HARWICH FIRE DEPARTMENT
HARWICH, MASSACHUSETTS
TYPE 3 Engine, SVI #1051
Production Specification

Contract Amdinistrator: Jackie Sipes
Sales Administrator: Rafe

FORT COLLINS SVI COLORADO

ROCK SOLID QUALITY

SCOPE AND GENERAL REQUIREMENTS

It is the intent of the Harwich Fire Department to secure an emergency apparatus to withstand the continuous use encountered in the emergency service. The apparatus shall be of the latest type, symmetrically proportioned and constructed with due consideration of the load to be sustained.

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

If any Bidder has questions in connection with these specifications, please contact Deputy Chief Dave Leblanc via email at dleblanc@harwichfire.com at least seven (7) days before bid date. It is not the purpose of these specifications to eliminate any qualified Bidder.

The Harwich Fire Department will review the question, and where information sought is not clearly indicated or specified, in the Harwich Fire Department's opinion, same will issue a clarifying or correcting addendum bulletin. Proper interpretation or the making of any necessary inquiry will be the Bidders responsibility. Oral answers will not be binding on the Harwich Fire Department.

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

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

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

The Harwich Fire Department specifications, along with Manufacturer's specifications and any forms, questionnaires, and listed exceptions, shall be submitted as a part of the Bidder's entire bid proposal.

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

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

In addition, all Bidders are required to submit Harwich Fire Department's specifications in their proposal, noting items where the Bidder’s proposal differs and consecutively number each item. The number shall correspond with the bidder’s exception, variation, or clarification page which must be attached to their proposal.

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

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

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

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

The apparatus body manufacturer shall be prime Bidder and shall identify the location of their facility and the number of regular full time employees. A complete history of the Bidder's company shall be supplied in his request for proposal request for proposals are requested from responsible manufacturers who are engaged in the manufacture of emergency apparatus. Harwich Fire Department does not request proposals from bankrupt, reorganized or unproven manufacturers.

Each Bidder shall submit a list of a minimum of ten (10) Departments where the vendor has delivered similar type and size apparatus within the last five (5) years with contact addresses and telephone numbers. Bidders shall submit photographs with their proposal showing similar emergency apparatus manufactured.

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

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

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

STAFF PROFILE AND EXPERIENCE

A list of key staff personnel who will work on this project including a photo and number of years of work experience in their particular field shall be provided with proposal. This list will include but not be limited to key; Sales, Contract Administration, Purchasing, Engineering, Fabrication, Electrical Systems including IT, Finish, and Warranty/Service support personnel.

GENERAL CONSTRUCTION AND DESIGN

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

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

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

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

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

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

ACCESSIBILITY

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

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

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

MATERIALS

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

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

QUALITY AND WORKMANSHIP

The manufacturing process, including quality control, shall be consistent with present industry standards. All equipment, material, and articles required under these specifications are to be new or fabricated from new materials produced from recovered materials. The term "Recovered Materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this document. The term "Heavy Duty", as used to describe an item, shall mean in excess of the standard, quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, system, etc., that is available. The Harwich Fire Department or their designate shall be the sole judge of quality, construction and stability of the apparatus and equipment being offered.

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

Defective components shall not be furnished. Parts, equipment, and assemblies, which have been repaired or modified to overcome deficiencies, shall not be furnished without the approval of the Harwich Fire Department. Welded, bolted, and riveted construction utilized shall be in accordance with the highest standards of the industry. Component parts and units shall be manufactured to definite standard dimensions with proper fits, clearances, and uniformity. General appearance of the vehicle shall not show any evidence of poor quality of work.

LIABILITY INSURANCE

The manufacturer shall furnish with the bid a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering for all employees.

General Liability (each occurrence) of $1,000,000.00. General Aggregate coverage of $2,000,000.00. Products Completed / Operations Aggregate coverage of $2,000,000.00. Medical Expense coverage of $5,000 (any one person). Personal Injury of $1,000,000.00.

Automobile liability of $1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of $4,000,000.00 each occurrence, Aggregate of $4,000,000.00.
Garage Keepers Liability coverage of $4,000,000.00 combined limit.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

INTERNET IN-PROCESS SITE

The manufacturer shall post and maintain a website where the Harwich Fire Department will be able to view digital images of their apparatus as its being built. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of unit.

VEHICLE STABILITY

ROLLOVER STABILITY

The apparatus shall meet the criteria defined in either of the following:

(1) The apparatus shall remain stable in both directions when tested on a tilt table in accordance with SAE J2180, *A Tilt Table Procedure for Measuring the Static Rollover Threshold for Heavy Trucks.*

(2) The calculated or measured vertical center of gravity (VCG) divided by the rear axle track width shall not exceed the criteria in Table

Vehicle GVWR	Tilt Criteria (degrees)	VCG/Track (percentage)
< 33,000 lb (14,969 kg)	30	75
> 33,000 lb (14,969 kg)	27	80

Compliance shall be certified by testing, calculating, or measuring the apparatus or by comparing the apparatus to a compliant, substantially similar example apparatus, and the certification shall be delivered with the fire apparatus.

The example apparatus shall be considered substantially similar if it includes a chassis with the same or higher center of gravity (CG) height, the same or narrower rear axle track width, the same or greater water tank size and CG height, and the same type of front and rear suspension.

The apparatus shall be loaded with fuel, fire-fighting agents, hose, ladders, a weight of 250 lb (114 kg) in each seating position, and weight equivalent to the required miscellaneous equipment allowance. *In addition, if the apparatus is designed to accommodate SCBA, an additional 25 lb (11.4 kg) per seating position shall be added to the miscellaneous equipment allowance.*

If the apparatus is designed to meet a specified higher equipment loading (e.g., a larger hose bed capacity) or to carry ground ladders or additional equipment, these greater loads shall be included in the testing, calculating, or measuring.

The weight added to the fire apparatus for the purpose of test, calculation, or measurement shall be distributed to approximate typical in-service use of the fire apparatus while not exceeding the manufacturer's published individual compartment weight ratings.

FIRE APPARATUS PERFORMANCE

The fire apparatus shall meet the requirements of this standard at elevations of 2000 ft (600 m) above sea level.

The fire apparatus shall meet all the requirements of this standard while stationary on a grade of 10 percent in any direction.

The fire apparatus shall meet the requirements of this standard in ambient temperature conditions between 32°F (0°C) and 110°F (43°C).

ROADABILITY

The apparatus, when loaded to its estimated in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
3) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

The maximum top speed of fire apparatus with a GVWR over 33,000 lb (11,800 kg) shall not exceed 68 mph (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

The vehicle shall be capable of maneuvering across a 20 percent grade and up and down a 25 percent grade.

SERVICEABILITY

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

WILDLAND DOCUMENTATION

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

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

2. Certification of compliance of the optical warning system
3. Siren manufacturer's certification of siren
4. Written load analysis and results of the electrical system performance tests
5. Certification of slip resistance of all stepping, standing, and walking surfaces
6. The wildland fire pump manufacturer's certification of suction capability

7. If special conditions are specified by the purchaser of the wildland fire pump, the pump manufacturer's certification of suction capacity under the special conditions
8. A copy of the apparatus manufacturer's approval for stationary pumping applications of the wildland fire pump
9. For each pump, the pump manufacturer's certification of the hydrostatic test
10. For each pump, the certification of inspection and test for the pump
11. The certification of water tank capacity
12. If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification that the foam proportioning system meets this standard
13. If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
14. If the apparatus has a line voltage power source, the certification of the test for the power source *(see NFPA 1901, Standard for Automotive Fire Apparatus, 22.15.7.2)*
15. If the apparatus is equipped with an air system, air tank certificates *(see NFPA1901, 24.5.1.2)*, the SCBAfill station certification *(see NFPA 1901, 24.9.7)*, and the results of the testing of the air system installation *(see NFPA 1901, 24.14.5 and NFPA 1901, 24.15.4)*
16. Certification of vehicle side slope stability, including the weight distribution assumed for the calculations or as loaded on the vehicle for the tilt table test
17. Any other required manufacturer test data or reports

OPERATIONS AND SERVICE DOCUMENTATION

The contractor shall deliver with the fire apparatus complete operation and service documentation covering the completed apparatus as delivered and accepted.

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

The contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

1) Manufacturer's name and address
2) Country of manufacture
3) Source for service and technical information
4) Parts replacement information
5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
6) Wiring diagrams for low voltage and line voltage systems to include the following information:
   a) Pictorial representations of circuit logic for all electrical components and wiring
   b) Circuit identification
   c) Connector pin identification
   d) Zone location of electrical components
   e) Safety interlocks
   f) Alternator–battery power distribution circuits
   g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
7) Lubrication charts
8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
9) Precautions related to multiple configurations of aerial devices, if applicable
10) Instructions regarding the frequency and procedure for recommended maintenance
11) Overall apparatus operating instructions
12) Safety considerations
13) Limitations of use
14) Inspection procedures
15) Recommended service procedures

16) Troubleshooting guide
17) Apparatus body, chassis and other component manufacturer's warranties
18) Special data required by this standard
19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus
20) One copy of the latest edition of FAMA's *Fire Apparatus Safety Guide*

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

NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE

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

FIRE APPARATUS SAFETY GUIDE

A Fire Apparatus Safety Guide published by Fire Apparatus manufacturer's Association shall be provided with delivered vehicle. 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 fire fighting apparatus manufactured on either custom or commercial chassis.

STATEMENT OF EXCEPTIONS

The final-stage manufacturer shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

1) A separate specification of the section of the applicable standard for which compliance is lacking
2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

Prior to or at the time of delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

GVWR	Chassis		Storage Area		Equipment Weight		Ground Clearance	
Apparatus Type	**lb.**	**kg.**	**ft.3**	**m3**	**lb.**	**kg.**	**in.**	**mm.**
Wildland Fire Apparatus	15,000	7,000	20	0.56	200	90	12	300
	15,001 - 20,000	7,001 - 9,000	50	1.42	500	225	13	330
	20,001 - 26,000	9,001 - 12,000	50	1.42	500	225	15	380
	>26,000	>12,000	75	2.12	750	340		
Wildland Mobile Water Supply Fire Apparatus	All	All			200	90		

TESTING

ROAD TEST

Road test shall be conducted in accordance with this section to verify that the completed apparatus is capable of compliance with Roadability Section.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition. The apparatus shall be loaded to its estimated in service weight.

The engine shall not operate in excess of the maximum governed speed. Acceleration tests shall consist of two runs in opposite directions over the same route. The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds. The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the Body Manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

If the apparatus is equipped with a hydraulic brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

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

TEST SEQUENCE

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

1. RESERVE CAPACITY TEST

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

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

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

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

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

3. LOW VOLTAGE ALARM TEST

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

MANUFACTURER PUMP CERTIFICATION

The apparatus upon completion shall be tested and certified by the manufacturer. The certification tests shall follow the guide lines outlined in NFPA 1901 "Standard for Fire Apparatus".

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

The fire pump shall be tested and results certified to perform as listed below;

- 100% of rated capacity at 150 psi (1,000 kPa) net pressure
- 70% of rated capacity at 200 psi (1,400 kPa) net pressure
- 50% of rated capacity at 250 psi (1,700 kPa) net pressure

The test 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.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (3,400 kPa).

The pump shall comply with the applicable requirements of "Standard for Fire Apparatus 1901, latest edition.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

If the apparatus is equipped with a pump driven by the chassis engine designed for both stationary pumping and pump-and-roll, the test shall verify that the engine speed control at 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 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-and-Roll" position.

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.

WARRANTY

A full statement shall be provided of the warranties for the vehicle(s) being bid. Warranties should clearly describe the terms under which the vehicle manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material and for the applicable period of time after delivery.

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

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source and will deal directly with the Harwich Fire Department on all warranty work.

GENERAL LIMITED WARRANTY - THREE (3) YEARS

The vehicle shall be free of defects in material and workmanship for a period of three (3) years or 50,000 miles (or 80,467 kilometers), whichever occurs first starting thirty (30) days after the original invoice date.

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

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles (or 96,561 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

STRUCTURAL WARRANTY - TEN (10) YEARS

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT LIMITED WARRANTY - TEN (10) YEARS

The body shall be free of bubbling or peeling as a result of a defect in the method of manufacture for a period of ten (10) years or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date. **Pro-rated warranties will not be acceptable.**

GRAPHICS LIMITED WARRANTY

The 3M graphics installation shall be warranted for a period of two (2) years. The 3M materials installed on completed vehicle shall be warranted for seven (7) years. The 3M Diamond grade film (if specified) shall be warranted for ten (10) years.

HALE FIVE YEAR PUMP WARRANTY

The fire pump shall be warranted by Hale for a period of five (5) years from the date of delivery to the Harwich Fire Department. Within this warranty period Hale shall cover parts and labor for the first two (2) years and parts only for years three (3) through five (5).

