the pump house area.*

*All drain lines, ABS lines, high pressure discharge lines and electrical wiring in the pump house area shall be properly and neatly routed, wire tied and rubber coated "P" clamped, to keep the items secured.*

### **DRAIN VALVES**

*All manual drains shall be Class One with 3/4" J-style lift handle kit.*

### **FRONT SUCTION**

*There shall be an auxiliary steamer inlet located on front of the apparatus.*

### **INTAKE VALVE**

*A 5.00 inch (125 mm) Akron Brass 7000 series electrically actuated "Butterfly" valve with quarter turn air bleeder valve shall be plumbed to the water supply side of the intake valve (with a .75 inch NPT port) to help evacuate air from the system and avoid cavitation of the pump.*

### **STYLE 9323 VALVE CONTROLLER**

*The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must be capable of being used in conjunction with at least two additional displays to control one valve. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.*



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## **INTAKE RELIEF VALVE**

*A Task Force Tips model #A18 pressure relief valve with a range of adjustment from 90 to 300 PSI shall be installed inside pump compartment piped to the suction side of the pump.*

*The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere and shall dump on the opposite side of the pump operator.*

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

*The relief valve shall have no stainless steel plumbing extension installed.*

## **INTAKE PLUMBING**

*The plumbing shall consist of 5.00 inch (125 mm) stainless steel piping.*

## **SUCTION/INTAKE TERMINATION**

*The termination shall include the following components:*

*One (1) 5.00 inch (125 mm) NPT X 5.00 inch (125 mm) NST 90 degree swiveling elbow*

*One (1) 5.00 inch (125 mm) Storz Adapter & Cable Chain*

## **DRAINS**

*The suction shall be plumbed with automatic drains in the lowest point(s) of the piping.*

*Two (2) drains shall be installed on each front suction pipe. One (1) drain will be located forward of the front wheel, and one (1) drain will be located rearward of the front wheel. The drains shall be located on the bottom sides of the front suction pipe.*

## **SUCTION LOCATION**

*The front suction inlet shall be located on the front bumper apron in the right hand outboard position.*

## **LEFT SIDE INLET**

*There shall be one (1) gated suction inlet with .75 inch (19mm) bleeder installed on the left side of the apparatus with the following specified components.*





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## **INTAKE VALVE**

*A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with stainless steel ball.*

## **INTAKE VALVE CONTROL**

*The intake control valve shall be a 'swing out type' direct operation manual lever actuator at the valve.*

## **INTAKE PLUMBING**

*The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.*

## **SUCTION/INTAKE TERMINATION**

*The termination shall include the following components:*

*One (1) 2.50 inch (65 mm) NST swivel female straight adapter with screen*

*One (1) 2.50 inch (65 mm) self-venting plug, secured by a chain*

## **INLET LOCATION**

*The inlet shall be located on the pump panel in the rearward position.*

## **RIGHT SIDE INLET**

*There shall be one (1) gated suction inlet with .75 inch (19mm) bleeder installed on the right side of the apparatus with the following specified components.*

## **INTAKE VALVE**

*A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with stainless steel ball.*

## **INTAKE VALVE CONTROL**

*The intake control valve shall be a 'swing out type' direct operation manual lever actuator at the valve.*

## **INTAKE PLUMBING**

*The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.*



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## **SUCTION/INTAKE TERMINATION**

*The termination shall include the following components:*

*One (1) 2.50 inch (65 mm) NST swivel female straight adapter with screen*

*One (1) 2.50 inch (65 mm) self-venting plug, secured by a chain*

## **INLET LOCATION**

*The inlet shall be located on the pump panel in the rearward position.*

## **LEFT SIDE DISCHARGE**

*There shall be two (2) gated discharges installed on the left side of the apparatus with the following specified components.*

## **DISCHARGE VALVE**

*A 2.50 inch (65 mm) Akron Brass 8000 series rack and sector actuated valve with a stainless steel ball.*

## **DISCHARGE VALVE CONTROL**

*The discharge shall be controlled from a rack and sector actuator having an ergonomically designed T-handle. The handle shall be chrome-plated with name plate insertion recess area.*

## **DISCHARGE PLUMBING**

*The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.*

## **DISCHARGE TERMINATION**

*The discharge termination shall include the following components:*

*One (1) 2.50 inch (65 mm) Male NST adapter*

*One (1) 2.50 inch (65 mm) NST female swivel by male with 45 degree polished elbow*

*One (1) 2.50 inch (65 mm) female self-venting cap, secured by a chain*

## **RIGHT SIDE DISCHARGE**

*There shall be one (1) gated discharge installed on the right side of the apparatus with the following specified components.*



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## **DISCHARGE VALVE**

*A 2.50 inch (65 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.*

## **DISCHARGE VALVE CONTROL**

*The discharge shall be controlled from the pump operator's panel location.*

## **DISCHARGE PLUMBING**

*The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.*

## **DISCHARGE TERMINATION**

*The discharge termination shall include the following components:*

*One (1) 2.50 inch (65 mm) Male NST adapter*

*One (1) 2.50 inch (65 mm) NST female swivel by male with 45 degree polished elbow*

*One (1) 2.50 inch (65 mm) female self-venting cap, secured by a chain*

## **RIGHT SIDE MASTER DISCHARGE**

*There shall be one (1) master discharge installed on the right side of the apparatus provided with the following specified components.*

## **DISCHARGE VALVE**

*A 3.00 inch (77 mm) Akron Brass 8800 series slo-cloz swing-out valve with a stainless steel ball.*

## **DISCHARGE VALVE CONTROL**

*The discharge shall be controlled from the pump operator's panel location.*

## **DISCHARGE PLUMBING**

*The plumbing shall consist of 3.00 inch (77 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.*

## **DISCHARGE TERMINATION**

*The discharge termination shall include the following components:*

*One (1) 3.00 inch (77 mm) NST adapter*



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One (1) 3.00 inch (77 mm) NST female swivel by 5.00 inch (125 mm) Storz with 30 degree elbow

One (1) 5.00 inch (125 mm) Storz cap, secured by a chain

## **DOUBLE STACK CROSSLAYS**

The crosslay hose beds shall be located in the upper portion of the pump compartment. The crosslay area shall be constructed with a fifteen 15.00 inch (381mm) approximate depth for laying a double stack of each hose size as specified below.

The crosslay area shall span the entire width of the apparatus pump module. Removable slotted aluminum flooring shall be provided for hose bed area and for drainage. Stainless steel scuff plates shall be installed at the bottom and at the vertical edges of the crosslay openings to protect the hose and hose ends.

Chicksan swivels shall be installed just below the floor of each crosslay bed, high enough for hose couplings to be accessed and tightened on to chicksans. Chicksan swivels shall swing from left to right to allow attached hose to be deployed from either side of the apparatus.

## **FIXED CROSSLAY DIVIDERS WITH NO HAND HOLD CUTOUTS**

Each crosslay divider acting as a hose bed separator shall be fabricated of .188 inch smooth aluminum and shall have a dual-action sanded finish. Each divider shall NOT have vertical hand hold cutouts provided at each end.

## **1 3/4" CROSSLAY**

A crosslay with the following specified components shall be provided for up to 200 feet (60 m) of 1.75 inch (44.4 mm) hose.

There shall be a total of two (2) provided.

## **DISCHARGE VALVE**

A 2.00 inch (50 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.

## **DISCHARGE VALVE CONTROL**

The discharge shall be controlled from the pump operator's panel location.

## **DISCHARGE PLUMBING**

The plumbing shall consist of 2.00 inch (50 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.



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### **DISCHARGE TERMINATION**

*The discharge termination shall include the following components:*

*One (1) 2.00 inch (50 mm) NPT x 1.50 inch (38 mm) NST brass chickens swivel*

### **CROSSLAY TRIM**

*Brushed stainless steel trim shall be installed at the openings on each side of the crosslay hose bed area. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.*

### **CROSSLAY COVER**

*The crosslay hose bed area shall have a .188 inch (4.76 mm) embossed aluminum diamond plate cover installed. The cover shall be installed to provide a solid surface over all bays. The cover shall be attached with a full length piano style hinge. When opened, the diamond plate cover shall rest upon rubber bumpers or an equivalent protective type stop to eliminate marring or scratching of other apparatus body work.*

### **CROSSLAY END COVERS**

*The crosslay hose bed area shall have a vinyl cover installed at each end of the crosslay area. The covers shall be held in place by an extrusion at the top of crosslay opening and shall include shock cord passing thru brass grommets. Hooks shall be installed at the lower corners to secure the cover to the apparatus.*

### **CROSSLAY SIDE COVERS COLOR**

*The crosslay hose bed side covers shall be black in color.*

### **DECK GUN MONITOR WATERWAY**

*There shall be one (1) deck gun monitor waterway installed on the apparatus with the following components.*

### **DISCHARGE VALVE**

*A 3.00 inch (77 mm) Akron Brass 8800 series slo-cloz swing-out valve with a stainless steel ball.*

### **DISCHARGE VALVE CONTROL**

*The discharge shall be controlled from the pump operator's panel location.*

### **DELUGE PLUMBING**

*The deluge waterway shall consist of 3.00 inch (77 mm) piping and shall be drained with an auto-*



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*drain located at the lowest point of the waterway plumbing if required.*

### **DELUGE PIPE LOCATION**

*The deluge pipe shall be located up through the pump compartment, to the left side of the apparatus.*

### **TELESCOPING MONITOR PIPE**

*Task Force Tips model # XG18VL-XL manually telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 18.00 inch (457.2 mm) by lifting a quick release latch located at the base of the extension tube. This latching device shall be capable of locking the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees.*

*If the extend-a-gun is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.*

*The aluminum riser shall have a 3.00 inch (77 mm) waterway; hardcoat anodized finish and be furnished with a 3.00 inch (77 mm) Victaulic inlet and a Task Force Tips Crossfire coupling outlet.*

### **SAFE-TAK PORTABLE MONITOR PACKAGE**

*Task Force Tips Crossfire model # XFC-42 portable lightweight monitor package consisting of monitor top, stacked tips, stream straightener, portable ground base, and base storage bracket shall be supplied.*

*The package shall be configured as follows:*

### **SAFE-TAK PORTABLE MONITOR BASE**

*Task Force Tips Safe-Tak 1250, model # XFH-1ST portable monitor base shall be provided. The monitor shall include a Safe-Tak, spring loaded butterfly valve designed to rapidly reduce the water flow by 90 percent in the event that contact with the ground is lost. The device shall include an integral carrying handle, four folding stainless steel legs with replaceable tungsten carbide spikes and an anchoring strap (attached to a protective cap) designed to be stored inside the waterway. The butterfly valve shall have a reset handle located near the inlet to allow the water flow to be reestablished once the base is properly stabilized. The base shall allow an optional pressure relief valve to be installed.*

