STATE OF CALIFORNIA

THE RESOURCES AGENCY
DEPARTMENT OF FORESTRY AND FIRE PROTECTION

CDF MODEL # 34 TYPE 3 INITIAL ATTACK FIRE APPARATUS

Specification # 4C-06-34P dated
July, 2007 with bid addendum language
Inserted (bold, italics)

The California Department of Forestry and Fire Protection (CDF) protects the State of California from fires, provides urban search and rescue, responds to medical emergencies, protects and enhances the forest, range and watershed values while providing social, economic and environmental benefits to the citizens of rural and urban California.

This specification describes the general design and construction requirements to be utilized by the successful contractor to construct one or more complete, workable, Type 3 initial attack fire apparatus with a polypropylene booster tank on vendor supplied 4 X 4 chassis(s) and shall be capable of meeting the present and future needs of the California Department of Forestry and Fire Protection.

The completed apparatus shall be capable of operating reliably while responding to structure fires, wildland fires, urban search and rescues, traffic accidents and medical emergency incidents during a variety of weather conditions and altitudes both on highway and off road in the urban and rural interface of California.

* The initial attack fire apparatus proposed by the bidder shall meet the following standards, laws and regulations in effect on the date of the Invitation for Bid form a part of this specification. Each vehicle is required to meet all regulations, standards and laws including revisions, ***in effect at time of bid.*** The final completed vehicle certification is the

responsibility of the firm constructing the body described herein.

- Federal Motor Vehicle Safety Standards (FMVSS)
- Federal Department of Transportation and Highway Safety
- California Vehicle Code
- California Code of Regulations, Title 8, 13 & 15
- California Health and Safety Code
- California Air Resources Board Regulations (CARB)
- OEM Body Builders Standards and Guidelines
- National Fire Protection Association (NFPA) # 1901, latest edition

A plate identifying the manufacturer, tare weight, gross vehicle, date of manufacture and all other information as specified in the Federal Traffic and Motor Vehicle Safety Act, Section 114, and Federal Code of Regulations. Title 49, shall be attached to the vehicle body in an easily accessible location.

* Should a conflict arise between an NFPA Standard and any portion of these specifications, the NFPA Standard shall prevail. ***Where specification does not meet NFPA 1901, NFPA 1906 Standard (latest edition) shall apply. Details regarding the specific NFPA Standard and compliance shall be finalized at the pre-construction conference.***

Any test equipment required or expense incurred for the Certification Tests shall be borne by the Contractor supplying this equipment.

TABLE OF CONTENTS

SECTION 1

ADMINISTRATIVE REQUIREMENTS

1.1 MINIMUM BIDDER QUALIFICATIONS: To demonstrate that bidders meet or exceed the requirements in this bid solicitation, all bidders must provide the following documentation.

*

- ***At time of bid submission, all bidders must have a current final stage vehicle manufacturer's license, and a copy of a valid occupational license issued by the California Department of Motor Vehicles, or a valid copy of their dealer's license issued by the state where their business is located along with a copy of the occupational license of the California joint bidder. No Exceptions***

- **At time of bid submission, if the bidder is sub-contracting the manufacturing of the completed apparatus described herein, the bidder shall submit in writing, the name and location of the sub-contractor(s), and verify that the sub-contractor(s) meet the aforementioned requirements. No Exceptions**

NOTE: The following additional information may be requested by the State. If the following information is requested, it must be submitted within five (5) working days following official request. Inability to furnish requested documentation within five (5) working days may be cause for rejection.

- Upon request, must provide documentation of having two (2) previous consecutive years in the fabrication of a minimum of eighty (80) Type 3 or larger initial attack fire apparatus with polypropylene booster tanks on a minimum 33,000 # GVW chassis.

- Upon request, must provide customer lists, contact names and numbers, type and style of apparatus manufactured during the previous two (2) years.

- Upon request, must provide documentation that they employ welders or inspectors currently certified by the American Welding Society or have received professional training available from recognized trade schools/learning institutions.

- Upon request, must provide documentation that employees are currently certified or have attended factory available training equal to Navistar's "Vehicle Integration Training" or have received similar OEM qualified "vehicle modifier training" from the manufacturer of the proposed chassis. This training is required to modify or interface the chassis and body configurations; this includes OEM training on multi-plex electrical circuits.