STAINLESS STEEL PLUMBING WARRANTY

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

AKRON BRASS FIVE YEAR VALVE WARRANTY

The Akron Brass valves shall be warranted by Akron Brass for a period of ten (10) years from the date of delivery to the Harwich Fire Department. The warranty for electronics shall be warranted by Akron Brass for a period of five (5) years from date of delivery to the Harwich Fire Department.

UPF POLY WATER TANK WARRANTY

The UPF poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred sixty (360) days after receipt of a purchase order or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to Harwich Fire Department as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT REQUIREMENT

The overall height (OAH) of the vehicle shall be approximately “ (124") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately “ (324").

OVERALL WIDTH

The overall width (OAW) of the body at drip rails shall be 100" (8' - 4"), and body shall be 98" (8' - 2").

ANGLE OF APPROACH

The angle of approach for this vehicle shall not be less than twenty (20) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1906.

ANGLE OF DEPARTURE

The angle of departure for this vehicle shall not be less than twenty (20) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1906.

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference shall be required at the Contractor's factory for three (3) personnel from the Harwich Fire Department to finalize all construction details prior to manufacturing.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-construction conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

FINAL INSPECTION CONFERENCE

A final inspection conference shall be required at the Contractor's factory for three (3) personnel from the Harwich Fire Department to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the final inspection conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

DELIVERY AND DEMONSTRATION

The Contractor shall be responsible for the delivery of the completed unit to the Harwich Fire Department's location. On initial delivery of the apparatus, the Contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Harwich Fire Department regarding the operation, care and maintenance of the apparatus and equipment supplied at Harwich Fire Department location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by Harwich Fire Department.

After delivery of the apparatus, the Harwich Fire Department shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

SUPPLIED CAB CHASSIS SPECIFICATION

Vehicle Configuration

108SD CONVENTIONAL CHASSIS
2018 MODEL YEAR SPECIFIED
SET BACK AXLE - TRUCK
STRAIGHT TRUCK PROVISION
LH PRIMARY STEERING LOCATION

General Service

TRUCK CONFIGURATION
DOMICILED, USA (EXCLUDING CALIFORNIA AND CARB OPT-IN STATES)
FIRE SERVICE
EMERGENCY VEHICLES BUSINESS SEGMENT
LIQUID BULK COMMODITY
TERRAIN/DUTY: 100% (ALL) OF THE TIME, IN TRANSIT, IS SPENT ON PAVED ROADS
MAXIMUM 8% EXPECTED GRADE
SMOOTH CONCRETE OR ASPHALT PAVEMENT - MOST SEVERE IN-TRANSIT (BETWEEN SITES) ROAD SURFACE
FREIGHTLINER SD VOCATIONAL WARRANTY
EXPECTED FRONT AXLE(S) LOAD : 14000.0 lbs
EXPECTED REAR DRIVE AXLE(S) LOAD : 23000.0 lbs
EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 37000.0 lbs

Truck Service

RESCUE - STRAIGHT (NON DROP) FRAME NO MAIN DRIVELINE DRIVEN SPLIT-SHAFT PTO
EXPECTED BODY/PAYLOAD CG HEIGHT ABOVE FRAME "XX" INCHES : 32.0 in

Engine

CUM L9 350EV HP @ 2000 RPM, 2200 GOV RPM , 1000 LB/FT @ 1400 RPM

Electronic Parameters

75 MPH ROAD SPEED LIMIT
CRUISE CONTROL SPEED LIMIT SAME AS ROAD SPEED LIMIT
PTO RPM WITH CRUISE SET SWITCH - 700 RPM
PTO RPM WITH CRUISE RESUME SWITCH - 800 RPM
PTO MODE CANCEL VEHICLE SPEED - 5 MPH
PTO GOVERNOR RAMP RATE - 250 RPM PER SECOND
PTO MINIMUM RPM - 700

REGEN INHIBIT SPEED THRESHOLD - 5 MPH

Engine Equipment

2016 ONBOARD DIAGNOSTICS/2010 EPA/CARB/FINAL GHG17 CONFIGURATION
NO 2008 CARB EMISSION CERTIFICATION
NO 2013 ENGINE ESCALATOR
STANDARD OIL PAN
ENGINE MOUNTED OIL CHECK AND FILL
SIDE OF HOOD AIR INTAKE WITH NFPA COMPLIANT EMBER SCREEN AND FIRE RETARDANT
DONALDSON AIR CLEANER
DR 12V 275 AMP 40-SI BRUSHLESS PAD ALTERNATOR WITH REMOTE BATTERY VOLTAGE SENSE
(2) ALLIANCE MODEL 1231, GROUP 31, 12 VOLT MAINTENANCE FREE 2250 CCA THREADED STUD BATTERIES
BATTERY BOX FRAME MOUNTED
STANDARD BATTERY JUMPERS
SINGLE BATTERY BOX FRAME MOUNTED LH SIDE UNDER CAB
WIRE GROUND RETURN FOR BATTERY CABLES WITH ADDITIONAL FRAME GROUND RETURN
NON-POLISHED BATTERY BOX COVER
POSITIVE LOAD DISCONNECT WITH CAB MOUNTED CONTROL SWITCH WITH LOCKING PROVISION MOUNTED OUTBOARD DRIVER SEAT
POSITIVE AND NEGATIVE POSTS FOR JUMPSTART LOCATED ON FRAME NEXT TO STARTER
CUMMINS TURBOCHARGED 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY VALVE
GVG, FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING
CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH, ACTIVATES STOP LAMPS
RH OUTBOARD UNDER STEP MOUNTED HORIZONTAL AFTERTREATMENT SYSTEM ASSEMBLY WITH RH HORIZONTAL TAILPIPE
ENGINE AFTERTREATMENT DEVICE, AUTOMATIC OVER THE ROAD ACTIVE REGENERATION AND DASH MOUNTED SINGLE REGENERATION REQUEST/INHIBIT SWITCH
STANDARD EXHAUST SYSTEM LENGTH
RH STANDARD HORIZONTAL TAILPIPE
6 GALLON DIESEL EXHAUST FLUID TANK
100 PERCENT DIESEL EXHAUST FLUID FILL
STANDARD DIESEL EXHAUST FLUID PUMP MOUNTING
LH MEDIUM DUTY STANDARD DIESEL EXHAUST FLUID TANK LOCATION
STANDARD DIESEL EXHAUST FLUID TANK CAP
HORTON DRIVEMASTER ADVANTAGE ON/OFF FAN DRIVE
AUTOMATIC FAN CONTROL WITHOUT DASH SWITCH, NON ENGINE MOUNTED
CUMMINS SPIN ON FUEL FILTER
COMBINATION FULL FLOW/BYPASS OIL FILTER
1200 SQUARE INCH ALUMINUM RADIATOR
ANTIFREEZE TO -34F, OAT (NITRITE AND SILICATE FREE) EXTENDED LIFE COOLANT
GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT
GATES POWERGRIP SHRINK BAND HOSE CLAMPS WHERE POSSIBLE
AUXILIARY ENGINE COOLING USING WATER FROM FIRE PUMP
ELECTRIC GRID AIR INTAKE WARMER
DELCO 12V 39MT HD/OCP STARTER WITH THERMAL PROTECTION AND INTEGRATED MAGNETIC SWITCH

Transmission

ALLISON 3000 EVS AUTOMATIC TRANSMISSION WITH PTO PROVISION

Transmission Equipment

ALLISON VOCATIONAL PACKAGE 198 - AVAILABLE ON 3000/4000 PRODUCT FAMILIES WITH VOCATIONAL MODEL EVS
ALLISON VOCATIONAL RATING FOR FIRE TRUCK/EMERGENCY VEHICLE APPLICATIONS AVAILABLE WITH ALL PRODUCT FAMILIES
PRIMARY MODE GEARS, LOWEST GEAR 1, START GEAR 1, HIGHEST GEAR 5, AVAILABLE FOR 3000/4000 PRODUCT FAMILIES ONLY
SECONDARY MODE GEARS, LOWEST GEAR 1, START GEAR 1, HIGHEST GEAR 6, AVAILABLE FOR 3000/4000 PRODUCT FAMILIES ONLY
PRIMARY SHIFT SCHEDULE RECOMMENDED BY DTNA AND ALLISON, THIS DEFINED BY ENGINE AND VOCATIONAL USAGE
SECONDARY SHIFT SCHEDULE RECOMMENDED BY DTNA AND ALLISON, THIS DEFINED BY ENGINE AND VOCATIONAL USAGE
PRIMARY SHIFT SPEED RECOMMENDED BY DTNA AND ALLISON, THIS DEFINED BY ENGINE AND VOCATIONAL USAGE
SECONDARY SHIFT SPEED RECOMMENDED BY DTNA AND ALLISON, THIS DEFINED BY ENGINE AND VOCATIONAL USAGE
LOAD BASED SHIFT SCHEDULE AND VEHICLE ACCELERATION CONTROL RECOMMENDED BY DTNA AND ALLISON, THIS DEFINED VOCATIONAL USAGE
DRIVER SWITCH INPUT - DEFAULT - NO SWITCHES
VEHICLE INTERFACE WIRING CONNECTOR WITHOUT BLUNT CUTS, AT END OF FRAME
ELECTRONIC TRANSMISSION CUSTOMER ACCESS CONNECTOR FIREWALL
PTO, TRANSFER CASE MOUNTED
MAGNETIC PLUGS, ENGINE DRAIN, TRANSMISSION DRAIN, AXLE(S) FILL AND DRAIN
PUSH BUTTON ELECTRONIC SHIFT CONTROL, DASH MOUNTED
TRANSMISSION PROGNOSTICS - ENABLED 2013
WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK
MERITOR MTC-4210 AND MTC-4213 TRANSFER CASE OIL COOLER
TRANSMISSION OIL CHECK AND FILL WITH ELECTRONIC OIL LEVEL CHECK
MERITOR MTC 4210XP 2-SPEED TRANSFER CASE
TRANSFER CASE SHIFT CONTROLS WITH TRANSFER CASE PTO ON/OFF SWITCH WHEN APPLICABLE
SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle and Equipment

MX-14-120-EVO 14,000# 1790MM KPI SINGLE FRONT DRIVE AXLE
5.57 FRONT AXLE RATIO
MXL 16T MERITOR EXTENDED LUBE FRONT STEERING AXLE DRIVELINE WITH HALF ROUND YOKES
MERITOR 16.5X5 Q+ MX DRIVE AXLE CAST SPIDER HEAVY DUTY CAM FRONT BRAKES
FIRE AND EMERGENCY SEVERE SERVICE, NON-ASBESTOS FRONT LINING
MERITOR CAST IRON FRONT BRAKE DRUMS
FRONT BRAKE DUST SHIELDS
FRONT OIL SEALS
STANDARD SPINDLE NUTS FOR ALL AXLES

MERITOR AUTOMATIC FRONT SLACK ADJUSTERS
STANDARD KING PIN BUSHINGS
TRW TAS-85 POWER STEERING
POWER STEERING PUMP
2 QUART SEE THROUGH POWER STEERING RESERVOIR
SYNTHETIC 75W-90 FRONT AXLE LUBE

Front Suspension

14,600# TAPERLEAF FRONT SUSPENSION
MAINTENANCE FREE RUBBER BUSHINGS - FRONT SUSPENSION
NO FRONT SUSPENSION SPRING BRACKET OPTIONS
FRONT SHOCK ABSORBERS

Rear Axle and Equipment

RS-23-161 23,000# R-SERIES SINGLE REAR AXLE
5.63 REAR AXLE RATIO
IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING
MXL 17T MERITOR EXTENDED LUBE MAIN DRIVELINE WITH HALF ROUND YOKES
MXL 17T MERITOR EXTENDED LUBE INTERTRANSMISSION DRIVELINE WITH HALF ROUND YOKES
DRIVER CONTROLLED TRACTION DIFFERENTIAL - SINGLE REAR AXLE
(1) DRIVER CONTROLLED DIFFERENTIAL LOCK REAR VALVE FOR SINGLE DRIVE AXLE BLINKING LAMP WITH EACH MODE SWITCH, DIFFERENTIAL UNLOCK WITH IGNITION OFF, ACTIVE <5 MPH
MERITOR 16.5X8.62 Q+ CAST SPIDER CAM REAR BRAKES, DOUBLE ANCHOR, FABRICATED SHOES
FIRE AND EMERGENCY SEVERE SERVICE NON-ASBESTOS REAR BRAKE LINING
BRAKE CAMS AND CHAMBERS ON FORWARD SIDE OF DRIVE AXLE(S)
GUNITE CAST IRON REAR BRAKE DRUMS
SKF SCOTSEAL PLUS XL REAR OIL SEALS
HALDEX GOLDSEAL LONGSTROKE 1-DRIVE AXLE SPRING PARKING CHAMBERS
BENDIX VERSAJUST AUTOMATIC REAR SLACK ADJUSTERS
SYNTHETIC 75W-90 REAR AXLE LUBE
STANDARD REAR AXLE BREATHER(S)