*The base shall be constructed from hardcoat anodized aluminum and have a red powder coat interior and exterior finish. The inlet shall be configured with one (1) 5.00 inch (125.0 mm) Storz swivel coupling. The unit shall be covered by a five-year warranty.*



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### **PORTABLE DECK GUN MONITOR TOP**

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

*The monitor shall have a 3.25 inch (83 mm) waterway for delivery of up to 1250 GPM with low friction loss. Vertical elevation shall be controlled through use of a handwheel controlled stainless steel worm gear which allows full travel to the safety stop point of 35 degrees above horizontal with seven rotations of the wheel. When positioned on a truck mounted riser the monitor shall be able to be used below the 35 degree stop point through release of the spring loaded safety pin.*

*An automatic drain to remove remaining water and avoid freezing shall be included. Integral stainless steel stream straightener and pressure gauge shall be included. The monitor shall be configured with a Crossfire inlet and 2.50 inch (65 mm) male NH outlet. The unit shall be covered by a five-year warranty.*

### **MONITOR STORAGE BRACKET**

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

***The storage bracket shall be shipped loose with the apparatus.***

### **MASTER STREAM STACK TIP SET**

*Task Force Tips model # MST-4NJ smooth bore stacked tip set shall be provided. For corrosion resistance the tip set shall be constructed from hardcoat anodized aluminum alloy. The set shall consist of four (4) tips with the base tip having a 2.50 inch (65 mm) female NH swivel inlet and 2.00 inch (50 mm) outlet. The other tip sizes shall be 1.75 inch (45 mm), 1.50 inch (38 mm) and 1.375 inch (34 mm). Each tip shall be laser engraved with a flow/pressure chart, orifice size and thread size.*

### **STREAM STRAIGHTENER**

*Task Force Tips model # XF-SS5 stream straightener shall be supplied. The straightener shall be constructed from extruded aluminum with internal vanes designed to reduce turbulence and increase the reach of smooth bore water streams. The device shall be 5.00 inches (125.00 mm) in length and have 2.50 inch (65 mm) female NH rigid inlet and 2.50 inch (65 mm) male NH rigid outlet.*



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## **BOOSTER REEL**

*There shall be an electric rewind booster reel with automatic brake installed on the apparatus. The booster reel shall have a capacity to handle 1.00-inch diameter (25.4 mm) booster hose.*

*There shall be a manual rewind device provided. A manual crank shall be mounted adjacent to booster reel.*

## **BOOSTER HOSE-DEALER PROVIDED**

*The booster hose shall be provided and installed by the Dealership before the truck is placed into service.*

*The booster Hose shall be Mercedes brand Boostlite color Yellow. Hose to be up to 200' in length.*

## **REEL FINISH**

*The hose reel specified shall be steel and painted the standard silver utilized by Hannay.*

## **HOSE REEL VALVE**

*The reel shall be plumbed to the pump with a 1.00 inch (25.40 mm) quarter turn Akron brass 8000 series ball valve and 1.00 inch (25.40 mm) high pressure hose and couplings.*

*The valve shall be controlled from the operator's panel.*

## **REWIND ACTIVATION**

*Two (2) electric rewind switches shall be located, one (1) on the pump operator's and one (1) on the right side panel.*

*The switches shall have a weather resistant Black rubber cover and a label indicating its function.*

*Each switch shall be labeled "HOSE REEL".*

## **HOSE REEL LOCATION**

*The hose reel shall be mounted above the pump on the right side.*

## **HOSE REEL ROLLERS**

*There will be one (1) Bell Roller assembly installed on the right side upper pump house to allow hose payout to the right side of the apparatus.*





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## **HOSE REEL BLOW OUT**

*There shall be an air "blowout" system provided and installed on the apparatus. The air blow out system shall be connected to the chassis air brake system. A check valve shall be installed between the chassis system and the reel blow out system. A ¼ turn manual control valve shall be installed on the pump operator's panel for the air blow out system.*

*The valve shall be labeled "REEL BLOW OUT".*

## **BOOSTER REEL GAUGE**

*There shall be no pressure gauge supplied for the Booster Reel.*

## **DISCHARGE GAUGES**

*A Thuemling 2.50 inch (65 mm) gauge shall be supplied for reading the pressure of each discharge greater than 1.50 inches (38 mm) in diameter, unless otherwise specified.*

*The gauge shall be a model FA-LFP-210.*

## **GAUGE SCALE**

*Each gauge shall be marked for reading a pressure range of 0-400 PSI.*

## **GAUGE FACE COLOR**

*Each gauge shall have black markings on a white face.*

## **TANK TO PUMP LINE**

*The connection between the tank and the pump shall be capable of the flow recommendations as set forth in NFPA 1901, current edition, latest revision and shall be tested to those standards when the pump is being certified.*

*One (1) non-collapsible flexible hose and valve shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation. Four (4) inch stainless steel schedule 10 piping shall be used to complete the connection from the tank to pump valve to the water tank.*

## **TANK TO PUMP CHECK VALVE**

*There shall be a tank to pump check valve, conforming to NFPA standard requirements to prevent water from back flowing at an excessive rate if the pump is being supplied from a pressurized source. The check valve shall be mounted as an integral part of the pump suction extension. A hole up to .25 inch (6.00 mm) is allowable in the check valve to release steam or other pressure buildup so that the void between the valve and check valve may drain of water that could be subject to*



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*freezing.*

## **TANK TO PUMP VALVE**

*A 3.00 inch (77 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.*

## **VALVE CONTROL**

*The valve shall be controlled from the pump operator's panel location.*

## **TANK FILL LINE**

*One (1) 1.50 inch (38.10 mm) tank fill/recirculating line shall be installed from the pump directly to the booster tank.*

## **TANK FILL VALVE**

*A 1.50 inch (38 mm) Akron Brass 8000 series swing-out valve with a stainless steel ball.*

## **VALVE CONTROL**

*The valve shall be controlled from the pump operator's panel location.*

## **TRI-MAX™ Space Frame Body- STAINLESS STEEL**

*The apparatus body shall be a Tri-Max™ **Space Frame** design, which serves as an incredibly durable, structural body framework. This framework acts as a series of beams and columns that support and protect the body and its contents. The space frame design provides maximum torsional resistance and load capabilities. The entire space frame structure shall be welded together utilizing an A.W.S. Certified welding procedure.*

*The space frame design shall also be required because it provides energy absorbing impact zones in the structure, thus providing increased safety to the rest of the apparatus and personnel on board. Documented proof of this extra safety shall be required upon request.*

*The Tri-Max™ body structure shall consist entirely of closed section members, except where the body is mounted to the chassis. Closed section members (such as square, rectangular, triangular, or round tubes) are required because they provide maximum strength and torsion rigidity. This solid tubular structural style of design, ultimately adds longevity to the body structure by eliminating flex and twists in material, creating less stress and fatigue. Body designs that use independent sub-frames will not be acceptable.*

## **BODY STRUCTURE MEMBERS**

*The space frame body shall have triangular shaped structural members in certain areas of the body. This shape is required to prevent loss of useable compartment space. Other body structure*



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members shall be square or rectangular. Each structural member will have a nominal outside dimension of 2.50 inches (63.50 mm) in at least one direction. The body shall be designed for maximum strength to weight ratio, therefore the gauge of sheet metal and structural members varies from 14 gauge to 11 gauge throughout dependent on the design requirement.

### **BODY MATERIAL TYPE**

All body structure and sheet material shall be premium grade Stainless Steel, Type 304L. This alloy is utilized because it provides an excellent balance of material strength, manufacturing properties, and corrosion resistance that is achieved through high levels of both chromium and nickel.

### **ECK® ANTI-CORROSION PROCESS**

Absolutely no dissimilar metals shall be used in the body and its supporting substructure without being separated by Eck®, which prevents corrosion by providing a barrier between dissimilar metals, sealing out moisture and absorbing energy created by a dissimilar metal reaction.

### **FRONT BODY COMPARTMENT WALLS**

The front compartment walls of both forward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments.

### **REAR BODY COMPARTMENT WALLS**

The rear compartment walls of both rearward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments. Access panels from the rear walls shall be strategically placed to ensure access to the rear taillight clusters for any servicing that may be completed.

### **COMPARTMENT TOP**

The top of the compartments shall be an integral portion of the body. No overlay material shall be visible from the interior of the compartments.

### **COMPARTMENT FLOORS**

The body compartments shall be enclosed with stainless steel sheet metal as specified above. The compartment floors shall have a 1.00 inch (25.40 mm) lip downward at the door opening side of the compartment. This lip shall integrate with a structural member on the bottom edge and form a "sweep-out" compartment. This design shall also allow for a structural flush fitting door frame and a complete door/weather seal.