At any time during the construction process if the successful contractor is not providing the quality of manufacturing that is required by the CDF, is not adhering to the requirements in this specification, or defaults on delivery schedules the State may terminate this contract following the terms and conditions of the Department of General Services, Procurement Division, "General Provisions", latest edition.

1.2 PRECONSTRUCTION CONFERENCE: A preconstruction conference shall be held at the successful bidders manufacturing facility between the manufacturer's representatives, a member of their engineering staff, construction supervisor and a minimum of two (2) CDF representatives within 30 calendar days after the formal notification of receiving the successful bid (ARO). This conference shall be held prior to the start of any construction. The purpose of this meeting is to review the specifications, resolve any questions concerning the specifications and/or any variations of the chassis and to provide the CDF with the opportunity to inspect the manufacturer's facilities.

1.3 PRODUCTION SCHEDULE: At the pre-construction conference, the successful bidder shall submit a tentative production schedule based upon the OEM chassis manufacturers estimated time of delivery. A subsequent "firm delivery schedule" shall be submitted within 30 days after the apparatus manufacturer's chassis order is placed, and shall be based on the OEM's expected delivery dates at the time of order. The apparatus manufacturer must have the chassis order placed within 30 days after the conclusion of the pre-construction conference.

* The first apparatus shall be completed within nine (9) months, 272 calendar days after conclusion of the pre-construction conference. The apparatus manufacturer shall be allowed a maximum of sixty (60) days ***or no more than 11 months from conclusion of the pre-construction conference*** between the first unit acceptance and the completion of the first group of multiple vehicles per the delivery schedule.

After pre-acceptance of the first unit at the manufacturers facility, the remaining apparatus shall be completed at the minimum rate of six (6) each per calendar month until completion of the contract.

All deliveries are due on or before the last business day of every month. Should the last day of the month fall on a weekend or holiday, the delivery shall be made no later than the next business day.

NOTE: Failure to meet the delivery schedule shall result in penalties being assessed as stated in Section 1.5 Penalty Clause.

1.4 CHASSIS REQUIREMENTS: The contractor shall supply the cab and chassis(s) and construct complete workable fire apparatus utilizing commercially available 4 X 4 chassis(s) as specified herein.

The odometer reading of each completed apparatus cannot exceed 5,000 miles at

the time of delivery to each agency. There will be a penalty charge of $1.00 per mile for each apparatus with an odometer reading in excess of 5,000 miles which will be deducted from the vendors invoice.

Chassis(s) pre-payment and/or progress payments for materials is not offered in this bid solicitation and subsequent purchase order.

1.5 PENALTY CLAUSE: The parties to this agreement acknowledge that the State shall incur actual damages should the contractor fail to perform the work as specified herein or should the contractor be unable to deliver the completed apparatus within the agreed upon contractor's production schedule. The parties, therefore, have agreed to late delivery charges in the amount of $424.00 per unit per work day which is the rental rate for a comparable unit. Work days are Monday through Friday inclusive, except declared State holidays observed Monday through Friday inclusive.

The parties also agree that the amount specified is not unreasonable nor punitive in nature because both parties have carefully considered the amount specified and believe it to be a reasonable estimate, and not excessive at the time the Purchase Order is entered into.

It is therefore agreed, that the contractor shall pay the State of California the sum of $424.00 per unit per workday (as stated above) for each workday the apparatus remains incomplete or unacceptable by the State. Late delivery charges shall be assessed until the final acceptance and delivery of the completed apparatus to the CDF Davis Equipment Facility. The total late delivery charges assessed against the contractor shall in no event exceed twenty-five (25 %) of the total value of the entire contract.

The contractor shall agree to pay late delivery charges as herein described. In the event that such late delivery charges are not paid, the contractor agrees that the State shall deduct the amount thereof from any monies due or that may become due to the contractor.

1.6 APPARATUS DRAWINGS: All drawings shall meet ANSI standards and be approved by a licensed Professional Engineer. Generic drawings are not acceptable. Drawings shall be submitted as follows:

* ***Drawings submitted with bid shall only depict basic vehicle layout including a top view and all four sides. Drawings submitted with the bid do not need to include any dimensions. Dimensions entered on drawings submitted with the bid will not be evaluated for purposes of award. Specification response shall take precedence over the drawings.***

Pre-Construction Conference:

- Scale drawing of pump panel layout.

- Scale drawing of water tank and location.

At time of each unit delivery:

- See Section 1.44, Apparatus Manuals.