Rear Suspension

23,000# AWD MULTI-LEAF SPRING REAR SUSPENSION
SPRING SUSPENSION - NO AXLE SPACERS
STANDARD AXLE SEATS IN AXLE CLAMP GROUP

Brake System

WABCO 4S/4M ABS WITH TRACTION CONTROL
REINFORCED NYLON, FABRIC BRAID AND WIRE BRAID CHASSIS AIR LINES
FIBER BRAID PARKING BRAKE HOSE
STANDARD BRAKE SYSTEM VALVES
    STANDARD AIR SYSTEM PRESSURE PROTECTION AND 85 PSI PRESSURE PROTECTION FOR AIR HORN(S)
STD U.S. FRONT BRAKE VALVE
RELAY VALVE WITH 5-8 PSI CRACK PRESSURE, NO REAR PROPORTIONING VALVE
WABCO SS-1200 PLUS AIR DRYER WITH INTEGRAL AIR GOVERNOR AND HEATER
AIR DRYER MOUNTED INBOARD ON LH RAIL
ALUMINUM AIR BRAKE RESERVOIRS
CLEAR FRAME RAILS FROM BACK OF CAB TO FRONT REAR SUSPENSION BRACKET, BOTH RAILS OUTBOARD
PULL CABLE ON WET TANK, PETCOCK DRAIN VALVES ON ALL OTHER AIR TANKS

Trailer Connections

UPGRADED CHASSIS MULTIPLEXING UNIT

Wheelbase & Frame

4425MM (174 INCH) WHEELBASE
11/32X3-1/2X10-15/16 INCH STEEL FRAME (8.73MMX277.8MM/0.344X10.94 INCH) 120KSI
1950MM (77 INCH) REAR FRAME OVERHANG
FRAME OVERHANG RANGE: 71 INCH TO 80 INCH
24 INCH INTEGRAL FRONT FRAME EXTENSION
CALC'D BACK OF CAB TO REAR SUSP C/L (CA) : 61.2 in
CALCULATED EFFECTIVE BACK OF CAB TO REAR SUSPENSION C/L (CA) : 56.7 in
CALC'D FRAME LENGTH - OVERALL : 316.16
CALC'D SPACE AVAILABLE FOR DECKPLATE : 61.2 in
CALCULATED FRAME SPACE LH SIDE : 75.82 in
CALCULATED FRAME SPACE RH SIDE : 114.21 in
SQUARE END OF FRAME
REAR TOW HOOKS
FRONT CLOSING CROSSMEMBER
LIGHTWEIGHT HEAVY DUTY ALUMINUM ENGINE CROSSMEMBER
STANDARD MIDSHIP #1 CROSSMEMBER(S)
STANDARD REARMOST CROSSMEMBER
STANDARD SUSPENSION CROSSMEMBER

Chassis Equipment

14 INCH CHROMED STEEL BUMPER
FRONT TOW HOOKS - FRAME MOUNTED
GRADE 8 THREADED HEX HEADED FRAME FASTENERS

Fuel Tanks

50 GALLON/189 LITER SHORT RECTANGULAR ALUMINUM FUEL TANK - LH
RECTANGULAR FUEL TANK(S)
POLISHING OF FUEL/HYDRAULIC TANK(S) WITH PAINTED BANDS
FUEL TANK(S) FORWARD
PLAIN STEP FINISH
FUEL TANK CAP(S)
DETROIT FUEL/WATER SEPARATOR WITH WATER IN FUEL SENSOR
EQUIFLO INBOARD FUEL SYSTEM
HIGH TEMPERATURE REINFORCED NYLON FUEL LINE

Tires

MICHELIN XDS 12R22.5 16 PLY RADIAL FRONT TIRES
MICHELIN XDS 12R22.5 16 PLY RADIAL REAR TIRES

Hubs

MERITOR IRON FRONT HUBS
CONMET PRESET PLUS IRON REAR HUBS

Wheels

ALCOA ULTRA ONE 89U64X 22.5X9.00 10-HUB PILOT 5.99 INSET ALUMINUM FRONT WHEELS
ALCOA ULTRA ONE 89U64X 22.5X9.00 10-HUB PILOT 5.99 INSET ALUMINUM REAR WHEELS
POLISHED FRONT WHEELS; OUTSIDE ONLY
POLISHED REAR WHEELS; OUTSIDE OF OUTER WHEELS ONLY

Cab Exterior

156 INCH BBC HIGH-ROOF ALUMINUM CONVENTIONAL CREW CAB
AIR CAB MOUNTS
CAB ROOF REINFORCEMENTS FOR ROOF MOUNTED COMPONENTS
NONREMOVABLE BUGSCREEN MOUNTED BEHIND GRILLE
FRONT FENDERS SET-BACK AXLE
BOLT-ON MOLDED FLEXIBLE FENDER EXTENSIONS
LH AND RH EXTERIOR GRAB HANDLES WITH SINGLE RUBBER INSERT
BRIGHT FINISH RADIATOR SHELL/HOOD BEZEL
STATIONARY BLACK GRILLE WITH BRIGHT ACCENTS
CHROME HOOD MOUNTED AIR INTAKE GRILLE
FIBERGLASS HOOD
TUNNEL/FIREWALL LINER
VALVE AND PLUMBING FOR CUSTOMER FURNISHED AIR HORN, PIPING CAPPED AT FIREWALL
DUAL ELECTRIC HORNS
DOOR LOCKS AND IGNITION SWITCH KEYED THE SAME
REAR LICENSE PLATE MOUNT END OF FRAME
HALOGEN COMPOSITE HEADLAMPS WITH BRIGHT BEZELS
LED AERODYNAMIC MARKER LIGHTS
OMIT STOP/TAIL/BACKUP LIGHTS AND PROVIDE WIRING WITH SEPARATE STOP/TAIL WIRES TO 7 FEET BEYOND END OF FRAME

STANDARD FRONT TURN SIGNAL LAMPS
DUAL WEST COAST BRIGHT FINISH HEATED MIRRORS WITH LH AND RH REMOTE DOOR MOUNTED MIRRORS
102 INCH EQUIPMENT WIDTH
LH AND RH 8 INCH BRIGHT FINISH CONVEX MIRRORS MOUNTED UNDER PRIMARY MIRRORS
RH DOWN VIEW MIRROR
STANDARD SIDE/REAR REFLECTORS
NO REAR WINDOW
TINTED DOOR GLASS LH AND RH WITH TINTED NON-OPERATING WING WINDOWS
RH AND LH ELECTRIC POWERED WINDOWS, PASSENGER SWITCHES ON DOOR(S)
TINTED WINDSHIELD
8 LITER WINDSHIELD WASHER RESERVOIR, CAB MOUNTED, WITH FLUID LEVEL INDICATOR

Cab Interior

OPAL GRAY VINYL INTERIOR
MOLDED PLASTIC DOOR PANEL WITHOUT VINYL INSERT WITH ALUMINUM KICKPLATE LOWER DOOR
MOLDED PLASTIC DOOR PANEL WITHOUT VINYL INSERT WITH ALUMINUM KICKPLATE LOWER DOOR
BLACK MATS WITH SINGLE INSULATION
NO FORWARD ROOF MOUNTED CONSOLE
IN DASH STORAGE BIN
(2) CUP HOLDERS LH AND RH DASH
GRAY/CHARCOAL FLAT DASH
SMART SWITCH EXPANSION MODULE
HEATER, DEFROSTER AND AIR CONDITIONER
STANDARD HVAC DUCTING
MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH
STANDARD HEATER PLUMBING
DENSO HEAVY DUTY AIR CONDITIONER COMPRESSOR
BINARY CONTROL, R-134A
PREMIUM INSULATION
SOLID-STATE CIRCUIT PROTECTION AND FUSES
12V NEGATIVE GROUND ELECTRICAL SYSTEM
DOOR ACTIVATED DOME/RED MAP LIGHTS, FORWARD LH AND RH AND REAR LH, RH AND CENTER
LH AND RH ELECTRIC DOOR LOCKS
(2) 12 VOLT POWER RECEPTACLES MOUNTED IN DASH
    H.O. BOSTROM SIERRA AIR-50 HIGH BACK AIR SUSPENSION DRIVER SEAT WITH ADJUSTABLERECLINE, FIXED LUMBAR AND NFPA 1901-2009
H.O.BOSTROM TANKER 450 AIR-50 SCBA HIGH BACK AIR SUSPENSION PASSENGER SEAT WITH SECUREALL READY CUSHION AND NFPA 1901-2009 COMPLIANT SEAT SENSOR
* H.O. BOSTROM TANKER 450 SCBA NON SUSPENSION LH AND RH REAR PASS SEATS WITH UNDER SEAT STORAGE, SECUREALL READY CUSHION AND NFPA 1901-2009 COMPLIANT SEAT SENSOR
LH AND RH INTEGRAL DOOR PANEL ARMRESTS
BLACK CORDURA PLUS CLOTH DRIVER SEAT COVER
N BLACK CORDURA PLUS CLOTH PASSENGER SEAT COVER
N NFPA 1901-2009 HIGH VISIBILITY ORANGE SEAT BELTS
ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN
4-SPOKE 18 INCH (450MM) STEERING WHEEL
DRIVER AND PASSENGER INTERIOR SUN VISORS

Instruments & Controls

WOODGRAIN DRIVER INSTRUMENT PANEL
WOODGRAIN CENTER INSTRUMENT PANEL
ENGINE REMOTE INTERFACE WITH PARK BRAKE AND NEUTRAL INTERLOCKS
BLACK GAUGE BEZELS
LOW AIR PRESSURE INDICATOR LIGHT AND AUDIBLE ALARM
2 INCH PRIMARY AND SECONDARY AIR PRESSURE GAUGES
INTAKE MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS
97 DB BACKUP ALARM
ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL
IGNITION SWITCH WITH NON REMOVABLE KEY
ICU3S, 132X48 DISPLAY WITH DIAGNOSTICS, 28 LED WARNING LAMPS AND DATA LINKED
HEAVY DUTY ONBOARD DIAGNOSTICS INTERFACE CONNECTOR LOCATED BELOW LH DASH
2 INCH ELECTRIC FUEL GAUGE
ENGINE REMOTE INTERFACE FOR REMOTE THROTTLE
ENGINE REMOTE INTERFACE CONNECTOR IN ENGINE COMPARTMENT
ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE
2 INCH TRANSMISSION OIL TEMPERATURE GAUGE
ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY
ENHANCED STABILITY CONTROL
ELECTRIC ENGINE OIL PRESSURE GAUGE
OVERHEAD INSTRUMENT PANEL
AM/FM/WB WORLD TUNER RADIO WITH SIRIUS XM, CD PLAYER, BLUETOOTH, IPOD INTERFACE AND USB AND AUXILIARY INPUTS, J1939
DASH MOUNTED RADIO
(2) RADIO SPEAKERS IN CAB
AM/FM ANTENNA MOUNTED ON FORWARD LH ROOF
INTEROPERABLE SDAR ANTENNA
ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE, WITHOUT ODOMETER
STANDARD VEHICLE SPEED SENSOR
ELECTRONIC 3000 RPM TACHOMETER
NFPA VEHICLE DATA RECORDER AND SEATBELT DISPLAY
NO DETROIT CONNECT SERVICES SELECTED
NO ZONAR SERVICES SELECTED
IGNITION SWITCH CONTROLLED ENGINE STOP
(2) FOOT SWITCHES: (1) OFFICER AIR HORN AND (1) DRIVER AIR HORN
DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY
SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY
MARKER LIGHT/HEADLIGHT SWITCH WITH SEPARATE INTERRUPTER FOR CLEARANCE LIGHTS
ALTERNATING FLASHING LOW BEAM HEADLAMPS WITH DASH SWITCH, WITH PARK BRAKE RELEASED
ONE VALVE PARKING BRAKE SYSTEM WITH DASH VALVE CONTROL AUTONEUTRAL AND WARNING INDICATOR
SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE
INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS

Design

TWO COLOR CUSTOM PAINT

Color

CAB COLOR A: L1132EB RED ELITE BC
CAB COLOR B: L0006EB WHITE ELITE BC
CHASSIS PAINT: N1132EA RED ELITE SS
NO FUEL TANK CABINET PAINT
STANDARD E COAT/UNDERCOATING

CAB TO AXLE DIMESION

Cab to axle will be 62”.

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

A permanent label in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle and tire information:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid . . (if applicable)
- Pump priming system fluid, if applicable . . (if applicable)
- Drive axle(s) lubrication fluid
- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the;
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the;
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

OVERALL HEIGHT, LENGTH DATA PLATE (US)

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed fire apparatus in feet and inches, the length of the completed fire apparatus in feet and inches, and the GVWR in pounds.

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

PERSONNEL CAPACITY

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

SEAT BELT WARNING - FAMA06/07

A safety sign FAMA06 shall be visible from each seat that is not equipped with occupant restraint and therefore not intended to be occupied while the vehicle is in motion.

A safety sign FAMA07, which warns of the importance of seat belt use, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

EQUIPMENT MOUNTING FAMA10

A safety sign FAMA10, which warns of the need to secure items in the cab, shall be visible inside the cab.