### **COMPARTMENT LOAD CAPACITY**

Each compartment shall have a minimum of one additional structural compartment floor support centered on the underside of the compartment floor. This additional member shall be integral with



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*the rest of the body structure. Each compartment must be designed, and 3rd party analyzed to carry a working load of:*

*Full depth side compartment: 1,000 lbs (453.59 kg) per compartment*

*Half depth side compartment: 750 lbs (340.19 kg) per compartment*

*Rear center compartment: 1,500 lbs (680.39 kg)*

***NOTE: These values are for design purposes only for individual compartment construction and are not meant to be used as an actual overall weight rating for equipment load per compartment for the specified apparatus. The apparatus shall be engineered such that the completed unit, when loaded to its estimated in-service weight, shall comply with the gross axle weight ratings {GAWR}, the overall gross vehicle weight rating {GVWR}, and the chassis manufacturer's load balance guidelines per NFPA.***

### **EXTERIOR HOSE BED WALLS**

*The exterior hose bed walls shall be an integral portion of the body. The wall shall give a smooth exterior look and finish with no vertical supports tubing visible from the exterior of the truck.*

### **FASTENERS**

*All bolts and nuts used in the finish construction of the apparatus shall be coated stainless steel which helps prevent dissimilar metal electrolytic reaction and corrosion. Any bolt extending into a compartment or into the hose bed area shall have an acorn nut attached or be protected in such manner where sharp edges are avoided.*

### **PAINT SPECIFICATIONS**

*All bright metal fittings, if unavailable in stainless steel, shall be heavily chrome plated.*

*Critical body and sub-frame area which cannot be primed after assembly shall be pre-painted.*

*All welded metal surfaces shall be ground to a smooth surface prior to a degreasing and high pressure, high temperature phosphatizing process. The entire surface shall be sprayed with a non-chromate sealing compound to prevent formulation of stains or flash rust on previously phosphatized parts.*

*The paint applied to the apparatus shall be PPG Industries Delta® brand, applied throughout a multi-step process including at least two coats of each color and clear coat finish.*

*The coating shall be an infra-red, baked air dried. The coatings shall provide full gloss finished suitable for application by high-pressure airless or conventional low pressure air atomizing spray.*

*The coatings shall not contain lead, cadmium or arsenic. The polyisocyanate component shall consist of only aliphatic isocyanates, with no portion being aromatic isocyanates in character. The*



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*solvents used in all components and products shall not contain ethylene glycol mono-ethyl ethers or their acetates (commercially recognized as cello solves), nor shall they contain any chlorinated hydrocarbons. The products shall have no adverse effects on the health or nor present any unusual hazard to personnel when used according to manufacturer's recommendations for handling and proper protective safety equipment, and for its intended use.*

*The coating system, as supplied and recommended for application, shall meet all applicable federal, state and local laws and regulations now in force or at any time during the courses of the bid.*

*The manufacturer shall supply (upon request) for each product and component of the system, a properly complete OSHA "Safety Data Sheet".*

*The following documents of the issue in effect on the date of the invitation to quote form a part of this document to the extent specified herein:*

*Federal Standards: Number 141A and 141B paint, varnish, lacquer and related material: methods of inspection, sampling, and testing.*

*Military Standard: MIL-C 83486B Coating, Urethane, Aliphatic Isocyanates, for Aerospace applications.*

*Industry Methods and Standards: ASTM Method of Analysis (American Society for testing and Materials). BMS 10-72A (Boeing Material Specifications).*

*The entire exterior body structure (excluding roll-up doors) shall receive the primer coats and the finish coats. The apparatus body, will be painted in a down draft type paint booth to reduce dust, dirt or impurities in the finish paint. The painted surfaces shall have a finish with no runs, sags, craters, pinholes or other defects. The coating will meet the following test performance properties as a minimum standard.*

### **BODY PAINT COLOR**

*The apparatus body shall be painted PPG 926234 Red.*

### **NATURAL COMPARTMENT FINISH**

*To prevent scratching of the paint finish and to provide the maximum reflectivity for the compartment lighting, the interior of the compartments shall have a natural finish. Absolutely no coatings will be allowed on the compartment interiors.*

### **BRUSHED STAINLESS FRONT OVERLAYS**

*The entire front face of the apparatus body shall have brushed stainless plate overlays installed.*



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### **RAW STAINLESS REAR OVERLAYS**

*The entire rear face of the apparatus body shall have raw stainless steel overlays installed for the installation of chevron striping.*

*All overlay materials shall be coated with 3M adhesive sealant on the back portion to provide an insulating barrier between dissimilar metals.*

### **FRONT CORNER TRIM 16 GAUGE BRUSHED STAINLESS STEEL**

*The front of the apparatus body vertical wall overlays shall be installed with a 16 gauge brushed stainless steel 1.0" x 1.0" corner trim piece, for edge protection. The vertical edge trim piece shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.*

### **REAR CORNER TRIM 16 GAUGE BRUSHED STAINLESS STEEL**

*The rear face of the apparatus body, vertical wall overlays shall be installed with a 16 gauge brushed stainless steel 1.00 inch by 1.00 inch corner trim piece, for edge protection. The vertical edge trim piece shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.*

*The vertical edge trim piece that is protecting the chevron striping surface or that is utilized for the purpose of striping, shall be secured utilizing fasteners only.*

### **VIBRA-TORQUE™ BODY MOUNTING SYSTEM**

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

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

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

*There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All body to chassis connections shall be bolted so that*



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*in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.*

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

### **BODY STRUCTURE WIDTH**

*The width of the apparatus body from the outside of the left compartments to the outside of the right compartments shall be 99" excluding any attached peripherals such as rub rails, fenderettes, grab handles, etc.*

### **COMPARTMENT VENTILATION**

*To allow for proper air circulation & flow, each compartment shall have a venting route. The venting locations shall be determined by best-fit for each body configuration. Louvered plate vents shall be installed appropriately on the compartment interior walls.*

### **COMPARTMENTATION**

*The following compartments shall be supplied on the apparatus:*

*Compartment "L1": There shall be one (1) full height compartment ahead of the rear wheels on the left side of the apparatus.*

*The approximate interior dimensions of this compartment shall be a minimum of 49" wide by 74" high with a depth of 25.5".*

*The framed opening shall measure 46.5" wide by 70" high.*

*Compartment "L2": There shall be one (1) compartment located directly over the rear wheels on the left side of the apparatus.*

*The approximate interior dimensions of this compartment shall be a minimum of 62" wide by 44.5" high with a depth of 25.5".*

*The framed opening shall measure approximately 62" wide by 40.5" high.*

*Compartment "L3": There shall be one (1) full height compartment located behind the rear wheels on the left side of the apparatus.*

*The approximate interior dimensions of this compartment shall be a minimum of 54" wide by 74" high with a depth of 25.5".*

*The framed opening shall measure approximately 51.5" wide by 70" high.*



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Compartment "R1": There shall be one (1) full height compartment located ahead of the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 49" wide by 74" high with a depth of 12.5" upper and 25.5" lower.

The framed opening shall measure approximately 46.5" wide by 70" high.

Compartment "R2": There shall be one (1) compartment located directly over the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 62" wide by 44.5" high with a depth of 12.5".

The framed opening shall measure approximately 62" wide by 40.5" high.

Compartment "R3": There shall be one (1) full height compartment located behind the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 54" wide by 74" high with a depth of 12.5". upper and 25.5" lower

The framed opening shall measure approximately 51.5" wide by 70" high.

Ladder box through the right side of hte compartments, sheet off the area for the ladder box for a pleasing appearance.

### **ROLL-UP DOOR CONSTRUCTION**

All horizontal and vertical side compartment doors shall be roll-up style doors.

### **R•O•M ROLL-UP DOOR**

A R•O•M Corporation Series IV roll-up shutter door shall be installed. Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.

Shutter slats shall feature a double wall extrusion 0.315 inches thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slat inner seal shall be a one piece PVC extrusion; seal design shall be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber





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*double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.*

*Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125 inches. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.*

*Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4.00 inches in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system.*

### **SIDE COMPARTMENT DOORS/TRACK/TRIM/WET PAINTED**

*The side compartment roll up doors, track and trim shall be wet finish painted to color match the apparatus body.*

### **ROLL-UP DOOR PROTECTORS**

*There shall be a protective cover installed under each body side compartment door roll to protect the door in the rolled up position.*

### **ROLL-UP DOOR PROTECTOR FINISH**

*The roll-up door protector shall be left Natural finish.*

### **DOOR ASSIST STRAPS**

*There shall be nylon straps installed on both the left and right body side 'high side' compartment doors to assist in closing the door.*

*The strap shall be attached to the bottom of each door (center mounted) and permanently mounted to the with a 10" footman loop using nutzerts.*

### **DOOR OPEN INDICATOR**

*Each roll up door shall have an integral door open indicator magnet in the lift bar.*

*If the door is not properly closed and the transmission is placed into drive or reverse mode with the*



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*parking brake released, it shall activate the "hazard light" in the cab to alert the crew.*

### **REAR CENTER COMPARTMENT**

*There shall be one (1) compartment, "B1", located at the rear of the apparatus, below the hose bed access area.*

*The approximate interior dimensions of this compartment shall be 43" wide and as high as possible determined by the hose bed height with a depth of 31" dependent on suspension, with the sides of the compartment being closed to the side compartments for maximum storage area.*

*The compartment shall have a roll-up door installed.*

*The framed opening shall be approximately 38" wide and 35" high.*

### **REAR COMPARTMENT DOOR**

*A non-locking R•O•M Corporation Series IV roll-up shutter door shall be installed. Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.*

*Shutter slats shall feature a double wall extrusion 0.315 inches thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slat must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design shall be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.*

*Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.*

*Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125 inches. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.*

*Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4.00 inches in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter*



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*balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system.*

### **REAR COMPARTMENT DOOR FINISH**

*The rear center compartment door shall be satin aluminum finish.*

### **ROLL-UP DOOR PROTECTOR**

*There shall be a protective cover installed under the rear compartment door roll to protect the door in the rolled up position.*

### **ROLL-UP DOOR PROTECTOR FINISH**

*The roll-up door protector shall be left Natural finish.*

### **DOOR OPEN INDICATOR**

*Each roll up door shall have an integral door open indicator magnet in the lift bar.*

*If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.*

### **FUEL TANK ACCESS**

*There shall be a removable panel located on the interior back wall of the rear center compartment for maintenance access to the chassis fuel tank.*

*The cover shall be labeled: "FUEL TANK ACCESS".*

### **REAR COMPARTMENT PARTITIONS**

*The rear center compartment of the apparatus shall have permanent partitions installed on each side to increase utilization of the rear center area and to block access to either of the side compartments. The partitions shall be constructed of the same materials as used in the body structure and shall be welded in place to form permanent compartmentation.*

### **SILL PLATES**

*Brushed stainless steel sill plates shall be installed at the bottom of each body compartment door opening.*

### **COMPARTMENT LIGHTING**

*Two (2) LED Tube lights model #RX-15T16-5050 shall be installed in each body compartment. The tube lights shall be centered vertically along each side of the door framing and at maximum length*



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*available to fit the opening.*

*The lights in each compartment shall be on a separate circuit, turning on only those lights that have open compartment doors.*

### **REAR TAILBOARD**

*The rear of the apparatus body shall be vertical in design - otherwise known as a 'flat-back'.*

*The rear tailboard shall be fabricated of the same tubular materials as used in the apparatus body.*

*The tailboard shall be an independent assembly welded to the rear body structural framing to provide body protection and a solid rear stepping platform.*

*The rear step shall be designed to incorporate "crush zone" technology. This idea incorporates lighter materials in the tailboard than the body structure so the step will "crush" in a collision before the body structure.*

*On the rear body surface, a sign shall be attached that states: "DO NOT RIDE ON REAR STEP, DEATH OR SERIOUS INJURY MAY RESULT."*

*The rear tailboard and body shall be constructed such that the angle of departure shall be no less than 8 degrees at the rear of the apparatus when fully loaded (Per NFPA 1901, current edition).*