1.7 PROTOTYPE MODEL: A prototype Model # 34 may be made available for inspection prior to bid submission, by "Appointment Only" at the California Department of Forestry and Fire Protection, Davis Equipment Facility.

The "Prototype" apparatus may be an operational unit of an earlier model year and due to the "polypropylene booster tank" requirement of this specification the prototype may be a model with an integral wet sided tank which does not necessarily incorporate all of the provisions of this specification. The contractor will be responsible for those changes, additions or adjustments as necessary to accomplish the objectives and descriptions of this specification.

The prototype may be used as a reference for general dimensions, quality of construction, placement of components, fabrication, fit finish and the critical construction clearances that the CDF requires.

After bid award, a CDF Model # 34 may be made available for further examination by the CDF Mobile Equipment Management (MEM) at a mutually agreed upon location and on mutually agreed dates for a period of time not to exceed a two (2) week interval.

1.8 CLARIFICATIONS AND CHANGE ORDERS: The contractor shall document any apparent differences that may exist between the attached specification, NFPA #1901 guidelines, the specified cab and chassis, the cab to axle and/or frame dimensions, body construction details or basic component location, so that proper component interface and body clearances can be maintained.

If clarifications or change orders are necessary, they shall be submitted for CDF's approval prior to the actual work being started. Submittals shall include a written description, parts lists, and if necessary, detailed drawings outlining the proposed changes. The drawings are necessary to evaluate the proposed clarification or change order and to update existing drawings.

When required by law, the State Office of Procurement will issue a written change order. Change orders amending the Purchase Order shall be signed by all parties, clearly indicating the reason for any change.

1.9 QUANTITY INCREASE: SECTION DELETED-not required with contract.

1.10 CURRENT PRODUCTION: The apparatus cab/chassis must be new and unused, in current production and the fire body shall be manufactured from current production materials, products and components. The supplied cab/chassis shall be

listed as the current production model, or subsequent model year that meets all Federal and California Air Resources Board (CARB) requirements for 2007 diesel engine emissions. The use of any used, rebuilt, non-current or prototype production materials, proprietary products or components is prohibited.

1.11 CONTROLS AND ACCESSORIES: All contractor installed control or accessory item(s) that are interfaced or connected into the main OEM chassis, engine, transmission or electronic management system shall be installed as directed by the chassis manufacturer using OEM specified hardware and/or components.

1.12 FABRICATION DETAILS: Minor details of construction and materials where not otherwise specified shall be left to the discretion of the contractor who shall be solely responsible for the design and construction of these components. Such details and other construction that is not specifically covered herein or not in variance with these specifications, shall conform to the specifications as outlined in the National Fire Protection Association (NFPA) Standard # 1901 latest edition, where applicable, and/or any changes or additions made to these specifications since that date.

If the cab and chassis are delivered with accessories or fittings that prevent the mounting of CDF specified components, (e. g. cab roof air horns, etc.) then such items shall be removed and all applicable body work will be accomplished by the contractor.

1.13 GENERAL CONSTRUCTION: All material and components shall be new and unused. All bolts shall be a minimum of cadmium-plated heat-treated, "SAE" Grade 5 of proper length. All threaded nut fasteners shall have flat washers installed beneath the bolt head and nut and feature self-locking nuts or have lock washers. Any original equipment manufacture special design bolt (i.e., SAE Grade 8 flanged head, long-shoulder bolt) that is removed from the chassis during fabrication shall be reinstalled or replaced by the same type or grade and properly torqued to the manufacture's specifications.

All welds shall be free of slag, internal and external. All workmanship, welding, cutting, fabrication, and assembly shall be of high quality and in conformance with good manufacturing practices. All welding shall be according to AWS standards. Flame-cut edges shall be finished for a neat and uniform appearance. No welding or cutting will be permitted on the basic chassis without the CDF Representative's approval.

All brackets, braces, fitting, and other attachments shall be bolted to the frame or chassis. Existing holes in the standard truck frame shall be utilized wherever possible. If additional bolt holes are required, they shall be drilled through the web of the frame, at least twice the "hole" diameter distance from the start of the frame flange radius. All frame-mounted assemblies shall utilize SAE Grade 8, flange headed bolts and nuts. The use of rivets shall be restricted to "blind" areas and only where alternative fastenings are not feasible.

Components shall be located for ease of inspection, routine maintenance or removal. Drains, oil and fuel filters, filler plugs, grease fittings, air and water lines and etc. shall be located so that they are readily accessible and do not require special tools for servicing.