FIRE SERVICE TIRES - FAMA12

A safety sign FAMA12, which warns of the special requirements for fire service–rated tires, shall be visible to the driver entering the cab of any apparatus so equipped.

HELMET WARNING - FAMA15

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

CLIMBING METHOD - FAMA23

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

REAR STEP CROSSWALK WARNING - FAMA24

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION

A final stage manufacturer vehicle certification label shall be provided and installed in the driver cab door jamb area.

FRONT BUMPER

The front bumper shall be as provided by the cab/chassis manufacturer. No other alteration or modifications are required to extension length.

BUMPER GRAVEL SHIELD

The front bumper extension shall have a 3/16" NFPA compliant aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

BUMPER PRE-CONNECT COMPARTMENT

The bumper extension shall have one (1) fire hose pre-connect compartment center of bumper extension. The compartment shall be as large as room allows. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinge wrapped with vinyl and chrome push release type latches. Door shall be notched to allow fire hose to be pre-connected to swivel located on streetside of front bumper. The compartment door shall have a gas shock type hold open device. This compartment shall not be watertight but shall include a compartment drain.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

If the bumper compartment is greater than 4 cu.ft. in volume and has an opening greater than 144 sq.in. it shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any equipment in the compartment. There shall be one (1) 9" OnScene LED type ground light mounted below the bumper.

A flashing warning light signal shall be provided indicating when a compartment door is not in a closed position as required by NFPA 1901.

Compartment capacity 200 feet of 1-3/4" DJ hose w/nozzle.

AIR HORN

One (1) Grover 24" Stuttertone chrome plated air horn shall be recessed mounted in the front bumper on the curbside side. An emergency air shut off valve shall be provided in the cab.

AIR HORN ACTIVATION

The air horn(s) shall be operated by a foot switch on the cab floor located at both the driver and officer positions.

MOTOR DRIVEN SIREN

There shall be a Federal model Q2B motor driven rotary siren with chrome plated grill and housing, recess in the extended front bumper. The siren shall be wired through the master warning light switch, and properly wired with heavy copper cable for minimum voltage drop.

The siren shall be located on the streetside of the front bumper.

There shall be a siren brake installed in the rocker switch control panel to activate the siren brake.

SIREN ACTIVATION

There shall be two (2) foot switches provided to activate the siren; one (1) for the driver, and one (1) for the officer. The switches shall be mounted on the floor in a location to prevent accidental activation.

FRONT TOW PLATE

A horizontal full frame width, 1/2" thick steel plate, center pull, front tow eye shall be furnished and installed belowand behind front bumper. The tow eye plate shall be triangle shaped extended 6" beyond the front bumper with a 3" x 4" rectangle tow eye. The tow eye must be braced and gusseted to prevent frame rail or bumper damage and bolted to the front frame rail web with eight (8) 5/8" SAE Grade 8 frame bolts and lock nuts.

Move below and behind front bumper.

FRONT TOW EYES

There shall be two (2) heavy duty cast tow eyes securely mounted to the chassis frame belowand behind the front bumper.

AIR INTAKE SYSTEM

An air filter shall be provided in the engine’s air intake system by the body builder. Air inlet restrictions shall not exceed the engine manufacturer’s recommendations. The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

In addition to the engine's air intake, the cab fresh air intake and/or outside cab vent shall be equipped with a means of separating water and burning embers from the air intake system

This requirement shall be permitted to be achieved by either of the following methods:

1. Provision of a device such that burning particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.

2. Provision of a multi screen ember separator capable of meeting the test requirements defined in the Parker Hannafin, Racor Division, publication LF 1093-90, *Ember Separation Test Procedure*, or an equivalent test.

EXHAUST

The existing exhaust tailpipe shall be extended to ahead of the rear axle on the curbside.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the apparatus or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator's position.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

PLYMOVENT EXHAUST ADAPTER

A Plymovent 5" exhaust adapter flange for Plymovent pneumatic systems shall be provided and installed on the chassis engine exhaust tailpipe.

RADIO/ANTENNA INSTALLATION

There shall be two (2) Harwich Fire Department supplied radio(s) with antenna installed in center console. The exact location of radios shall be determined by the Harwich Fire Department at the pre-construction meeting. All required radio programming shall be responsibility of Harwich Fire Department. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of Harwich Fire Department after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

Customer will supply MFG and Model ahead of time.

12 VDC ACCESSORY PLUG

There shall be two (2) 12 volt accessory plug(s) provided and installed in the center console, wired battery direct. The location of accessory plugs shall be one each side of console.

12 VDC USB, DUAL PORT PLUG

There shall be two (2) 12 volt dual port USB plug(s) provided and installed in the center console, wired battery direct. The location of the USB plugs shall be located one each side of console.

CAB DOOR INTERIOR HAZARD LIGHT - FOUR DOOR CAB

There shall be one (1) surface mounted flashing LED light mounted to the inside of each cab entry door to provide a visual indication to oncoming traffic that the door is open. Each light shall be activated when the door is open.

SCBA BRACKETS

There shall be two (2) Zico ULLH walkaway type SCBA air pack bracket(s) provided with strap assembly mounted in cab area.

The brackets shall be mounted in at rearmost position of cab console leaving room for EMS compartment (24-30" Long.)

SEAT BELT COLOR

Section 14.1.3.4 of the NFPA 1901 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - COMMERCIAL CAB

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS

SEAT BELT MONITORING

A Weldon 6204 series system with Occupant Restraint Indicator (ORI) display shall be provided and installed to allow the driver to know if all persons seated in the vehicle are secured with seat belts before moving the vehicle. Built-in smart seating logic shall detect if the correct sit and buckle sequence is not followed for all seats. System shall also provide an output for an external alarm. Weldon diagnostic port will be located under dash on driver side. System shall include the following features;

VEHICLE DATA RECORDER (VDR)

The vehicle data recorder shall have the following features;

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available.
- Easily interfaces with traditional wiring, or optional V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable
- Use in conjunction with the Occupant Restraint Indicator or optional V-MUX™ multiplex system

OCCUPANT RESTRAINT INDICATOR

The occupant restraint indicator shall have the following features;

- Supports commercial and custom cab seating layouts; up to 12 seats
- Built-in audible alarm
- Use in conjunction with Vehicle Data Recorder (VDR)

IGNITION LEVER

An ignition lever or button instead of a key shall be provided by the cab chassis manufacturer.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with a VECSAFE heavy duty valve cap (or equal) "Mechanical" indicator that indicates proper tire pressure. The VECSAFE valve cap is self-calibrating. When the cap is mounted on the valve stem the first time, it will memorize that tire pressure, and can be set to recognize a drop in pressure as little as 4 psi. It can be checked for functionality and battery condition by simply unscrewing the cap. If it is in working condition, it will immediately start blinking.

HELMET STORAGE

No helmet storage is required in the cab driving area.

HELMET STORAGE

No helmet storage is required in the cab crew area.

CAB CRASH TEST CERTIFICATION

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

The certification shall state that the cab does meet or exceed the requirements below:

1) European Occupant Protection Standard ECE Regulation No. 29.
2) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

CAB MIRRORS, DRIVER ADJUSTABLE

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

CAB STEP COVER AND BATTERY COMPARTMENT

The stock cab upper and lower entry steps shall be overlaid with 1/8" NFPA compliant aluminum treadplate. There will be a removable panel to access and replace the chassis batteries and a hinged fuel fill access door.

The maximum stepping height shall not exceed 18", with the exception of the ground to first step, which shall not exceed 24" when the vehicle is loaded to its estimated in-service weight. All steps shall have a minimum area of 35 sq in and shall be of such a shape that a 5" diameter disk does not overlap any side when placed on the step, and shallbe arranged to provide a t least 8" of clearance between the leading edge of the step and any obstruction. All platforms shall have a minimum depth of 8" from the leading edge of the platform to any obstruction.

The following options will be cut into the step cover:

BATTERY CHARGING RECEPTACLE LOCATION

The specified battery charging receptacle and/or display panel shall be located on front face of specified cab step cover.

MUDFLAPS

There shall be 1/4" rubber mudflaps provided and installed behind each set of tires to prevent throwing road debris and lower road spray.

ROAD EMERGENCY SAFETY KIT

The completed unit shall be supplied with one (1) set of three (3) dual faced reflective triangles, and three (3) warning flares complete with storage case per DOT requirements.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided and mounted inside cab area.

BATTERY JUMPER STUDS

Two (2) battery jumper studs, one (1) positive with a red weather cover, and one (1) negative with a black weather cover shall be provided in the lower front portion of the driver step area. Jumper studs shall be identified with color coded label.

These studs shall allow this vehicle to be jump started due to a battery failure, or to allow easy access to assist another vehicle.

THERMAL IMAGING CAMERA

Mounting for Harwich Fire Department supplied Thermal Image Camera to be provided on cab center console. Camera shipping responsiblity of Harwich Fire Department.

GAS METER CHARGER

Mounting for two (2) Harwich Fire Department supplied gas meter charger to be provided on cab center console. Charger shipping responsiblity of Harwich Fire Department.

CHASSIS AIR TANK VALVES

The cab/chassis air brake system tank drains shall be extended to Class 1 brass petcock valves with chrome plated zinc handle located on forward streetside lower body. Each air tank and valve shall be inter-piped with color coded reinforced nylon tubing. Brass compression type fittings shall be used on the nylon tubing, meeting all DOT requirements where applicable.

Each handle shall be properly labeled with colored tag to identify each tank.

DRIVELINE GUARD

There shall be one (1) driveline guard provided per drive shaft. Driveline guards shall be a "U" bolt type driveline guard to provide protection in case of driveline or universal joint failure.

BODY DESIGN

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

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

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

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Harwich Fire Department to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Harwich Fire Department from such repair and shall NOT be used.

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

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

EXTERIOR ALUMINUM BODY

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

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas, No Exceptions.

The front and rear corners of body shall be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

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

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

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

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

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

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

DRIP RAILS

The body shall have drip rails over the side full height compartments. The drip rails shall be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

ROOF CONSTRUCTION

The roof structure shall be integral with the body sheet metal construction and shall be an all welded assembly. The body roof structure shall be overlaid with not less than 3/16" aluminum 3003H-14 alloy tread plate and welded to roof structure and body sheet metal. All seams in roof material shall be fully and continuously welded to prevent entry of moisture.

There shall be a total of four (4) 2" x 2" x 1/4" 6061-T6 alloy aluminum "C" channels running the length of body, two (2) on each outboard side. These "C" channels shall be used for roof support and in addition shall be used for mounting of any specified reels. This open "C" channel design along with special reel mounting clips allows for a universal location of any specified reels within each compartment.

In between the two (2) center "C" channels running the length of body shall be 2" x 2" x 1/4" 6061-T6 alloy aluminum tubing running in between and welded in place on approximate 16" centers to support roof and/or walkway structure if specified.

A 2" formed radius shall be provided along the body sides and utilized as a wiring trough. The use of aluminum extrusions in this area shall not be acceptable, .

BODY SUBFRAME

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

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 4" x 1/4" aluminum tubes minimum, the same width as the chassis frame rails. Welded to this tubing shall be cross members of 2" x 4" x 1/4" aluminum. Smaller dimension, lighter gauge tubing or angle material subframe shall not be accepted.

These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located on 16" centers, or as necessary to support walkway or heavy equipment.

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

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of four (4) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

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

There will be NO exceptions to this section.

10" REAR STEP BUMPER

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

Lenght must be adjusted to accomodate Kochek Hydrant Valve and 4"Stortz and fabricated Hydrant Box.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below body. The tow eyes shall be fabricated from 3/4" thick steel plate with a 3" diameter opening. Tow eyes shall have a black powder coat finish.

GROUND LIGHTS

There shall be two (2) OnScene 8" Access LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when the vehicle park brake is set.

TOOL BOX (REAR BUMPER)

There shall be a fabricated box to be mounted on rear bumper for Hydrant tools. Box to be approximately 16" long, 8" wide x 5" high with aluminum treadplate hinged lid.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 3/16" smooth aluminum panels.

RUBBER BODY FENDERS

The body wheel well openings shall be provided with round radius, rubber fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using stainless steel fasteners with plastic isolators to help prevent corrosion.

WHEEL WELL LINERS

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

SCBA CYLINDER COMPARTMENTS

There shall be four (4) SCBA cylinder storage compartments, two (2) on each side of body in the rear wheel well area. Each compartment shall have a brushed SST door assembly with a positive catch latch. Each compartment shall have a 8" diameter tube behind the wheel well panel attached to the door assembly. Each compartment shall allow the storage of an SCBA cylinder or a fire extinguisher up to 7-3/4" in diameter and 22" deep. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

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

The exterior (and interior, if painted) body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion.