### **TAILBOARD LENGTH**

*The rear tailboard shall be approximately 13.50 inches (342.90 mm) deep and shall incorporate a ventilated "Diamondback" material stepping surface bolted in place which spans the full width of the apparatus on non-recess designs, and as wide as possible on inset recess designs. The extruded stepping surface shall be completely enclosed by the supporting structural framework to minimize damage.*

*The ventilated "Diamondback" material shall be capable of being easily replaced if necessary, using only hand tools. The framework shall be covered with an adhesive tape providing an aggressive traction surface. Use of any aluminum diamond plate material on these areas shall not be acceptable.*

### **WHEEL WELLS**

*Wheel wells shall have semicircular black polymer composite inner liners that are bolted to the wheel well panel and supported inboard by brackets that are connected to the body framework. Each wheel well shall be a continuous piece with no breaks or ledges where road grime or debris may accumulate. This liner shall be removable for access to suspension assembly for repairs. There shall be no exception to the bolted wheel well inner liner requirement.*



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## **WHEEL WELL MODULES**

*The body wheel well area shall be fabricated of same material type as the body and finish painted. There shall be “smart storage” compartmentation features incorporated on each side of the apparatus body wheel well modules to utilize and maximize storage space availability.*

### **LEFT FRONT WHEEL WELL COMPARTMENT**

*There shall be a storage compartment in the wheel well on the left side in front of the axle.*

### **WHEEL CHOCK COMPARTMENT**

*The compartment shall hold a set of Zico folding wheel chocks.*

### **LEFT REAR WHEEL WELL COMPARTMENT**

*There shall be a storage compartment in the wheel well on the left side behind the axle.*

### **INTEGRATED FLOOR DRY STORAGE MODULE**

*A floor dry storage module with pivoting re-fill access door shall be provided and installed in the apparatus wheel well area as specified.*

*The floor dry storage module shall be manufactured as large as possible to maximize the available space. The module shall be integrated into the wheel well area and be capable of storing up to approximately 40 pounds of all purpose floor dry absorbent compound material.*

*A manual drain shall be located at the bottom of the compartment for ease of dispensing the material.*

*The storage module shall be labeled "Floor Dry".*

### **SMART STORAGE FUEL FILL ASSEMBLY**

*There shall be a fuel fill assembly located on the apparatus body accessing the chassis supplied fuel tank. The assembly shall be located in the rear Smart Storage module specified behind the rear axle.*

*There shall be a drain in the fuel fill assembly to allow over flow to drain on the back side of the apparatus body. The fuel fill cap shall be manufactured of plastic materials, green in color and equipped with a tether.*

*The fuel fill cap shall be labeled "DIESEL FUEL". The stainless steel fuel fill neck shall have a .375 inch inside diameter vent line installed from the top of the fuel tank to the fill tube.*



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## **RIGHT FRONT WHEEL WELL COMPARTMENT**

*There shall be a storage compartment in the wheel well on the front side in front of the axle.*

## **SCBA COMPARTMENT**

*The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.*

## **RIGHT REAR WHEEL WELL COMPARTMENT**

*There shall be a storage compartment in the wheel well on the right side behind the axle.*

## **SCBA COMPARTMENT**

*The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.*

## **SMART STORAGE DOORS**

*The smart storage compartment doors shall be Brushed Stainless Steel. Where a module storage compartment is specified, a hinged door shall be provided. Each compartment door shall be secured with a push button latch.*

## **DOOR OPEN INDICATOR**

*There shall be a "magnetic proximity" style switch installed for each smart storage compartment door.*

*If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.*

## **FENDERETTES**

*Two (2) polished stainless steel fenderettes shall be provided and installed on body rear wheel well openings, one (1) each side. Rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering. A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to resist deterioration.*

## **LEFT SIDE UPPER STORAGE COMPARTMENTS**

*Two (2) storage compartments shall be provided and installed on the upper left side of the apparatus body.*

*The approximate length of the forward compartment shall be 71" long.*



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*The approximate length of the rearward compartment shall be 91.5" long.*

*The depth of the compartments shall be approximately 15".  
The width of the compartments shall be approximately 23".*

*The compartment shall extend beyond the apparatus body roof and walking surface approximately 1" and provide a vertical edge to prevent water intrusion. An adhesive backed bulb seal shall be applied to the underside perimeter of the lid, excluding the hinge side, to ensure a positive seal.*

*The formed door incorporating broken edges of 45 degrees or less shall extend over the compartment edge approximately 1" to minimize water penetration. Each door shall be secured by gas shocks to hold the door(s) open and closed (no latches). The door shall be fabricated of NFPA compliant, slip resistant embossed aluminum diamond plate and be secured by an aluminum hinge. If deemed necessary due to width, the doors shall be reinforced to act as a suitable walking or standing surface. Each door shall be held open by a gas charged strut on each side and permit full access to the compartment along its length. The struts shall be concealed inside the compartment when the door is in the closed position. The compartments shall be constructed as part of the body and be accessible from the hose bed area.*

*The upper forward compartments shall be vented into the hosebed dunnage area with two vents. There shall be plastic tubing installed for adequate drainage that is routed from corners of the upper compartment floors down to below the lower compartment floor level.*

*Each cover shall have a 7" chromed suit case handle.*

### **RIGHT SIDE UPPER STORAGE COMPARTMENTS**

*Two (2) storage compartments shall be provided and installed on the upper right side of the apparatus body.*

*The approximate length of the forward compartment shall be 71" long.*

*The approximate length of the rearward compartment shall be 91.5" long.*

*The depth of the compartments shall be approximately 15".  
The width of the compartments shall be approximately 23".*

*The compartment shall extend beyond the apparatus body roof and walking surface approximately 1" and provide a vertical edge to prevent water intrusion. An adhesive backed bulb seal shall be applied to the underside perimeter of the lid, excluding the hinge side, to ensure a positive seal.*

*The formed door incorporating broken edges of 45 degrees or less shall extend over the compartment edge approximately 1" to minimize water penetration. Each door shall be secured by gas shocks to hold the door(s) open and closed (no latches). The door shall be fabricated of NFPA*



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*compliant, slip resistant embossed aluminum diamond plate and be secured by an aluminum hinge. If deemed necessary due to width, the doors shall be reinforced to act as a suitable walking or standing surface. Each door shall be held open by a gas charged strut on each side and permit full access to the compartment along its length. The struts shall be concealed inside the compartment when the door is in the closed position. The compartments shall be constructed as part of the body and be accessible from the hose bed area.*

*The upper forward compartments shall be vented into the hosebed dunnage area with two vents. There shall be plastic tubing installed for adequate drainage that is routed from corners of the upper compartment floors down to below the lower compartment floor level.*

*Each cover shall have a 7" chromed suit case handle.*

### **UPPER STORAGE COMPARTMENT LIGHTING**

*One (1) LED Tube light model #RX-15T16-5050 shall be installed in each upper body storage compartment along the hinge side of the cover. The tube light shall be of maximum length available to fit in the compartment.*

*The lights shall be on a separate circuit, activating only those lights that have an open compartment door.*

### **HOSE STORAGE**

*A hosebed shall be provided and installed with the minimum capacity as required by (NFPA) 1901, Standard for Automotive Fire Apparatus.*

*The hosebed shall have a slotted .25 inch (6.35 mm) aluminum flooring installed to allow drainage through the tank cavity to the ground below.*

*The aluminum flooring shall be manufactured in discrete sections to allow for ease of removal and stability. The area shall be free of sharp edges to protect the hose when loading and unloading.*

*The inside of the hose bed shall be approximately 41.5" wide x 39" tall x 120" deep.*

### **HOSE BED AREA**

*The hose bed area of the apparatus shall be overlaid with brushed stainless steel material.*

### **HOSE BED AREA TRIMMED W/ BRUSHED SST**

*The vertical corners at the back hose bed shall be trimmed with brushed stainless steel. The trim shall extend from the hose floor level up to the top edge of the body side.*





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## **HOSE BED WALL HEIGHT**

*The walls of the hose bed shall be 90.00 inches (2.29 m) tall, measured from the bottom edge of the compartments to the top flange.*

## **'A' FRAME HOSEBED COVER**

*There shall be a double door cover provided and installed which overlays a tubular structure for the hosebed.*

*Each cover shall be capable of supporting 600 pounds (272 kg) while standing on the cover. Each cover shall be capable of being opened independently and rest on a tubular structure which runs down the middle of the hose bed with a truss support at the rear of the apparatus. The covers in the closed position shall be higher in the center of the hose bed than they are at the hinged end to create an 'A' frame appearance and to aid in water run off.*

*The front and rear of hose bed covers shall have vertical end caps that extend down to create a level line of diamond plate the width of the covers.*

*The doors shall be fabricated of .125 inch (3.18 mm) embossed aluminum diamond plate with full length two-piece stainless steel piano hinges.*

*The hosebed covers shall be wired to the hazard light in chassis cab. Coil spring type limit switches shall be installed at the hosebed cover door hinges. If the door is not properly closed with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.*

*There shall be one (1) grab handle, one (1) installed on the top of the driver's side cover at the rear.*

## **PNEUMATIC ACTUATION**

*The hosebed covers shall be supplied with two (2) pneumatically actuated cylinders, to assist in lifting and lowering the hosebed covers.*

*The pneumatic actuation device shall allow adjustment of the rate of speed for lift or lowering. The cylinders shall be equipped with low temperature seals, to extend operation down to -40 degrees Fahrenheit.*

*There shall be an individual 3-position toggle switch for each cover.*

*The operating control switches for the covers shall be located at the left rear of the body in a CPI (Cast Products) enclosure with a hinged door.*

## **REAR HOSEBED RESTRAINT**

*There shall be a vinyl flap that extends down over the rear of the hosebed provided and installed with the apparatus. The cover shall be fastened by an elastic shock cord sewn into the tarp with*



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*brass grommets where the shock cord passes through the hosebed cover. Hooks shall be provided on the lower corners to provide a means of attaching the cover to the apparatus. The hooks shall be made of cast aluminum.*

### **REAR FLAP COLOR**

*The rear flap shall be black.*

### **REAR LETTERING**

*The following lettering shall be provided on the rear hose bed flap:*

*ANN ARBOR - White reflective letters  
(located centered in flap, top to bottom in a straight line)*

### **LED HOSE BED COVER LIGHTING**

*Four (4) 48.00 inch (122cm) LED Tube lights model #RX-15T16-5050-122CM shall be installed to the underside of each hose bed cover, centered on the cover from front to back.*

*The lights shall be on a separate circuit and turn on only when the covers are opened.*