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

PAINT PROCESS

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

1) Clean bare metal with a wax and grease remover using low lint rags.
2) Inspect, straighten, and hammer high points, grind all seams, sharp edges, and welds. DA sand entire paintable surfaces using 24-180 grit dry paper. Plastic fill all low spots and DA sand fill areas using 36-180 grit dry paper. Apply pinhole filler and DA sand areas using 80-180 grit dry paper.
3) Re-clean bare metal using a wax and grease remover and low lint rags.
4) Within 24 hours, a PPG Delfleet® epoxy color primer with proper hardener for corrosion resistance using a pressure pot spray gun and applying 2-5 full wet coats or 1.5-8.0 dry mils max. achieving full hiding and allow to air dry 60 minutes @ 70°F or bake for 45 minutes @ 140°F degree.
5) Inspect, putty fill, and dry guild coat entire body surface and DA sand using 180-400 grit dry paper.
6) Re-clean bare metal using a wax and grease remover using low lint rags.
7) A PPG Delfleet® primer sealer with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 1 full wet coat or 1.0-2.0 dry mils achieving full hiding and allow to flash off in spray booth for minimum of 60 minutes @ 70°F.
8) A PPG Delfleet® FBCH basecoat (color) with proper hardener and dry additive shall then be sprayed using a pressure pot set @ 45-60 PSI and achieving full hiding or 1.5-2.0 wet mils and allow to flash off in spray booth 45-60 minutes before applying clearcoat.
9) A PPG Delfleet® clearcoat with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 2-3 full wet coats or 5.0 wet mils for a uniform gloss and allow to flash off in spray booth 10 minutes and bake for 120-140 minutes @ 125°F (surface temp.).
10) After cooling, DA sand heavy orange peel or runs using 1000 grit dry sand paper and final DA sand using 1500-2000 grit dry sand paper. Wipe off all surfaces to remove dust and debris. Buff unit as needed using 3M rubbing compound and a white wool pad and inspect until all sand scratches are removed.
11) Polish as needed using 3M Perfect-It-Polish and a black foam pad, repeat as necessary and inspect until all sand scratches are removed.

PAINT - ENVIRONMENTAL IMPACT

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

FASTENERS

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

ELECTROLYSIS CORROSION CONTROL

The vehicle shall be assembled using ECK brand or similar corrosion control compound on all high corrosion potential areas.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

PAINT FINISH - SINGLE COLOR

The body shall be painted with a single color of PPG Delfleet® Evolution per Harwich Fire Department approved paint spray out provided.

A small touch-up bottle of paint shall be provided with completed vehicle.

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

SHOP NOTES
Black 99Xalt2
Red 48Xalt1
IMRON brand

BODY UNDERCOATING

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT WARRANTY

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

COMPARTMENT INTERIOR FINISH

The interior of all exterior body compartments shall be a "Maintenance Free" smooth unpainted finish. All body seams shall be finished with a caulk sealant for both appearance and moisture protection.

REFLECTIVE STRIPE REQUIREMENTS

Material

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

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

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

Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

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

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

GRAPHICS PROOF

A color graphics proof of the reflective striping layout shall be provided for approval by Harwich Fire Department prior to installation. The graphics proof shall be submitted to Harwich Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

It shall be the responsibility of the bidder to properly spec the graphics required via visual inspection.

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be black in color.

There shall be a 1/2" SuperGold pinstripe located on the top and bottom edges of the main stripe.

REFLECTIVE STRIPE - CAB DOOR INTERIOR

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchcal 680.

Stripe Color: Black

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

Stripe Color: Black

There shall be a 1/2" SuperGold pinstripe located on the top and bottom edges of the main stripe.

The stripe shall remain in a straight line from the front of the front of cab to the rear body.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

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

The rear side panels of the body on each side of a rear stairway or compartment shall have a chevron style reflective stripe, extending from bumper height up to side compartment drip rail height. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

LETTERING

GRAPHICS PROOF

A color graphics proof of the lettering layout shall be provided for approval by Harwich Fire Department prior to installation. The graphics proof shall be submitted to Harwich Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

It shall be the responsibility of the bidder to properly spec the graphics required via visual inspection.

SIDE CAB DOOR LETTERING

There shall be forty two (42) 3" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

Final design and layout shall be determined prior to construction.

There shall be four (4) 8" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

FORWARD CAB DOORS:

"HARWICH" arched
"FIRE DEPT."

CREW DOORS:

"ENG68INE"

REAR BODY LETTERING

There shall be seven (7) 6" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"HARWICH" Located above RC1 compartment door.

There shall be one (1) 3" high reflective letters furnished and installed on the vehicle.

"KEEP BACK 343 FEET" located low on RC1 door.

- This reflective lettering shall be black in color.

There shall be two (2) 12" high reflective letters furnished and installed on the vehicle.

"68" located on back flap of hosebed cover.

- This reflective lettering shall be white in color.

There shall be six (6) 3" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

Final design and layout shall be determined prior to construction.

There shall be two (2) 8" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"ENG68INE" Located on RC1 compartment roll-up door.

FRONT OF CAB LETTERING

There shall be twelve (12) 3" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"ENGINE" located on bumper chamfered corners.

There shall be four (4) 5" high reflective letters furnished and installed on the vehicle.

"68" Located below "ENGINE" on front bumper chamfered corners.

- This reflective lettering shall be white in color.

CUSTOM DECAL LOGO - 12" -18"

Two (2) custom designed 12" - 18" Scotchcal type retroreflective logo shall be provided and located on the completed vehicle. The exact design and/or artwork shall be provided by the Harwich Fire Department prior to construction.

One (1) copy of the above custom logo shall be provided and located on the completed vehicle as directed by Harwich Fire Department.

US FLAG

One (1) 12" - 18" wide waving type US flag(s) printed on Scotchcal type retroreflective material shall be provided and located centered on front bumper.

EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

The vehicle shall be equipped with R•O•M Series IV roll-up exterior compartment doors. The R•O•M roll-up doors shall be complete with the following features;

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” 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. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will 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”. 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” in diameter and held in place by two (2) heavy duty 18 gauge zinc plated plates. Counter balance system shall have two (2) over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

ROM DOOR BOTTOM RAIL

All exterior compartment doors shall have the standard 3.0" tall bottom rail extrusion for easy one (1) hand opening and closing.

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

BODY WIDTH DIMENSIONS

The wildland body shall be 98.0" wide, and 100.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

Area Description	Dimension
Compartment depth above subframe	12.5"
Compartment depth below subframe	22.5"

STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S1)

The interior useable compartment width shall be approximately 54.0" wide.

The compartment door opening shall be approximately 49.5" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door finish guard shall be provided with the roll-up door.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.
- Two (2) OnScene 28" Access LED compartment lights, vertically mounted.

STREETSIDE COMPARTMENT - REAR (S2)

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door finish guard shall be provided with the roll-up door.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

CURBSIDE COMPARTMENT - ABOVE REAR WHEELS (C1)

The interior useable compartment width shall be approximately 54.0" wide.

The compartment door opening shall be approximately 49.5" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door finish guard shall be provided with the roll-up door.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.
- Two (2) OnScene 28" Access LED compartment lights, vertically mounted.

CURBSIDE COMPARTMENT - REAR (C2)

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door finish guard shall be provided with the roll-up door.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.
- Mounting shall be provide at base of compartment for specified battery powered ventilation fans.
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- There shall be one (1) 120 VAC outlet(s) located in compartment on the forward wall.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered through the on-board shore power system.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall start at the top of the body sub-frame and be as high as the side compartments, unless specified otherwise.

The interior useable compartment width shall be approximately 50.0" wide.

The compartment door opening shall be approximately 31.0" wide.(door opening to be as high as possible)

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the roll-up door.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 30" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- There shall be one (1) Austin Front Drawer Release (FDR) 400 lbs. slide-out tray(s) approximately 30" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length.
- The specified portable winch shall be mounted in compartment using a heavy duty "U" shaped channel. Winch receiver tube and mounting pin shall be utilized to hold in place during travel.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the tray. The striping shall be 2" wide and red/white in color.
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.

ROPE ANCHOR OR PORTABLE WINCH RECEIVERS

The completed unit shall have an integrated receiver or anchor system for use with removable rope anchor point and/or a portable electric winch, when specified.

Receivers or anchors installed at any location on the apparatus for use as removable winch anchors shall be designed and affixed to provide at least a 2.0 to 1 straight line pull no-yield safety factor over the load rating of the removable winch.

Receivers or anchors installed at any location on the apparatus for use with rope operations shall be designed and affixed to the apparatus to provide at least a 9,000 lbf (40,000 N) no-yield condition with a straight line pull.

A safety sign FAMA28 shall be located on or near each receiver or anchor stating the maximum straight line pull rating.

Side receiver(s) (if specified) shall have the following load rating:

	STRAIGHT PULL	SAFETY FACTOR
Rope Tie Off:	600 Lbs.	15:1
Winch:	5,000 Lbs.	2:1

Front and/or rear receiver(s) (if specified) shall have the following load rating:

	STRAIGHT PULL	SAFETY FACTOR
Rope Tie Off:	600 Lbs.	15:1
Winch:	Winch Load Rating (9,000 Lbs. Max)	2:1

The following items shall be provided to accomplish rope rescue and/or portable winch operation;

- One (1) Warn model XD9000i, 9,000 lb. 12 volt electric winch shall be furnished with the completed unit. It shall be capable of being stored in a compartment and mounted to the apparatus by inserting the mounting point into a properly rated receiver. A minimum of 125' of 5/16" stranded galvanized steel cable with pinned utility hook shall be installed on the drum. A 12' remote control shall be provided with the assembly that permits the operator to stand at a safe operating distance from the cable and winch.

- There shall be one (1) 2" x 2" x 1/4" wall steel receiver tube(s) with powder coat paint finish located at the front bumper for use with removable rope anchor point and/or a portable electric winch (when specified) and/or a removable hose roller.

  - There shall be one (1) 12 VDC plug(s) with quick connect provided to power a Warn portable winch. All 12 VDC cables to be sized according to Warn and installation for intended use.
  - The receiver(s) shall have one (1) rubber cover(s) provided.

- There shall be one (1) 2" x 2" x 1/4" wall steel receiver tube(s) located at the rear bumper for use with removable rope anchor point and/or a portable electric winch (when specified).

  - There shall be one (1) 12 VDC plug(s) with quick connect provided to power a Warn portable winch. All 12 VDC cables to be sized according to Warn and installation for intended use.
  - The receiver(s) shall have one (1) rubber cover(s) provided.

LADDER / EQUIPMENT STORAGE, REAR CURBSIDE

There shall be a ladder and/or equipment storage compartment located on the rear curbside of vehicle. The bottom of compartment shall be located at approximate top of fender height extending thru body behind the streetside compartments and the booster tank.

Access to the compartment shall be from a rear facing vertically hinged compartment door. The door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, a 6" stainless steel locking "D" ring handle. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted OnScene LED light near door opening that shall be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting shall be used for storage of specified equipment as required to prevent damage to equipment.

Storage shall be provided for the following ladders and equipment with proper labeling;

- One (1) 20' 3-section ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Harwich Fire Department.

- One (1) pike pole(s). Manufacturer, model number of the pike pole shall be provided in equipment section of specification, or at pre-construction meeting when provided by Harwich Fire Department.

FRONT PROTECTION PANELS

To protect areas subject to intensive wear, scuffing or abuse, protection panels shall be installed on the front vertical body panels and wrapped around to the front compartment door opening. The protection panels shall be fabricated from 20 gauge brushed stainless steel.

REAR BODY HANDRAILS

There shall be two (2) 24" vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

REAR BODY HANDRAILS

There shall be two (2) 24" horizontal handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

PUMP MODULE HANDRAILS

There shall be two (2) 24" handrails, one (1) each side of pump module for access to upper dunnage area. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

FOLDING STEP(S)

There shall be four (4) Innovative Controls polished cast aluminum folding step(s) provided and installed on completed vehicle. Each step shall be heavy duty with stainless steel spring and textured step surface meeting NFPA standards. Each step shall include an LED light.

Location(s): Rear body panel.

REAR STEP

Two (2) Zico PS-8 manual pull-out and down step(s) shall be installed below the rear bumper. The step surface, when pulled out from its nested position, shall be approximately 8" below the rear bumper step.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

Wiring

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125% of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10%. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring.*

Wiring and Wire Harness Construction

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable,* or SAE J1128, *Low Voltage Primary Cable,* type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage over-current protective devices. Such devices shall be readily accessible and protected against heat in excess of the over-current device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:

1) SAE J156, *Fusible Links*
2) SAE J553, *Circuit Breakers*
3) SAE J554, *Electric Fuses (Cartridge Type)*
4) SAE J1888, *High Current Time Lag Electric Fuses*
5) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125% of maximum current for which the circuit is protected.

Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

1) The propulsion engine and transmission
2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
3) The radio(s) at a duty cycle of 10 percent transmit and 90% receive (for calculation and testing purposes, a default value of 5 A continuous)
4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
5) The minimum optical warning system, where the apparatus is blocking the right-of way
6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver’s instrument panel to allow direct observation of the system voltage.

Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

12 VOLT DIAGNOSTIC RELAY CONTROL CENTER

The 12 volt power distribution shall be conveniently located with easy access for service. All relays and circuit breakers shall be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers shall be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel shall utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board shall be provided with twelve (12) heavy duty independent switching relays. Each relay shall have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel shall be located in apparatus body within a protected enclosure with removable or hinged cover.

CAB CONSOLE

A center cab console shall be provided between the Driver's and Officer's seats and extend to back wall of cab. Console shall be as large as possible and fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall be provided for durability and finished appearance.

The rear portion of the console shall be provided with open top storage for notebooks or maps. Two (2) adjustable dividers shall be provided in the storage area. The forward portion of console shall be slanted for mounting of siren head, radio or 12 volt control panel, and etc, with easy access to both Driver and Officer.

The final design of console shall be determined by engineering and then for approval from HFD..

Slope area shall have switch panel at top (front), Radios then siren, Map slots at rear and place the TIC and Gas Meters in between siren location and map.

ROCKER SWITCH PANEL

The control of the 12 volt equipment installed on chassis and body shall be centrally located in the cab. The individual rocker style switches shall be located on a separate electrical panel, complete with backlit name tags describing function of each individual switch. The back lighting shall have two (2) levels of intensity, low level lights activated when the vehicle lights or ignition switch is turned "On", and high level lights activated when individual switch is turned "On". An internally lighted rocker switch shall be furnished to the left of specified emergency lighting switches, and identified as "MASTER EMERGENCY SWITCH".

Switch circuitry shall be on a printed circuit board. The lights shall be solid state type and have a 100,000 hour life span.

Layout to be: E-Master, Front, Left, Right, and Rear scene Lights, and Siren Brake.

ELECTRICAL SYSTEM MANAGER

LOAD MANAGEMENT

If the total continuous electrical load exceeds the minimum continuous electrical output rating of the installed alternator(s), an Innovative Controls automatic electrical load management system shall be required. The minimum continuous electrical loads shall not be subject to automatic load management.

The apparatus 12 volt electrical system shall be provided with a system manager for:

- Monitoring chassis battery voltage
- Shedding pre-determined electrical circuits
- Sequencing pre-determined electrical circuits
- Automatically controlling chassis engine fast-idle
- Monitor master switch and parking brake applications
- Automatically control warning light modes ("Calling-For" and "Blocking Right of Way")
- Provide low voltage alarm
- Programmable control circuits
- Remote system status indicator panel

System manager shall perform all electrical functions required by current NFPA 1901 Standards.

BATTERY MONITORING

The system manager shall monitor the vehicle battery voltage. When electrical loads exceed the alternator output and the voltage drops, the load manager shall start shutting down electrical outputs. The system shall shut down only as many outputs required to maintain the system voltage. A special indicator to show different states of the electrical system by flashing at rate proportional to the battery discharge.

LOAD SEQUENCING AND SHEDDING

The system shall be capable of sequentially switching and shedding 12 volt loads. The Master light switch starts the sequential switch when it is turned "On". Likewise turning the Master Switch "Off" will sequentially de-energize the loads.

BATTERY SYSTEM

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer's recommendation.

An onboard battery conditioner or charger or a polarized inlet shall be provided for charging all batteries. Where an onboard conditioner or charger is supplied, the associated line voltage electrical power system shall be installed in accordance with Chapter 22.

One of the following master disconnect switches shall be provided:

1) A master body disconnect switch that disconnects all electrical loads not provided by the chassis manufacturer
2) A master load disconnect switch that disconnects all electrical loads on the apparatus except the starter

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green "battery disconnect on" indicator light that is visible from the driver's position shall be provided.

Rechargeable hand lights, radios, and other similar devices shall be permitted to be connected to the electrical system ahead of the master disconnect switch.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within 5 seconds.

BATTERY SWITCH

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver's position shall be provided.

BATTERY SOLENOID

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

BATTERY CONDITIONER

One (1) Kussmaul model 091-9-1000 Pump-Plus 1000, single battery charger/air compressor, with 120 VAC input, and 15 amp 12 VDC amp output battery conditioner with a 12 volt, 80 psi air compressor shall be provided and installed. This system shall monitor the condition of battery(s) and provide an electrical current at variable rates to overcome battery failure. The air compressor shall maintain air pressure in the chassis air brake system. A Kussmaul bar graph type indicator panel shall be provided for showing status of battery conditioner.

SHORE POWER INLET

One (1) Kussmaul 120 VAC, 20 amp Super Auto-Eject shore power inlet(s) shall be provided. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged.

The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

- The outlet cover shall be red.
- The shore power plug shall be located near the Driver door area.

ENGINE COMPARTMENT LIGHT

There shall be one (1) OnScene Severe Service LED light(s) mounted in the engine compartment with integral switch with a light output of at least 20 candlepower (250 lumens). The engine compartment light(s) shall operate only when the master battery switch is turned "On".

INTERIOR CAB LIGHT, LED

Five (5) Whelen model #60CREGCS, 6", 12 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided on cab ceiling. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a 5 second delay after switching off.

One at each door and one in center.

CHASSIS HEADLIGHT WIG/WAG

A chassis headlight wig/wag flashing unit shall be provided. The headlight flasher shall shut down when the parking brake is engage for "Blocking Mode".

Conversion to LED headlamps to be provided and installed by the Dealer.
SHOP NOTES
Funds added for Dealer provided LED head light conversion.

The lights shall be controlled at the switch panel in cab.

CAB HAZARD WARNING LIGHT

A Truck-Lite red LED flashing ligh shall be provided and located in the driving compartment and be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

- Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.
- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

Compartments and equipment meeting all of the following conditions shall be permitted to be exempt from being wired to the hazard light:

- The volume is less than or equal to 4 ft3 (0.1 m3).
- The compartment has an opening less than or equal to 144 in.2 (92,900 mm2).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

The hazard light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".
An audible alarm shall be provided for the door ajar light.

BACK-UP ALARM

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

There shall be one (1) ASA Voyager rear observation camera system provided and installed on completed unit. The system shall include one (1) model VCC150 high resolution CCD color camera installed on the rear body.

The camera image shall be displayed on a model AOM713, 7" color flat panel display (up to 3 camera inputs) located on dash where stereo would be.

Mount monitor where Stereo would be.

TAIL LIGHTS

Rear body tail lights shall be vertically mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS. The following lights shall be furnished;

- Two (2) Whelen M6 Series M6T amber LED turn lights
- Two (2) Whelen M6 Series M6BTT red LED stop/tail lights
- Two (2) Whelen M6 Series M6BUW clear LED back-up lights with clear lens

Each light above shall be mounted in an M6FC chrome finish bezel.

CAB STEP LIGHTS / GROUND LIGHTS

There shall be four (4) OnScene 8" Access LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE MOUNTING BRACKET

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

Location determined by Hydrant Valve and Storage Box on rear bumper.

BROW MOUNT FLOODLIGHT(S) - LED

There shall be one (1) Whelen Pioneer SlimLine Plus model PSL2BLK with dual panel Super LED light(s) on front of cab. Light quantity shall be divided equally per side. Lights shall be 12 VDC, 12 amp, 150 watt, with 14,000 useable lumens.

Each light shall be mounted in a PBSLFCB, 3” adjustment radius with either a straight out, 0 degree or a 15 degree downward angle.

The lights shall be controlled at the switch panel in cab.

SIDE SCENE LIGHTS

There shall be four (4) Whelen M6 series (6" X 4") surface mounted Super-LED Scene lights (M6ZC) provided on the upper body. Light quantity shall be divided equally per side. Each light will have an 8-32 degree gradient lens and chrome flange.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be controlled at the switch panel in cab.

REAR SCENE LIGHTS

Two (2) Whelen M6 series (6" x 4") surface mounted Super-LED Scene lights shall be provided on the upper rear body to light the work area immediately behind the vehicle. Each light will have a 26 degree lens and chrome flange.

The above scene lights shall light to a level of at least 3 fc (30 lx), measured at 25 equally spaced points on a 2.5 ft (750 mm) grid with in a 10 ft x 10 ft (3 m x 3m) square to the rear of vehicle.

The lights shall be controlled at the switch panel in cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

WARNING LIGHT PACKAGE

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four (4) warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four (4) zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two (2) signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

Steadily burning, non flashing optical sources shall be permitted to be used.

UPPER LEVEL OPTICAL WARNING DEVICES

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen 54" Legacy model GB2DDDD LED lightbar permanently mounted to the cab roof. The lightbar configuration shall be as follows;

- Two (2) Super LED Warning/Alley Lights
- Twelve (12) DUO+Series LED Flasher, (1) Long White/Red
- Two (2) DUO+Series Linear LED Flasher, (1) Long Red/White

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in

The lightbar(s) shall be separately controlled at switch panel in the cab.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6R) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6R) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6R) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

LOWER LEVEL OPTICAL WARNING DEVICES

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1600 mm) above level ground.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen 400 series (4" x 3") red Linear Super-LED lights (40R02ZRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

There shall be two (2) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, one (1) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the switch panel in cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6R) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB SIDE)

ZONES B AND D - BODY LIGHT (BODY WHEELWELL AREA)

There shall be four (4) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, two (2) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the switch panel in cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, one (1) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the switch panel in cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6R) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be controlled at the switch panel in cab.

ELECTRONIC SIREN

One (1) Whelen model 295SLSA1 electronic siren control with selectable 100 or 200 watt output, hands-free operation, user selectable siren tones, park kill, and standard hard wired microphone shall be provided and installed in cab within easy reach of Driver. Siren power shall be wired through the master warning light switch.

SIREN SPEAKERS

Two (2) Whelen model SA314B, 100 watt aluminum, 9.3" x 7.3" x 5.3" siren speaker shall be provided, recessed in the front bumper, one (1) on the streetside and one (1) on the curbside. The solid state siren speaker shall be vibration resistant.

WILDLAND SIDE MOUNT PUMP MODULE

The 74" (measured laterally across vehicle width) x 29" wide side mount pump enclosure shall be removable and supported from the chassis frame rails with spring type body mounts. This enclosure shall allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

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

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

The following controls and equipment shall be provided on the pump panel or within the pump enclosure:

1) Electric primer.
2) Pump and plumbing area service lights.
3) Pressure control device and throttle control.
4) Fire pump and engine instruments.
5) Pump intakes and discharge controls.
6) Master intake and discharge gauges.
7) Tank fill control.
8) Tank suction control.
9) Water tank level gauge.
10) Pump panel lights.

PUMP COMPARTMENT SERVICE ACCESS

The front portion of the pump compartment structure (directly behind the chassis cab) shall not be overlaid to provide an opening for access to the midship fire pump.

PUMP PANEL - SIDE MOUNT

The pump operator's panel, along with the lower streetside and curbside pump panels shall be constructed of smooth plate aluminum with powder coated paint finish, fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing towards the front of the module for easy access to gauges.

STREETSIDE PUMP PANEL - BOLTED

The streetside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

LOWER CURBSIDE PUMP PANEL - BOLTED

The curbside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

PUMP MODULE EQUIPMENT STORAGE COMPARTMENT

There shall be one (1) equipment compartment located on the upper curbside of the pump module. It shall have dimensions of 22" wide x 26" high. The clear door compartment dimensions shall be 20.5" wide x 23" high x 12" deep with the door closed. An OnScene LED light shall illuminate the interior of the compartment when the door is open.

The equipment compartment shall be provided with a flush style hinged door. The doors shall be provided with a high quality, continuous double seal type weather stripping to prevent moisture and dust from entering the exterior compartment. The door shall be double pan design with the outer door material being 1/8" aluminum door with a 1/8" aluminum removable inner liner that shall have a natural finish to provide reflective qualities during night operations. The vertically hinged door shall have a gas shock and polished stainless steel 1/4" piano hinge.

The door latch shall be an Eberhard locking slam latch, with a chrome "D" ring with a 5-degree bend for easier grasping of each door handle with gloved hands. The door shall be provided with a keyed lock.

The exterior of the door shall be painted to match the lower job color. The interior shall be painted to match the compartment interior paint specified.

There shall be two (2) large removable panels provided on the inside of the compartment. These panels shall provide an opening for service access to the right side of the interior of the pump module and to the bottom side of the diesel pump.

- There shall be two (2) Zico 1000 series KD-UH walkaway type SCBA air pack bracket(s) with high cycle coated spring clips and angled foot plate (no CRS strap inc.), located in curbside pump panel compartment.

PUMP COMPARTMENT TOP OVERLAY

The top of the pump compartment shall be overlaid with materials of a non slip 1/8" NFPA compliant aluminum treadplate.

PUMP MODULE COMPARTMENT - CURBSIDE

Above the curbside pump panel adjacent to specified crosslays shall be an compartment for storage of long equipment. The compartment shall be integral with the pump module construction, and will not be bolted or added on modules. The compartment shall be approximately 11" wide x 16" high..

Access to the compartment shall be from a side facing compartment door. Door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, push release latch.