### **HOSE BED DUNNAGE AREA**

*A vertical bulkhead shall be provided and installed at the front of the hose bed area, just behind the water tank fill tower, forming a storage area that is separated from the hose bed.*

*The rear face of the bulkhead shall serve as a mounting surface for the hose bed dividers, resulting in the ability to move any hose bed divider across the entire width of the hose bed.*

### **REINFORCED HOSEBED DIVIDER WITH HAND CUTOUT**

*There shall be a full height adjustable reinforced hosebed divider provided and installed in the hose bed area of the apparatus body.*

*The divider shall be fabricated of .25 inch (6.35 mm) thick aluminum plate with a double sided reinforcement and attached to the adjustable slide rails. The rear of the divider shall have a radius to provide a smooth corner and a hand cut out to aid in access to the hose bed area. The top and rear edges shall be reinforced with 1.00 inch (25.40 mm) round aluminum tubing for extra rigidity. Hose payout shall be unobstructed by the divider.*

*The hosebed divider shall be scalloped towards the center for ease of loading hose.*

*There shall be a total of one (1) provided and installed in the hose bed.*



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## **HOSE LOAD**

*The hosebed shall accommodate the following hose loads:*

### **BAY 1:**

*-800 feet of 2.50 inch hose*

### **BAY 2:**

*-800 feet of 5.00 inch hose*

## **TANK CAPACITY**

*The tank shall be 500 gallons (1893 liters) in capacity.*

## **UPF POLY TANK III**

*The booster tank shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments.*

*All joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with (NFPA) 1901, Standard for Automotive Fire Apparatus. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of .125 on all dimensions.*

## **WATER FILL TOWER AND COVER**

*The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of .50 inch (12.7 mm) PT3™ polypropylene. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a .25 inch (6.4 mm) thick removable polypropylene screen and a PT3™*



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*Polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I. D. of 4.00 inch (100 mm) that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in (NFPA) 1901, Standard for Automotive Fire Apparatus, so as to not interfere with rear tire traction.*

*The tank cover shall be constructed of .50 inch (12.7 mm) thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2.00 inch (50 mm) minimum polypropylene dowels spaced a maximum of 40.00 inch (1016 mm) apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.*

### **MOUNTING**

*The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40.00 inch (1016 mm), cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of .25 inch (6.4 mm) x 1.00 inch (25 mm) and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.*

*A picture frame type cradle mount with a minimum of 2.00 inch (50 mm) x 2.00 inch (50 mm) x .25 inch (6.4 mm) mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4.00 inch (100 mm) x 4.00 inch (100 mm) x 4.00 inch (100 mm) by 6.00 inch (150 mm) high are permitted for the purpose of capturing the tank.*

*Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3.00 inch (77 mm) x 3.00 inch (77 mm) x .25 inch (6.4 mm) and shall be approximately 6.00 inch (150 mm) to 12.00 inch (304.80 mm) long. These brackets must incorporate rubber isolating pads with a minimum thickness of .25 inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any*



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*way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.*

### **TANKNOLOGY™ TAG**

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

### **FILL TOWER**

*The fill opening shall be approximately 13.00 inches (330.20 mm) x 12.00 inches (304.80 mm). The tower will have a .25 inch (6.40 mm) thick removable Polypropylene screen and a Polypropylene hinged type cover that will open if the tank is filled at an excess rate.*

*There shall be a removable .25 inch (6.40 mm) thick Polypropylene screen to prevent debris from falling into the tank.*

*The fill tower shall have a 4.00 inch (100.00 mm) overflow that will discharge underneath the tank, behind the rear wheels. The overflow shall terminate above the tank water level when filled to the rated capacity.*

### **FILL TOWER LOCATION**

*The fill tower shall be located to the left side at the front of the hose bed.*

### **SUMP**

*The sump will be constructed in an 8.00 inch (203.20 mm) x 16.00 inch (406.40 mm) x 3.00 inch (77.00 mm) deep area.*

*The sump will be constructed of .50 inch (12.70 mm) Polypropylene and be located inline with the tank suction valve. There shall be a 4.00 inch (100.00 mm) schedule 40 Polypropylene tube installed that will run from the suction outlet to the sump location. The tank will have an anti-swirl plate located approximately 2.00 inch (50 mm) above the sump.*



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## **SUMP PLUG**

*The sump shall have a 3.00 inch (77.00 mm) plug for use in draining and cleaning out the tank.*

## **OUTLETS**

*In addition to the tank suction valve outlet located in the sump, there shall be an outlet provided for the tank fill valve. If there are any additional options selected (such as an extra tank suction or direct tank inlets), there shall be additional outlets provided to accommodate these items.*

## **LADDER STORAGE**

*The ground ladders shall be stored within a compartment located through the right side compartments.*

*All items shall be stored in their own independent section to allow one item to be removed without disturbing another. There shall be polypropylene slide angles installed in each section where applicable, to support the ladders and allow ease of removal. There shall be a stop in the front of each section to prevent the items from sliding forward.*

*There shall be a vertically hinged door, matching the rear overlay material, on the rear of the compartment with two (2) push button type latches and a chrome handle centered between the push button latches.*

*If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.*

## **LADDER COMPARTMENT MATERIAL**

*The ground ladder compartment shall be fabricated of .125 inch smooth aluminum.*

## **LADDER COMPARTMENT LOCATION**

*The ground ladder compartment shall be located on the right side, with the ladders lying on their side.*

## **LADDER COMPARTMENT END CAP**

*The compartment shall be enclosed through the tank to the pumphouse, and incorporate a removable weather resistant end cap, providing access for serviceability, drainage and cleaning.*

## **LADDER COMPLIMENT**

*The following ladders shall be supplied with the apparatus:*

*One (1) Duo-Safety 24 foot (7.0 m) two (2) section aluminum extension ladder(s), model 900A.*



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*One (1) Duo-Safety 14 foot (4.0 m) aluminum roof ladder(s) with folding hooks, model 775A.*

*One (1) Duo-Safety 10 foot (3.0 m) aluminum attic ladder(s), model 585A.*

### **PIKE POLE STORAGE**

*There shall be four (4) Tubes provided for storage of the pike poles installed with the ground ladder compliment.*

*The following pike poles shall be supplied with the apparatus:*

*- two (2) Fire Hooks Unlimited 6' NY Style roof hook with aircraft steel handle, chisel end and celtex grip.*

*Model FHU-RH-6*

*- one (1) Fire Hooks Unlimited 8' NY Style roof hook with aircraft steel handle, chisel end and celtex grip.*

*FHU-RH-8*

*- one (1) Fire Hooks Unlimited 10' NY Style roof hook with aircraft steel handle, chisel end and celtex grip.*

*Model: FHU-RH-10*

### **EQUIPMENT DOOR STRIPING**

*Retro-Reflective striping in a chevron pattern matching the rear layout shall be provided on the equipment access door.*

### **COMPARTMENT UNISTRUT**

*Vertically mounted Unistrut shall be installed in all apparatus body compartments, in the upper and lower sections, to accommodate the installation of shelves, trays, and or other miscellaneous equipment.*

### **OVER-WHEEL COMPARTMENT PARTITIONS (dual sides)**

*Compartment partitions, fabricated of the same material as the body, shall be welded in place in both left and right side over-wheel compartments flush to the forward and rearward frame openings.*

*These partitions shall aid in keeping loose equipment from falling into the fore and aft compartments.*



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## **SHELVING**

*The shelving shall be made out of .190 inch (4.83 mm) smooth aluminum sheet material with a formed 2 inch (50.80 mm) lip on the front and back.*

*The side mounting brackets shall be integral with the shelving to form the sides. The shelving shall be vertically adjustable.*

*The following shelving shall be provided:*

### **UPPER HALF DEPTH SHELVING**

*A full width x half depth shelf shall be provided and installed in the upper area of the compartment specified.*

*There shall be a total quantity of two (2) provided.*

- One (1) located in the R-1 compartment.*
- One (1) located in the R-3 compartment.*

### **UPPER FULL DEPTH SHELVING**

*A full width x full depth shelf shall be provided and installed in the upper area of the compartment as specified.*

*There shall be a total quantity of one (1) provided.*

- One (1) located in the L-3 compartment.*

### **LOWER FULL DEPTH SHELVING**

*A full width x full depth shelf shall be provided and installed in the lower area of the compartment as specified.*

*There shall be a total quantity of one (1) provided.*

- One (1) located in the R-1 compartment.*
- One (1) located in the R-3 compartment.*

### **REAR COMPARTMENT SHELF**

*An adjustable shelf installed in the rear center compartment, B-1, of the apparatus. Each shelf shall be as wide and deep as possible.*





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*There shall be a total quantity of one (1) provided.*

### **ROLL OUT TRAY(S)**

*Each tray shall be fabricated of .190 inch (4.83 mm) thick 3003 grade or higher aluminum sheet material with four (4) 3.00 inch (76.20 mm) side flanges, corner welded for maximum strength and shall be as wide and as deep as compartment allows.*

*The following shall be supplied:*

### **ROLL-OUT ASSEMBLY/AUSTIN**

*The floor mounted tray shall be full width and shall be secured to an Austin Hardware 22.00 inch (558.80 mm) long ball bearing "heavy duty" slide assembly. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a lock-in, lock-out front drawer release system (FDR).*

*The tray shall have a 300# capacity and 100% extension.*

*There shall be a total quantity of five (5) provided.*

- One (1) located in the L-2 compartment.*
- One (1) located in the L-3 compartment.*
- One (1) located in the R-1 compartment.*
- One (1) located in the R-3 compartment.*
- One (1) located in the rear center compartment.*

### **ROLL-OUT ASSEMBLY/AUSTIN**

*The adjustable tray shall be full width and shall be secured to an Austin Hardware 22.00 inch (558.80 mm) long ball bearing "heavy duty" slide assembly. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a lock-in, lock-out front drawer release system (FDR).*

*The tray shall have a 300# capacity and 100% extension and adjustable height utilizing unistrut materials.*

*There shall be a total quantity of one (1) provided.*

- One (1) located in the rear center compartment.*



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### **ROLL OUT/TILT DOWN TRAY**

*The roll out/tilt mounted tray shall be full width and depth and shall be secured to a (Slide Master) Aluminum frame roll-out system. The slide unit shall extend down 30-degrees and 90% extension with a 200# slide capacity. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a latching device to hold the tray in the stored position.*

*There shall be a total quantity of two (2) provided.*

*Each slide shall be held in the locked position by a lever actuated twist lock.*

*Each Slide Master slide shall be wet painted {silver} in color.*

*- One (1) located in the L-2 compartment.*

*- One (1) located in the L-3 compartment.*

### **SHELF AND TRAY MATTING**

*Any shelf or tray provided shall have VersaFlex matting installed. The tiles shall be custom fitted for durability and a pleasing appearance.*

### **MATTING COLOR**

*The matting shall be black in color.*

### **ROLL OUT TRAY REFLECTIVE STRIPING**

*Each roll out tray provided shall have RED retro-reflective striping installed to indicate a hazard or an obstruction.*

### **SHELF REFLECTIVE STRIPING**

*Each shelf provided shall have RED retro-reflective striping installed to indicate a hazard or an obstruction.*

### **PULL-OUT TOOL BOARD/ALUMINUM**

*An aluminum pull-out tool board shall be installed in the compartment as specified. The tool board shall be attached to unistrut material mounted on the floor and ceiling of the compartment, extending perpendicular to the rear wall, allowing for horizontal adjustment from front to rear.*

*The tool board shall be mounted on ball bearing slides, top and bottom. A locking device shall be installed on the lower slide to keep the board in the stored and extended positions.*

*There shall be a total quantity of two (2).*



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*The pull-out/ swing-out style tool board shall have RED reflective striping installed making the perimeter of the tool board more readily visible.*

*- Two (2) located in the L-1 compartment.*

### **FIXED DEPTH SWING-OUT TOOL BOARD/ALUMINUM**

*An aluminum swing-out tool board shall be installed in the compartment as specified. The tool board shall be fabricated within a structural tubular frame, supported on a pivot rod, seated in bearings attached to the compartment floor and upper bracket.*

*The tool board shall be capable of swinging open to a position perpendicular to the rear wall. A thumb latch and gas shock shall be installed to keep the board in the open and or closed positions.*

*There shall be a total quantity of one (1).*

*The pull-out/ swing-out style tool board shall have RED reflective striping installed making the perimeter of the tool board more readily visible.*

*- One (1) located in the R-2 compartment.*

### **WALL MOUNTED TOOL BOARD/ALUMINUM**

*An aluminum tool board shall be installed to the back wall of the compartment as specified. The tool board shall be mounted directly to unistrut material attached the wall.*

*There shall be a total quantity of two (2).*

*- One (1) located in the R-1 compartment.*

*- One (1) located in the R-3 compartment.*

### **SIDE RUB RAILS (RUBBER EXTRUDED W/MOUNT)**

*The lower edge of the apparatus shall be trimmed with rubber rub rails to absorb minor damage while protecting the body. The rub rails shall be fabricated of an extruded rubber cushion material integrated into an aluminum c-channel mount.*

*The rub rails shall not be constructed as an integral part of the apparatus body structure, allowing each rub rail to be easily removed in the event of damage.*

*The rub rails shall be secured with stainless steel fasteners and spaced away from the apparatus body with .50 inch nylon spacers to help absorb moderate side impacts and prevent the collection of water and debris for easier cleaning.*



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### **REAR RUB RAIL (RUBBER EXTRUDED W/MOUNT)**

*The rearward edge of the rear step shall be trimmed with a rubber rub rail to absorb minor damage while protecting the rear of body. The rub rail shall be fabricated of extruded rubber cushion material and integrated into an aluminum c-channel mount.*

*The rub rails shall not be constructed as an integral part of the apparatus body structure, allowing each rub rail to be easily removed in the event of damage.*

*The rub rails shall be secured with stainless steel fasteners and spaced away from the apparatus body with .50 inch nylon spacers to help absorb moderate side impacts and prevent the collection of water and debris for easier cleaning.*

### **FOLDING STEPS**

*Illuminated folding step(s) shall be installed that shall meet current NFPA in step height requirements.*

*The top of the stepping surface shall have a knurled finish and an LED light that illuminates the stepping surface with an additional light provided on the step mounting bracket to illuminate the area under the step.*

*Each surface of the folding step shall have grip material with a minimum of 42 sq. inches in size and shall be capable of sustaining a 500 lb. static load.*

*The steps shall be manufactured by Cast Products Inc. (CPI).*

### **STEP LOCATION**

*Four (4) folding steps shall be installed on the right forward vertical wall of the front compartment.*

### **10" HANDRAIL**

*One (1) 10.00 inch long by 1.25 inch diameter handrail constructed of knurled #3 polished stainless steel tubing shall be installed in a best fit location above the forward step(s) to assist in climbing the steps and in accordance with (NFPA) 1901, Standard for Automotive Fire Apparatus, standard requirements. There shall be a 2.00 inch minimum clearance between the bracket and the body.*

### **LIGHTING ACTIVATION**

*Step lighting shall be activated with the park brake or the underbody light switch in the cab.*

### **STEP LOCATION**

*Four (4) folding steps shall be installed on the left forward vertical wall of the front compartment.*



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*One (1) 10" long x 1 1/4" diameter handrail constructed of knurled #3 polished stainless steel tubing shall be installed in a best fit location above the forward step(s) to assist in climbing the steps and in accordance with the current edition of NFPA 1901, current edition, standard requirements. There shall be a 2" minimum clearance between the bracket and the body.*

### **LIGHTING ACTIVATION**

*Step lighting shall be activated with the park brake or the underbody light switch in the cab.*

### **INTERMEDIATE REAR STEP**

*The rear step shall be 8.00 inches (203.20 mm) in depth.*

*The step shall be constructed of a 7.00 inch (177.80 mm) wide piece of "Diamondback" grip material spaced away from the back of the body 1.00 inches (25.40 mm) to provide an 8.00 inch (203.20 mm) deep stepping surface. The step shall be mounted on the flat back of the apparatus with gusset-type mounting to provide sufficient support for loading and deploying hose and for gaining access to the hose bed area.*

### **INTERMEDIATE REAR STEP LOCATION**

*The rear step shall be located just above the B-1 compartment door.*

*The directional lightbar shall be located (under) between the rear step and the rear center compartment.*

### **STEP LIGHTING**

*One (1) light shall be installed to illuminate the stepping areas as provided. The light shall be a LED Tube light model #RX-15T16-5050-21CM with an aluminum mounting bezel.*

*The light shall be directed towards and positioned above the stepping surfaces.*

### **LIGHTING ACTIVATION**

*Step lighting shall be activated with the park brake or the underbody light switch in the cab.*

### **"SMART" ALUMINUM ACCESS LADDER**

*A "Smart" aluminum fold down access ladder shall be provided at the rear of the apparatus. The ladder rungs shall be constructed of a slip resistant stepping material.*

*The upper section shall be permanently secured to the body with a mechanical style hinge and fasteners that allow the ladder to extend down and out to the ground from the apparatus body. When deployed, the fold-down steps shall create a safe and comfortable climbing angle.*



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*Two (2) gas cylinders shall be installed to assist in the deployment of the lower fold-down section. A mechanical locking mechanism shall be provided to retain the ladder in a stowed and secured position when in transit or when not in use. Access ladder rung illumination shall be provided during low light conditions.*

*If the step is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.*

### **ACCESS LADDER LOCATION**

*The ladder shall be installed at the rear of the apparatus on the left side.*

### **STEP LIGHTING**

*Five (5) lights shall be installed to illuminate the stepping areas as provided. The light shall be a LED Tube light model #RX-15T16-5050-21CM with an aluminum mounting bezel.*

*The lights shall be directed towards and positioned above the stepping surfaces.*

### **LIGHTING ACTIVATION**

*Step lighting shall be activated with the park brake or the underbody light switch in the cab.*

### **KNURLED SST HANDRAILS**

*All handrails shall be 1 1/4" in diameter constructed of knurled #3 polished stainless steel tubing. There shall be a 2" minimum clearance between the bracket and the body.*

*The following handrails shall be installed at the approximate lengths as noted:*

### **REAR HANDRAIL LOCATION**

*Two (2) handrails installed on the rear of the apparatus. Each handrail shall be of an adequate length, as available usable space allows, to provide a suitable gripping area for personnel.*

*The handrails shall be spaced away from the body using chrome plated ends. One (1) vertical handrails shall be installed, on the right side, just below the hose bed sides. The remaining handrail shall be installed horizontally, just below the hose bed area.*

### **10" HANDRAILS**

*Two (2) 10" handrails shall be installed, one (1) on each side of the pump compartment above the pump panel.*



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## **10" HANDRAILS**

*Two (2) 10.00 inch handrails shall be installed, one (1) on each side of the apparatus body compartments on the rear.*

## **TOW EYES**

*There shall be two rear tow eyes installed to the frame rails, one each side, accessible below the rear center compartment. They shall be manufactured of 1.00 inch plate steel and each plate shall be bolted to the chassis frame rail with a minimum quantity of (6) grade 8 bolts. The two plates shall be anchored together with 1.00 inch steel tubing to prevent swaying of the frame rails during a towing operation. All steel components shall be painted black.*

## **LOW-VOLTAGE ELECTRICAL SYSTEM**

*The apparatus shall be equipped with a Logic Controlled, Low-Voltage (12v) Electrical System, compliant with the latest revision of the (NFPA) 1901, Standard for Automotive Fire Apparatus.*

*The system shall be capable of performing total load management, load management sequencing, and load shedding via continuous monitoring of the low-voltage electrical system. In addition, the system shall be capable of switching loads (similar to operating as an emergency warning lamp flasher) eliminating the dependency on many archaic electrical components such as conventional flasher modules. The system shall also incorporate provisions for future expansion or system modification.*

*The low-voltage electrical system shall be designed to distribute the placement of electrical system hardware throughout the apparatus thereby enabling a smaller, optimized wire harness. The programmable, logic controlled system shall eliminate redundant electrical hardware such as extra harnesses, circuit boards, relays, circuit breakers, and separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.*

*As-built electrical system drawings and an apparatus-specific reference of I/O shall be furnished in the final delivery manuals. These drawings shall illustrate the electrical system broken down into separate functions, or small groups of related functions. Drawings shall depict circuit numbers, electrical components and connectors from beginning to end. **A single drawing for all electrical circuits installed by the apparatus manufacturer shall not be accepted.***

## **NODE**

*An electrical distribution node or relay shall be installed in the below locations of the apparatus body.*

*The pump node shall be located in under the full depth transition in compartment R1.*

*The rear body nodes shall be mounted as high and as practical on the rearward wall of the rearmost compartment.*



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*A protective cover shall be installed to prevent damage to the node or electrical system during equipment installation and or removal.*

*Node covers shall be approximately 16.00 to 22.00 inches in length with an inspection hole positioned for view of the node indicator LED lights.*