The list of items to be stored in upper rear compartment shall be determined at the pre-construction meeting.

- Two (2) PVC tubes to be provided for Harwich Fire Department supplied hooks or rakes.

STREETSIDE RUNNING BOARD - SIDE MOUNT PANEL

The streetside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access LED ground light(s) shall be provided below the body.

- A pull-out and down (camper style) step shall be installed below the pump panel running board. The step surface, when pulled out from its nested position, shall be approximately 13" below running board. This step shall be 20" wide x 8" deep. Slotted side support pieces of the pull-out portion of step to be made out of .25" steel plate.

CURBSIDE RUNNING BOARD - SIDE MOUNT PANEL

The curbside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access LED ground light(s) shall be provided below the body.

- A pull-out and down (camper style) step shall be installed below the pump panel running board. The step surface, when pulled out from its nested position, shall be approximately 13" below the running board. This step shall be 20" wide x 8" deep. Slotted side support pieces of the pull-out portion of step to be made out of .25" steel plate.

PUMP MODULE FINISH

The upper exterior sides above pump panels shall be constructed of 1/8" smooth plate aluminum and painted body color. The upper exterior front and rear of pump module shall be constructed of 1/8" treadplate aluminum.

PUMP HEAT PAN ENCLOSURE

No pump heat pan enclosures are required to protect pump from freezing.

PUMP HEATER

No pump heater is required to protect pump and gauges from freezing.

CROSS LAY

The specified pump module shall have two (2) cross lay(s). The cross lay hose bed(s) shall be located in the upper portion of the pump module.

The cross lay area shall be located at the front of side pump module and at the rear of top control module. The cross lay area shall span the entire width of the pump module.

CROSS LAY TRIM

Brushed stainless steel trim shall be installed at the openings on each side of the cross lay hose bed area. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.

The divider(s) between the hose bed areas shall be fabricated from 3/16" smooth aluminum and mounted in a channel on each end for adjustability.

Removable slotted aluminum flooring shall be provided for the hose bed area.

The pump module cross lay(s) shall have two (2) OnScene Rough Service 9" LED lights provided, one (1) each end to light the interior cross lay hose bed area.

Each end of hose bed shall have a black nylon style webbing cover. The covers will be mechanically fastened at the top of the hose bed and the bottom edges will be secured using elastic cord and shoulder bolts.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

Wants double stacked (4-100' Stacks) with divider between them.

CROSS LAY BED COVER

A 1/8" aluminum tread plate hinged cover shall be provided over the lay beds complete with full length stainless steel piano hinge. Stops shall be provided to protect cab or other adjacent body components. The hinge shall be located on the forward section of the cover, closest to the chassis cab.

HALE MBP SINGLE STAGE FIRE PUMP

PUMP ASSEMBLY

1. The pump shall be of a size and design to mount on the chassis rails of commercial and or a custom truck chassis, and have the capacity of up to 1,000 GPM (4,000 LPM), NFPA 1901 rated performance. **Pump to be rated at 1000 GPM.**

2. The entire pump shall be assembled and tested at the pump manufacturer's factory.

3. The pump shall be driven by a the truck transmission mounted PTO. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance within the torque rating of the PTO, truck transmission and drive line components.

4. The entire pump shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.

5. The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.

6. Pump body shall be vertically split, on a single plane for easy removal of entire impeller assembly including clearance rings.

7. Pump shaft to be rigidly supported by two bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

8. The pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machines, hand-ground and individually balanced. The vanes of the impeller intake eye shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

9. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body.

10. The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

ANODES

To reduce the effect of galvanic action, the fire pump shall be equipped with two (2) easily replaceable sacrificial catalytic action 3/4" magnesium anodes. One anode shall be installed on the inlet (suction) side of the system, and one anode shall be installed on the pressure (outlet) side of the main fire pump.

CERTIFICATION

The pump will perform and meet the following tests:

100% of rated capacity @150 PSI net pump pressure.
100% of rated capacity @ 165 PSI net pumps pressure.
70% of rated capacity @ 200 PSI net pump pressure.
50% of rated capacity @ 250 PSI net pump pressure

Pump shall be tested at manufacturer under full NFPA suction conditions.

GEARBOX

1. Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of torque of the engine. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature..

2. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine.

3. All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (No exceptions.)

4. The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

5. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.

6. For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

PAINT FINISH

The paint finish will be black finish paint.

PUMP DRIVE SYSTEM

The water system pump shall be driven by a Chelsea "Hot-Shift" transmission PTO and mounted directly to the transmission of the chassis. The drive line shall be hollow tube type, with heavy duty universals and splined shaft to allow movement of the chassis components and pump.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to a neutral position transmission switch to prevent engagement unless the vehicle is in neutral with the parking brake set.

Model part number shall be Chelsea 859XFFJP-B5XV, 128% Ratio.

Double check the model number and ratio with engineering before ordering the PTO on the chassis.

MECHANICAL SEALS

The Hale pump shall be equipped with a mechanical seal in place of pump packing on the suction (inboard) side of the pump. The mechanical seal must be two (2) inches in diameter and shall be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

1/2" PUMP COOLER LINE

There shall be a 1/2" line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on main pump panel, and shall be clearly labeled "Pump Cooler".

PUMP COOLER CHECK VALVE

There shall be a check valve installed in the pump cooler line to prevent tank water from back flowing into the pump when it is not in use.

HALE FIVE YEAR PUMP WARRANTY

The fire pump shall be warranted by Hale for a period of five (5) years from the date of delivery to the Harwich Fire Department. Within this warranty period Hale shall cover parts and labor for the first two (2) years and parts only for years three (3) through five (5).

MANUFACTURER FIRE PUMP TEST

The pump shall undergo a manufacturer's test per applicable sections of NFPA 1901 standards, prior to delivery of the completed apparatus.

The test 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.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (3400 kPa) for a minimum for 10 min. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA 1901 standards.

The results of this test shall be furnished with the vehicle on delivery.

FIRE PUMP TEST LABEL

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 pump shall comply with the applicable requirements of "Standard for Fire Apparatus 1901, latest edition.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

SAFETY SIGN

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operators panel.

ALTITUDE REQUIREMENT

The apparatus shall be designed to meet the specified rating at 2,000 feet (610 meters) altitude.

PUMP DRAIN VALVE

A manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by pulling a single control. The valve assembly shall consist of a stainless steel plunger in a bronze body with multiple ports.

PUMP DRAIN CONTROL

The pump drain shall be controlled at the pump operator's panel and identified as "Pump Drain". The control shall be a Class1 round 1/4 turn handle control that is easily actuated with a gloved hand.

AIR PRIMING PUMP CONTROL AT PUMP PANEL

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multi-stage venturi based AirPrime System.

The priming pump shall be rigidly attached to the pump transmission and utilizes air supplied from the chassis air system to operate the pump primer. The AirPrime is more efficient and reliable than the conventional electric motor driven primers, and virtually eliminates the impact load on the vehicles electrical system improving the reliability of the vehicle. AirPrime also improves performance in the elapsed time for establishing water supply resulting in improved fire ground operations and safety.

A manual rocker switch with Auto-Prime / Off / Manual-Prime shall be provided on main pump operator's panel.

The primer shall be capable of priming the pump through a 20' section of suction hose with a 10' lift within 30 seconds for pumps less than 1,500 gpm, and 45 seconds for pumps 1,500 gpm and larger.

6" SUCTION INLET - STREETSIDE

One (1) 6" (150 mm) un-gated suction intake shall be installed on the streetside pump panel to supply the fire pump from an external water supply. The threads shall be 6" NH male threads.

The intake shall be provided with a removable screen.

- The intake shall be provided with a 6" NHF swivel rocker lug x 4" NST adapter with hardcoat finish.

SUCTION CAP

The suction inlet shall be equipped with a 4" NH chrome plated, long handled, cap capable of withstanding 500 psi.

HEAT EXCHANGER

A heat exchanger shall be provided on the pump driving engine cooling system that uses water from the discharge side of the pump to cool the engine coolant through the use of a closed heat exchanger. The water from the pump and the engine coolant shall not be intermixed. This cooling system shall be controlled by a 1/4 turn valve on the pump operator's panel.

INTAKE RELIEF VALVE

There shall be an Akron model 59 brass intake relief valve installed on the suction side of the pump. The system shall be adjustable from 75 to 250 PSI and shall be designed to prevent vibration from altering the setting of the pilot valve. The system shall be factory set at 150 PSI prior to delivery.

The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" NSTM connection. The discharge shall be away from the pump operator and labeled "DO NOT CAP".

AUXILIARY PUMP

No auxiliary pump shall be provided with completed unit.

FOAM SYSTEMS

There shall be a FoamPro 1601 foam system with a 12 Volt, 1/3 hp electric motor driven positive displacement piston type foam concentrate pump with a rated capacity of .01 to 1.0 gpm @ 200 psi, with operating pressures up to 400 psi. The system will draw a maximum of 30 amps @ 12 VDC.

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrate. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a control module suitable for installation on the pump panel. Incorporated within the motor driver shall be a microprocessor that receives input from the system flowmeter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in the discharge system specified to be “foam capable.” A simulated flow feature shall be incorporated into the motor driver to simulate an approximate flow value of 100 gpm. This feature is to be engaged or disengaged with a momentary switch and will automatically disengage when the main system switch is turned off.

The control module shall enable the pump operator to:

- Activate the foam proportioning system
- Select proportioning rates from 0.1% to 1.0%
- See a “low concentrate” warning light flash when the foam tank runs low and in two minutes, if foam concentrate is not added to the tank, shut the foam concentrate pump down

A 12-volt electric motor driven positive displacement plunger pump shall be provided. The pump capacity shall be from 0.1 gpm (0.38 L/min) to 1.0 gpm (3.8 L/min) at 200 psi (13.8 BAR) with a maximum operating pressure up to 400 psi (27.6 BAR). The pump shall have the capability to draw 3 foot of lift. The system will draw a maximum of 30 amps @ 12 VDC or 15 amps @ 24 VDC. The motor shall be controlled by the microprocessor (mounted to the base of the pump). It shall receive signals from the control module and power the 1/3 hp (.25 kW) electric motor in a variable speed duty cycle to ensure that the correct proportion of concentrate is injected into the water stream. A full flow check valve shall be provided in the discharge piping to prevent foam contamination of fire pump and water tank. A 12 psi (.83 BAR) opening pressure check valve shall be provided in concentrate line.

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

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

An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Dealer. The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards.

A means shall be provided to prevent water back flow into the foam proportioning system and the foam concentrate storage tank.

FOAM TANK REFILL SYSTEM

The apparatus shall be equipped with an electronic, automatic, concentrate refill system. System shall operate independently of the foam proportioner allowing simultaneous use. Refill operation shall not require apparatus or fire pump to be running. The system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell following manufacturer's recommendations. External fill and flush connections to be quick-connect, cam-lock type. Internal piping to incorporate check valves to prevent back flow. Concentrate tank inlet shall be positioned to minimize agitation per manufacturer's recommendations. The refill operation shall be based on direct measurement of concentrate level in tank. System must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporated within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all bronze three-way valve shall be included to allow the operator to flush system after use. Valve control, intake and flush ports shall be located within corresponding panel plate.

The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

- Provide push-button start/stop control of foam refill
- Solid green light advises operator concentrate cell is full
- Flashing green indicates system is running
- Green light off, system off
- Allow override of “full tank” condition
- Provide a means to flush the pump and intake piping

System shall include a 12 volt electric motor driven, positive displacement concentrate pump. Pump shall deliver minimum flow of 10 gpm (37.8 L/min) @ 20 psi with all concentrates currently utilized in fire apparatus. Pump body to be of all bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system will draw a maximum of 38 amps @ 12 VDC. A pump/motor solenoid (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.4 kW) electric motor directly coupled to the concentrate pump. The system shall receive readings when the concentrate tank is full and stop operation to prevent overfill.

Components of the complete refill system shall include:

- Operator control and display with Weather-Pac connectors
- Refill/flush quick-connect cam-lock fittings and cap
- Check valves
- Pump/motor assembly and solenoid
- Strainer
- Tank level switch
- Three-way fill/flush valve
- Stainless steel pick-up wand and 6' of reinforced suction hose, 1" diameter to allow maximum flow
- Panel placards

An installation and operation manual shall be provided, along with a one-year limited warranty by the manufacturer. The system must be installed and plumbed by a Certified FoamPro Dealer. When two types of concentrates are to be used, a separate refill system must be specified for each.

PLUMBING SPECIFICATIONS

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

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

STAINLESS STEEL INTAKE MANIFOLD

The suction manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The suction manifold assembly shall have radiused sweep elbows to minimize water turbulence into the suction volute.

The suction manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire intake piping system, valves, bleeder valves, and intake closures, excluding the tank-to-pump line on the tank side of the valve, shall be capable of withstanding a hydrostatic pressure of 250 psi (1700 kPa).