*The finish of the cover shall match the compartments interior finish.*

*Node covers will not include any type of shelve mounting structure and shall limit the height of unistrut or shelf height within the compartments.*

***ALL ELECTRICAL NODES SHALL BE LABELED AS TO THE NODE NUMBER.***

### **PERIMETER LIGHTS LOCATION**

*There shall be six (6) underbody perimeter lights installed on the apparatus positioned to provide illumination to the immediate ground area around the unit.*

*One (1) under each side of the pumphouse, one (1) under each side at the front of the body, and two (2) under the rear tailboard.*

### **PERIMETER LIGHTS**

*The underbody perimeter lights provided will be TecNiq model T44 series, 4" round, 8 diode LED lights.*

### **PERIMETER LIGHTS ACTIVATION**

*The perimeter lights under the body shall illuminate the area with the activation of the chassis ground lights.*

### **UPPER LIGHTING PACKAGE**

*The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the upper areas of the vehicle.*

### **LIGHTBAR ACTIVATION**

*The lightbar shall be controlled through the master warning switch.*

### **AUXILIARY UPPER ZONE A:**

*There shall be two (2) Whelen model L31HGF Green beacons with 360 degree LED lights, provided and installed on the apparatus, one (1) each side.*

*One (1) each side on the rear upper outboard corners of the cab roof.*





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## **UPPER ZONE A WARNING SWITCH**

*The upper auxiliary cab warning lights shall be controlled through the master warning switch.*

## **UPPER ZONE B&D-FORWARD:**

*There shall be two (2) Whelen model 900 series Super-LED lights with chrome bezels provided and installed with the apparatus.*

*There shall be one (1) each side of the body in the upper forward corners.*

*The forward edge of the light shall be 12" rearward of the front of body.*

## **SIDE WARNING LIGHTS FLASH**

*The upper side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.*

## **SIDE WARNING LIGHTS COLOR**

*The upper warning lights mounted on the side positions shall be red with clear lenses.*

## **UPPER ZONE B&D-REAR:**

*There shall be two (2) Whelen model 900 series Super-LED lights with chrome bezels provided and installed with the apparatus.*

*There shall be one (1) each side of the body in the upper rear corners.*

*The rearward edge of the light shall be 12" forward of the rear of body.*

## **SIDE WARNING LIGHTS FLASH**

*The upper side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.*

## **SIDE WARNING LIGHTS COLOR**

*The upper warning lights mounted on the side positions shall be red with clear lenses.*

## **UPPER ZONE C:**

*There shall be two (2) Whelen model 900 series Super-LED lights with chrome bezels, one (1) each side, provided and installed with the apparatus.*



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## **REAR WARNING LIGHTS COLOR**

*The upper warning lights mounted at the rear shall be red with clear lenses.*

## **ADDITIONAL UPPER ZONE C:**

*There shall be two (2) Whelen 600 series LED lights with chrome bezels, one (1) each side, provided and installed with the apparatus.*

*The lights shall be installed just below the rear scene lights.*

## **REAR WARNING LIGHTS FLASH**

*The rear upper 900 Red LED lights shall flash in a "X" pattern with the opposite 600 Green LED light.*

*This shall be accomplished by a ULF 44 flasher.*

## **REAR WARNING LIGHTS COLOR**

*The upper warning lights mounted at the rear shall be green with clear lenses.*

## **LOWER LED WARNING LIGHTING**

*The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the lower areas of the vehicle.*

## **LOWER FRONT WARNING LIGHT SWITCH E-MASTER ONLY**

*The lower front warning lights shall be controlled through the master warning switch only. There shall not be a secondary switch.*

## **LOWER ZONE B&D:**

*There shall be four (4) Whelen model 600 series Super-LED lights with chrome bezels, two (2) each side, provided and installed with the apparatus.*

## **SIDE WARNING LIGHTS FLASH**

*The lower side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be programmed to emit the "Comet Flash 75" flash pattern.*

## **SIDE WARNING LIGHTS COLOR**

*The lower side warning lights mounted on the side positions shall be red with clear lenses.*



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## **SIDE WARNING LIGHTS LOCATION**

*The warning lights on the side of the apparatus shall be mounted at the pump panel location and at the rear tailboard location.*

## **AUXILIARY WARNING LIGHTS LOWER ZONE B&D**

*There shall be four (4) auxiliary Whelen 500 series LED lights installed two (2) each side.*

*One (1) shall be installed in front and one (1) behind the rear axle on the lower body sides. These four (4) lights shall be installed in the rear fender (wheel well) area of the body.*

## **SIDE WARNING LIGHTS FLASH**

*The lower front lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.*

## **SIDE WARNING LIGHTS COLOR**

*The lower side warning lights mounted on the side positions shall be red with clear lenses.*

## **LOWER ZONES B&D CAST ALUMINUM LIGHT HOUSING WITH PAINTED INSERT**

*A cast aluminum light housing with painted outward facing inserts, shall be installed for the rearmost warning light in zones B&D. The housing will ensure the light is mounted as far rearward as possible.*

*The inserts shall be painted to color match the body.*

## **SIDE WARNING SWITCH**

*The lower side warning lights shall be controlled through the master warning switch.*

## **LOWER ZONE C:**

*There shall be two (2) Whelen model 600 series Super-LED lights with chrome bezels, one (1) each side, on provided and installed on the rear of the body.*

## **REAR WARNING LIGHTS FLASH**

*The lower rear lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be programmed to emit the "Comet Flash 75" flash pattern.*



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## **REAR WARNING LIGHTS COLOR**

*The lower rear warning lights mounted at the rear shall be red with clear lenses.*

## **REAR WARNING SWITCH**

*The lower rear warning lights shall be controlled through the master warning switch.*

## **LED REAR TAIL LIGHT ASSEMBLY**

*There shall be Whelen model 600 series, 4 x 6, LED rear tail light assemblies provided and installed with the apparatus, one (1) each side at the rear*

*The following shall be installed in the order as specified from top to bottom:*

*One (1) red stop/tail light*

*One (1) amber turn signal light populated in the shape of an arrow*

*One (1) clear backup light*

## **MOUNTING ASSEMBLY**

*There shall be Whelen 3-position vertical chrome plated housing provided for each tail light assembly.*

## **BACKUP LIGHTS**

*The backup lights shall illuminate when the apparatus is placed in reverse.*

## **LED DOT LIGHTING**

*There shall be seven (7) lights located on the rear of the apparatus.*

*Five (5) of the lights shall be mounted on the lower rear portion of the apparatus, for use as identification lamps.*

*Two (2) lights shall be located on the upper rear body sides facing the side, for use as clearance lamps.*

*All lower lights shall be installed in the rub rails.*

*The lights shall be Weldon brand 9186-1500 series LED red and amber markers.*

## **LED INTERMEDIATE TURN SIGNAL LIGHTING**

*There shall be two (2) amber intermediate turn signals and two (2) amber intermediate marker lights on the sides of the apparatus (one (1) each per side) between the front and rear axles*

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*installed in the rub rails.*

*The lights shall be Weldon brand 9186-1500 series LED amber markers.*

### **INTERMEDIATE TURN SIGNALS**

*The intermediate turn signals will flash with the turn indicators.*

### **REAR DIRECTIONAL LIGHTBAR**

*There shall be a Whelen model #TAL65 36.00 inch long directional lightbar with six (6) amber 500 series LED light heads provided and installed on the apparatus. The traffic advisor shall include model TACTL5 control head that includes remote flash control.*

*The RDL controller shall be recess installed in the center dash in the chassis provided cutout.*

*The RDL shall be powered up by master power switch and go to rapid random flash pattern.*

### **DIRECTIONAL LIGHTBAR LOCATION & PROTECTION**

*The rear directional lightbar shall be surface mounted directly below the intermediate step and installed directly above the rear door.*

### **REAR VIEW CAMERA LOCATION**

*A camera shipped loose with the chassis shall be surface mounted on the left rear of the apparatus body for maximum viewing capability. A protective shroud shall be installed over the system to protect against damage.*

### **SPECIAL ATTENTION-JUNCTION BOXES**

*Any electrical junction boxes located in the pump house, under the body, under the cab and any electrical junction boxes for telescoping lights or receptacles in the cab/body shall be installed in ABS water tight type boxes with ABS covers with the cover silicone on and ABS core locks.*

*In addition all 120/240volt wiring shall be protected by flexible conduit.*

### **SIDE SCENE LIGHT LOCATION**

*There shall be two (2) scene lights installed on the body side of the apparatus, one (1) on each side center location of the body side walls.*

### **SCENE LIGHT MODEL**

*The lights shall be HiViz model FireTech FT-B-65 LED scene lights.*



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*The housing shall be powder coated white.*

## **BODY SIDE SCENE LIGHT ACTIVATION**

*The scene lighting shall be activated by two (2) virtual buttons on the Vista display and control screen and two (2) weather resistant push button switches at the pump operator's panel, one (1) for each light.*

*The switch shall be labeled as follows:*

*Left Scene*

*Right Scene*

## **REAR SCENE LIGHT LOCATION**

*There shall be two (2) scene lights installed on the rear facing vertical surface of the body, one (1) on each side.*

*The scene lights on the rear vertical walls shall be positioned far outboard on each side below the warning lights specified.*

## **SCENE LIGHT MODEL**

*Fire Tech LED Guardian FT-GESM scene lighting shall be surface mounted on the apparatus.*

*Each light shall be 9.55 inches high X 10.63 inches wide. Wiring shall extend from a weatherproof strain relief at the rear of the light.*

*Each lamp head shall have twelve (12) white LEDs that generate a rated 20,500 lumens at 12 volts DC.*

*The lens shall redirect the light along the vehicle and out onto the working area.*

*The light housing shall have a chrome bezel.*

## **REAR SCENE LIGHT ACTIVATION**

*The rear scene lighting shall be activated when the apparatus transmission is shifted into reverse and by a virtual button on the Vista display and control screen in the cab and a weather resistant push button switch at the pump operator's panel.*

*The switch shall be labeled as follows:*

*Rear Scene*



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## **TELESCOPING LIGHT LOCATION**

*The specified telescoping lights shall be mounted at the rear face of the cab, one (1) each side on the vertical panels.*

## **SCENE LIGHT MODEL**

*Fire Research Spectra LED Scene Light model SPA530-Q20 side mount, bottom raise telescopic light shall be provided on the apparatus.*