STAINLESS STEEL DISCHARGE MANIFOLD

The discharge manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The discharge manifold assembly shall have radiused sweep elbows to minimize water turbulence into the discharge header.

The manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire discharge piping system; valves; drain cocks; and outlet closures, excluding the tank fill line on the tank side of the valve and CAF system piping and components that include valves that permit isolation from discharge pressure, shall be capable of withstanding a hydrodynamic discharge pressure of 500 psi (3400 kPa) or 100 psi (700 kPa) over the maximum discharge pressure capability rating of the pump, whichever is greater.

STAINLESS STEEL PLUMBING WARRANTY

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

CURBSIDE INTAKE - 2-1/2"

There shall be one (1) 2-1/2" (65 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

TANK TO PUMP CHECK VALVE

There shall be a check valve between the pump suction and the booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.

TANK TO PUMP VALVE

A 3" (75 mm) full flow ball valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. The valve shall be flanged to bolt directly to the pump and shall incorporate a chromium plated bronze ball. The remaining internal moving parts shall be stainless steel for years of dependable service. A non collapsible flexible hose shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation.

The tank to pump valve shall be controlled from the pump operator's panel.

- Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The valve handle will be pulled for the open valve position. The control handle shall be located adjacent to the plumbing connection.

FRONT DISCHARGE

2-1/2" DISCHARGE

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- There shall be a 2-1/2" (65 mm) VFC x 2-1/2" (65 mm) NSTM brass or chrome plated 90 degree swivel elbow provided for each discharge.
- One (1) Innovative Controls model 3003000, ¾” brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting activated with pump engagement.

  - Gauge(s) shall have a Night-Glo white background with black text and blue (water) or red (foam) pie indicator.

SHOP NOTES
Request red backlighting.

  - Gauge(s) shall have a range from 0 to 400 PSI.

  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

CURBSIDE DISCHARGE

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.

- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.

  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located streetside operators panel.

- Each discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.

  - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.

- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting activated with pump engagement.

  - Gauge(s) shall have a Night-Glo white background with black text and blue (water) or red (foam) pie indicator.

SHOP NOTES
Request red backlighting.

  - Gauge(s) shall have a range from 0 to 400 PSI.

  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

HOSEBED STREETSIDE DISCHARGE

Discharge(s) shall be located forward, streetside hosebed location.

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting.
  - Gauge(s) shall have a Night-Glo white background with black text and blue (water) or red (foam) pie indicator.

SHOP NOTES
Request red backlighting.

  - Gauge(s) shall have a range from 0 to 400 PSI.

HOSEBED CURBSIDE DISCHARGE

Discharge(s) shall be located forward, curbside hosebed location.

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting.

  - Gauge(s) shall have a Night-Glo white background with black text and blue (water) or red (foam) pie indicator.

SHOP NOTES
Request red backlighting.

  - Gauge(s) shall have a range from 0 to 400 PSI.

MISCELLANEOUS DISCHARGE

2" CROSS LAY(S)

There shall be two (2) 2" cross lay(s) located in pump module, or per the itemized compartment list. The crosslay(s) shall be transverse of the pump module or body with access from either side.

Each cross lay shall have a minimum storage capacity of 200' of 1-3/4" double jacket hose and nozzle.

- Two (2) of the discharge(s) shall flow water and foam.

- Two (2) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.

  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.

- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NSTM brass or chrome plated 90 degree swivel elbow provided for each discharge.

- Two (2) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

- Two (2) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting.

  - Gauge(s) shall have a Night-Glo white background with black text and blue (water) or red (foam) pie indicator.

SHOP NOTES
Request red backlighting.

  - Gauge(s) shall have a range from 0 to 400 PSI.

TANK FILL VALVE

There shall be one (1) 2" (52 mm) tank fill valve plumbed with 2" plumbing from the pump to the tank. Installation shall be completed with 2" rubber hose and stainless steel hose couplings. The tank fill valve shall be controlled from the operator's control panel.

- One (1) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle connected to the valve. The control handle shall be located adjacent to the plumbing connection.

PUMP PANEL

The side mount pump control panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

The pump controls shall be mounted on an aluminum control panel with a black powdercoat painted finish.

PUMP PANEL LOCATION

The pump control panel shall be side mounted.

The pump panel shall include the following items;

PUMP PANEL ACCESS

The pump panel shall be open to the side of the truck. The Pump Operator shall NOT be required to open a compartment door to access the pump control panel.

ENGINE GAUGES

The cab/chassis engine gauges shall be provided with the specified pump pressure governor system.

PRESSURE GOVENOR

The apparatus shall be equipped with the Class 1 Total Pressure Governor Plus (TPG+) connected to the Engine Control Module (ECM) mounted on the engine. The “TPG+” will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine’s J1939 data for optimal resolution and response when supported by the engine manufacturer. If J-1939 engine control is not supported, then analog remote throttle control shall be provided by the “TPG+”. The “TPG+” shall function as a Master Pump Discharge and Intake Gauge with the following features;

- Audible alarm output
- Easy set-up and configuration
- Large, easy to read alpha-numeric display
- Analog engine control of J1939 CAN control for improved resolution and response
- Improved ergonomic tactile feedback button
- Totally integrated instruments including battery voltage, temperature, oil pressure, and RPM
- Integrated engine information reduces required pump panel space
- Programmable presets
- Displays intake and discharge pressure
- Dedicated check engine light and stop engine light

MASTER INTAKE/PRESSURE GAUGES

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Intake Pressure, and labeled "PUMP INTAKE".

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Discharge Pressure. Gauge shall be labeled "PUMP DISCHARGE".

Both gauges shall have a die cast zinc, chrome plated bezel and color-coded. The left side (Pump Intake) bezel shall be color coded red, and the right side (Pump Discharge) bezel shall be colored black.

A test gauge port manifold shall be integrated into lower center bezel.

- Gauge(s) shall have a white background with black text.
- Gauge(s) shall have a range from -30" to 600 PSI.

PUMP SAFETY AND TEST LABELS

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

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

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

PUMP PANEL LIGHTING

All gauges and controls on the pump operator's panel shall be adequately illuminated by a full panel width shielded light assembly with full width OnScene Solutions LED light (each panel, if equipped). The light shall be activated by a weather-proof type switch on the pump operator's panel as well as automatically when pump is engaged. This switch shall also activate any area step lighting.

PUMP PANEL AIR HORN SWITCH

The pump operator's panel shall have an Innovative Controls switch panel to activate the cab/chassis air horn(s). Switch shall be constantly illuminated and labeled.

LOW PRESSURE AIR OUTLET

There shall be one (1) air outlet connection to supply low pressure air for general maintenance. The outlet shall terminate in a 1/4" NPT threaded port. Air outlet shall be located on lower pump operator's panel. The connector shall be supplied by the Harwich Fire Department.
SHOP NOTES
The outlet will be located in the lower rearward corner of the pump operators panel.

BACK PACK FILLER VALVE

A Class 1 brass, 3/4", quarter turn ball valve with chrome T-handle shall be supplied and labeled "Back Pack Filler". The valve shall be installed on the streetside lower forward side of the pump panel with the discharge hose terminating at the outside of the apparatus body. The valve plumbing shall be 3/4" I.D. properly routed and clamped from the tank sump to the filler valve.
SHOP NOTES
The outlet will be located in the lower rearward corner of the pump operators panel.

POLY WATER TANK

The water tank capacity shall be approximately 500 US gallon or 416 Imperial gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.

CONSTRUCTION

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.

The water tank shall be of a specific configuration and designed to be completely independent of the body and compartments. 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. 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 1/8” 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 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. 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 1/4" thick removable polypropylene screen and a PT3™ 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" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction.

The tank cover shall be constructed of 1/2" 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" minimum polypropylene dowels spaced a maximum of 40” 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.

SUMP

There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3” above the inside floor.

OUTLETS

There will be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 G.P.M. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

MOUNTING

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

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4” x 1” and a 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" x 2" x 1/4” mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4” by 6” high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

CENTER OF GRAVITY

A center of gravity calculation shall be determined for each tank and provided as requested in order to provide the apparatus manufacturer with the necessary data to design and certify the apparatus with respect to the NFPA requirements regarding rollover stability.

WATER TANK LEVEL GAUGE

There shall be one (1) Innovative Controls SL series 10-LED water tank level gauge(s) for indicating water tank level. The tank level gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

WATER TANK LEVEL INDICATOR

There shall be two (2) Whelen Strip-Lite model PSTANK LED lights provided to indicate the water tank level and connected to tank level sensor in water tank. The four tank levels to be indicated as follows;

Green = "Full"
Blue = "3/4"
Amber = "1/2"
Red = "1/4"

The red "1/4" level light shall flash when the tank level drops below "1/4" of the tank capacity. Each light will be installed in a vertical orientation and be de-activated whenever the parking brake is released.

UPF POLY WATER TANK WARRANTY

The UPF poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

FILL TOWER PROTECTION

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

CLASS A POLYPROPYLENE FOAM CELL

There shall be one (1) 20 US gallon or 16.6 Imperial gallons polypropylene foam cell incorporated into the polypropylene water tank. This foam tank capacity shall be deducted from water tank size specified.

There shall be one (1) pressure/vacuum vent installed on the foam tank.

A minimum 1 in. (25 mm) inside diameter full flow drain valve and piping shall be provided at the lowest point of any foam concentrate tank. The drain shall be piped to drain directly to the surface beneath the apparatus without contacting other body or chassis components.

A label shall be affixed to the foam tank fill indicating: "WARNING" Class A foam tank fill, do not mix brands or types of foam.

FOAM TANK LEVEL GAUGE

There shall be one (1) Innovative Controls SL series 10-LED foam tank level gauge(s) for indicating foam tank level. The gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

HOSE BED STORAGE AREA

Hose bed storage area shall be located over water tank and body, and shall exit at the rear of the apparatus. The interior of storage area shall be free from all projections such as nuts, sharp angles, or brackets that may damage equipment.

ALUMINUM HOSE BED DECKING

The hose bed deck shall be constructed from 3" x 3/4" hollow aluminum extrusions welded into a one-piece grid to allow ventilation and water drainage. The extrusions shall have a radiused ribbed top surface. The deck will be completely removable for easy access to the booster tank. The booster tank fill tower shall be protected as necessary to prevent damage from equipment located in the storage area.

FILL TOWER PROTECTION

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

HOSE BED DIVIDER(S)

Two (2) adjustable aluminum hose bed partition(s) shall be provided in the hose storage area. The partition(s) shall be 3/16" smooth aluminum with split aluminum tubing welded to the top and rear edges.

VINYL HOSE BED COVER

A red marine grade vinyl hose bed cover shall be provided. Will include White Reflective "68" to the rear flap of cover.

HOSE BED FULL WIDTH EXTENSION

A full width, bolt-on type hose bed extension step shall be provided. Step shall be fabricated from 3/16" NFPA compliant treadplate aluminum with side gusset supports to body. The specified center rear marker lights shall be located on rear facing edge. The underside of step shall have a 36" OnScene LED light to light the bumper or compartment area below.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1906 standards, the vehicle shall be designed for an equipment loading allowance of 500 lbs. of Harwich Fire Department provided equipment based on the wildland body having at least 50 cu. ft. of storage space under 26,000 GVWR, and an equipment loading allowance of 750 lbs with 75 cu. ft. of storage space over 26,000 GVWR.

EQUIPMENT

The following equipment shall be furnished with the completed wildland vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- One (1) Duo-Safety 912 series 20' 3-section extension ladder(s) shall be provided with the completed unit.
- Four (4) Streamlight Fire Vulcan C4 LED flashlight(s) with shoulder strap shall be provided with 80,000 candela and 3 hour run time. Each flashlight shall be orange in color and have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have an LED spotlight style bulbs and reflectors. The flashlight(s) shall be wired to battery direct unless otherwise specified by Harwich Fire Department.
- Four (4) flashlight(s) shall be mounted two (2) in the rear cab area on the side of the center console and two (2) front area on console..
- Two (2) Kochek 4.0" x 8' Flexlite PVC flexible suction hose(s) shall be provided with completed unit. The hose shall have NST couplings provided.
- Two (2) 4" barrel strainer(s) with foot valve shall be provided with completed unit. Barrell strainer hard suction end shall match provided hard suction(s).
  - The suction hose(s) shall be mounted on streetside above wheels in formed aluminum hard suction tray(s).

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1906 for wildland vehicles, section 5.7 shall be supplied and mounted by Harwich Fire Department before the unit is placed in emergency service.

LOOSE EQUIPMENT TO BE INCLUDED WITH APPARATUS

A list of loose equipment provided with this specification, shall be included in the bidder's proposal.

- There shall be two (2) Zico AC-32, NFPA approved aluminum wheel chocks provided for 32" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20% grade, with the transmission in neutral, and the parking brake released.
  - The wheel chock(s) shall be mounted on the apparatus, location as per the Harwich Fire Department.

    Mounting location TBD at final inspection.
- There shall be one (1) SuperVac V18B Bat Pac Fan will be supplied in location C2.