*The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail.*

*The lamp head shall have eighty four (84) ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 12/24 volts DC, draw 18/9 amps, and generate 20,000 lumens of light. The lamp head shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamp head angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamp head shall be no more than 5.375 inches high by 14.00 inches wide by 3.75 inches deep and have a heat resistant handle. The lamp head and mounting arm shall be powder coated. The LED scene light shall be for fire service use.*

## **STEADY REST BRACKET**

*Each scene light pole shall have a steady rest bracket installed to support the inside pole when it is in the retracted position.*

## **REAR CAB SCENE LIGHT ACTIVATION**

*The rear cab scene lighting shall be activated by a virtual button on the Vista display and control screen in the cab and a weather resistant push button switch at the pump operator's panel.*

*The switch shall be labeled as follows:*

*Rear Cab Tele-Light*

## **SURFACE PROTECTOR PLATE**

*A mirrored stainless steel protector shall be installed behind each light head to protect the surface behind the light(s) from being scratched.*

## **RECEPTACLE INSIDE EMS COMPARTMENT**

*One (1) receptacle shall be provided and installed inside each of the two (2) chassis cab EMS compartments. The receptacles shall be low on the back wall and to the left side of each*



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*compartment.*

## **RECEPTACLE TYPE**

*The receptacle(s) shall be type NEMA 5-15 120V/15A single receptacle with a cover.*

## **RECEPTACLE POWER**

*The previously described outlet(s) shall be powered by the shoreline connection and shall be live when the shoreline power is provided.*

## **REFLECTIVE STRIPING**

*There shall be a 4.00 inch (101.60 mm) inch reflective stripe applied to the chassis and apparatus body as specified:*

## **STRIPE PATTERN**

*The reflective striping shall be applied around the perimeter of the apparatus in a straight line pattern.*

## **STRIPE COLOR**

*The reflective striping shall be white in color.*

## **REAR RETRO-REFLECTIVE CHEVRON STRIPING**

*A minimum of 50 percent of the rear-facing vertical surface, visible from the rear of the apparatus, shall be equipped with Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the vehicle at an angle of 45-degrees.*

*The stripe shall be 6.00 inches (152.40 mm) wide alternating in colors in compliance with the current edition of NFPA 1901, current edition.*

## **CHEVERON COLOR**

*The retro-reflective chevron striping shall be red and fluorescent yellow-green in color.*

## **REFLECTIVE LETTERING**

*Reflective WHITE letters with BLACK outline shall be provided and installed on the apparatus as directed by the Fire Department. A maximum total of sixty (60) letters up to 6.00 inches (152.4 mm) high shall be provided.*





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## **LICENSE PLATE MOUNTING**

*A Cast Products, model LP0005-1-C, cast aluminum open bottom license plate bracket shall be installed. The bracket shall incorporate a clear LED (WL0501) to illuminate the license plate and meet DOT requirements.*

## **MISCELLANEOUS EQUIPMENT**

*The following equipment list shall be provided with the completed apparatus.*

### **WHEEL CHOCKS**

*One (1) set(s) of NFPA compliant Ziamatic folding wheel chocks model # SAC-44-E shall be supplied with the apparatus.*

### **EXTINGUISHERS**

*All NFPA required fire extinguishers will be supplied and installed by the Fire Department before the apparatus is placed into service.*

### **RECHARGEABLE FLASHLIGHTS**

*A hand held Streamlight Fire Vulcan LED rechargeable lantern, model #44451 (orange) with quick release shoulder strap and charge rack shall be installed on the apparatus.*

*There shall be a total quantity of two (2) provided.*

*A total of two (2) light(s) shall be mounted in the crew area of the cab.*

### **AXES**

*A Fire Hooks Unlimited, item FAP-6, six pound pick head axe with a yellow, fiberglass handle shall be provided.*

*There shall be a total quantity of one (1) provided.*

*A Fire Hooks Unlimited, item FA-6, six pound flat head axe with a yellow, fiberglass handle shall be provided.*

*There shall be a total quantity of one (1) provided.*

### **PROVIDED CONFERENCES**

*The department shall be provided the following conferences.*

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### **PRE-CONSTRUCTION CONFERENCE**

*There shall be a pre-construction conference held, prior to manufacturing. The conference shall be at Spartan Motors facility located in Charlotte MI.*

### **CHASSIS FINAL INSPECTION**

*There shall be a final inspection conference held for the final inspection of the completed chassis at the Spartan Motors facility located in Charlotte MI.*

### **FINAL INSPECTION CONFERENCE**

*There shall be a final-construction conference held, prior to delivery of the completed apparatus.*

*Individuals from the Fire Department shall be provided by the contractor, meals while at the Spartan Motors facility located in Charlotte MI.*

### **DELIVERY**

*The completed Apparatus, to insure proper break-in of all components while still under warranty, shall be delivered under it's own power, to the Fire Department.*

*The unit will remain insured by the apparatus manufacturer until the department accepts the unit.*

### **TRAINING**

*Spartan ER, shall have a qualified delivery engineer instruct the Fire Department Personnel/ Motor Pool in the proper operation, care and maintenance of the equipment delivered.*

*The firefighter/operator training/motor pool shall be conducted after the vehicle is delivered and accepted by the department, at a time mutually agreed on by both the " Department " and " Spartan ER ", for training.*

### **APPARATUS PRE-DELIVERY INSPECTION**

*The following shall be performed by the Dealership service center before the apparatus is delivered to the fire department:*

#### **Chassis:**

- \* All fluid levels shall be checked and filled.(If needed)*
- \* The drive train shall be completely lubed.*
- \* All belts and brakes shall be checked for proper adjustment.*
- \* The batteries, electrical system and components shall be completely checked.*
- \* Secondary braking system.*
- \* The warning light/siren/air horn systems shall be completely checked.*

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- \* All shoreline plug-ins and all components energized by the shoreline.
- \* Chassis door adjustments.
- \* The tires checked for proper pressure.

### **Pump:**

- \* All fluid levels shall be checked and filled.(If needed)
- \* Pump engagement and operation of all components, including foam system.
- \* All gated valves and linkages shall be completely lubed.
- \* Water shall be flowed thru all discharges.
- \* All gated valves shall be checked for leaks and rod adjustments.

### **Body:**

- \* The warning light system shall be completely checked.
- \* The electrical system shall be completely checked.
- \* All shoreline plug-ins and all components energized by the shoreline.
- \* Body door adjustments.

### **Final:**

- \* The unit shall be road tested.
- \* The unit shall be completely cleaned, inside and outside.
- \* The unit shall be filled with fuel.

### **DEALER SUPPLIED EQUIPMENT PROVIDED WITH THE COMPLETED APPARATUS**

The following equipment shall be supplied by the Dealership with the delivered apparatus. Mounting shall be provided for the equipment specified to mount.

### **TFT DQS40 QUADRAPHOG 5-40 GPM BOOSTER NOZZLE**

One (1) Task Force Tip DQS40 Quadraphog 5-40gpm booster nozzle with 1" swivel inlet.

TFT: DQS40

### **TFT 6" NSTFSLH X 5" SWIVEL STORZ W/BLEEDER AND CAP**

Two (2) 6" NST female swivel short handle x 5" swivel storz ball intake relief valve with locks, bleeder, cap and lanyard.

### **EQUIPMENT**

The following additional equipment shall be provided with the completed apparatus.

- 1) 200' of Mercedes Boostlie 1" booster hose w/FRC 100' sections color Yellow

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- 2) Install department provided antennas four (4) and GPS antenna and one (1) radio
- 3) 800' of Mercedes Megaflo 5" LDH supply hose w/ Gold Storz 5" couplings color Yellow
- 4) (1) Honda EU2200i 2200-Watt 120-Volt Super Quiet Portable Inverter Generator
- 5) (2) Streamlight 45670 Portable Scene Light with 120V AC/12V DC Charger, Yellow

## **Additional Equipment**

### **Extrication equipment loadout**

- 1 Hurst SP555E2 Package
- 1 Hurst S700E2 Package
- 1 Hurst R421E2 Package
- 2 Hurst Power Supply Adapter
- 1 Rescue 42 TeleCrib Engine Kit
- 1 Rescue 42 Hook Cluster
- 2 Rescue 42 Strut Jack
- 12 Turtle 4x4x18 Hybrid
- 8 Turtle 2x4x18
- 2 Turtle Step Chock w/COG
- 1 Turtle 3" Lock Block
- 1 Turtle 18" ModPad
- 1 Turtle Wheel Chocks (pair)
- 2 Turtle Crib Toters
- 1 Ajax 911 RK Chisel Kit
- 1 Paratech MultiForce Remote Kit
- 1 MVA Crash Kit - Rescueman tools
- 1 Dewalt corded reciprocating saw kit 13 amp DW311K
- 2 20 ton bottle Jacks Strongway jacks, Northern Tool



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## **Nozzles -**

- (2) - Pre-connect nozzles - Inventory*
- (2) -Bundle Nozzles - Inventory*
- (2) - 2 ½ smooth bore attack - 2.5 Elkhart Brass play pipes with Indy stacked tips*
- (1) - 1 ½ spare - Inventory*
- (1) - Solid stream nozzle - Elkhart Brass 1.5 XD with shut off, smooth bore-187 XD-7/8 tip*

## **Brass -**

### **All pyrolite**

- (1) - 2 ½ double female*
- (1) - 2 ½ double male*
- (1) - 1 ½ double male*
- (1)- 1 ½ double female*
- (1) - 5" to 4" storz adaptor*
- (3) - Hydrant 4" NST to 5" storz*
- (3) - 2 ½ Hydrant gate valves*
- (2) - Akron spanner/hydrant wrench holder brackets*
- (1)- Akron Hydrant wrench Style 15*
- (1) - Yellow hydrant bag with dual bottom layer*

## **Loose Equipment**

- Big Easy Kit - Vehicle lockout tool kit*
- Elevator Keys*
- Dry Chem- 20lbs.*
- CO2 extinguisher - 10-BC*
- 2 ½ gallon - AFFF foam extinguisher*
- 2 1/2 gal. water can*
- TIC - Scott Model X380 with charger station*
- Halligan- 30" pro bar - Fire Hooks*
- High Rise Hose Bag- 4' milwaukee strap bag*
- Sledge Hammer-12 pnd*
- Bolt Cutter-36"*
- Pinch Bar-Pinch point crow bar, 51"*
- Fire Maul 32" with end cap and grip tape*
- (20) - 28 inch pop-up road cones - 5 pack kits in carrying cases*
- General purpose scoop shovel - Grainger-52CD18*
- Round Point Shovel - Grainger 3YU82*
- Push Broom 24" Heavy bristle - H1929 ULINE products*