If the apparatus body construction causes restriction(s) to the OEM chassis lube fittings, oil, fuel filters, spring pins and etc., removable accessory panels shall be provided. Lube extensions, oil drain or fill extensions, or if special tools are required for minor chassis maintenance they shall be provided by the contractor for each apparatus manufactured.

Securing of air, water, fuel and/or electrical lines, looms or harnesses shall not utilize stick-on or adhesive backed plastic fasteners. Insulated metal clamps or clips shall be provided or OEM chassis manufacturer provided plastic clamps or bands can remain in place and do not require replacement with insulated metal clamps or clips. The use of OEM style heavy duty zip-ties is acceptable.

All components shall be designed and protected so that heavy rain, dust or other adverse weather conditions shall not interfere with normal operations.

All body construction, sub-assemblies, individual or OEM components (e. g. compartment doors, electrical harnesses, plumbing, pump panels, mounting brackets, and shelving) supplied by the vendor must be manufactured to a tolerance that guarantee's absolute interchangeability between all completed units.

1.14 QUALITY ASSURANCE: The contractor shall prepare and submit a written Quality Assurance Plan (Quality Control) check list for each vehicle under construction. This check list, by serial and job number shall record the satisfactory completion of each of the operationally tested item(s) or task(s) during the construction phase.

The written plan shall include all steps, checkpoints, forms and other documentation included in the quality control program. This check list shall be made available for CDF to review during construction and a completed copy, signed off by the project manager, shall be submitted to the CDF Representative prior to the pre-acceptance operational test of each unit. This plan must be submitted to the CDF Representatives during the pre-construction conference.

1.15 PERSONNEL PROTECTION: Guards, shields, or other protection shall be provided where necessary in order to protect personnel from injury from hot, moving or rotating parts during non-maintenance operations.

1.16 CDF REPRESENTATIVES: The CDF shall monitor the contractor in all phases of fabrication to and including the final testing of each apparatus produced according to this contract. The term "CDF Representative" as used in these specifications for CDF will be a Forestry Equipment Manager II.

1.17 INSPECTION TRIPS: The CDF shall conduct inspection trips as described below. The scheduling of the required factory inspection trips will be discussed during the pre-construction conference.

Inspection Trip #1: Two (2) CDF representatives shall travel to the contractor's fabrication facility for the initial pre-construction conference and facility inspection.

Inspection Trip #2: One (1) CDF representative shall travel to the contractor's fabrication facility for the quality assurance progress inspection including plumbing and body build-up construction of the agency's initial apparatus under construction.

Inspection Trip #3: One (1) CDF representative shall travel to the contractor's fabrication facility for the pre-delivery inspection/tilt table testing/pump testing for the agency's initially completed apparatus.

Inspection Trip #4: One (1) CDF representative shall travel to the contractor's fabrication facility for inspection of the first group of multiple vehicles at the quality assurance phase including plumbing/body build-up under construction.

Inspection Trip #5: One (1) CDF representative shall travel to the contractor's fabrication facility for inspection of the first group of multiple vehicles at the pre-delivery stage.

Inspection Trip #6 & #7: One (1) CDF representative shall travel to the contractor's fabrication facility for two (2) randomly selected inspections to ensure contract compliance.

If additional inspection trips are desired by the CDF, those trips will be at no cost to the bidder.

It shall be the vendor's responsibility to notify the CDF Representative five (5) working days in advance when requesting an inspection and to minimize the number of trips by scheduling multiple vehicles for each inspection trip.

1.18 TRAVEL EXPENSES: All travel and transportation expenses for the CDF Representatives for the required pre-construction conference and inspection trips shall be arranged and pre-paid for by the vendor. The travel and transportation expenses shall be arranged from Sacramento, Ca. to the contractor's manufacturing facility and return. Transportation expenses consist of the charges for commercial carrier fares, lodging, meals, rental vehicles including fuel, private or State vehicle mileage at $.41 per mile, overnight and day parking for State or privately owned vehicles, bridge or road tolls, taxi or street car fares and all other charges essential for transportation.

When air travel is used, the CDF personnel shall use Sacramento International

Airport. Claims for transportation by the scheduled airlines shall be allowed at the lowest fare available in conformity with the regular published tariffs for scheduled airlines in effect on the date the flight originated.

1.19 OUT OF STATE TRAVEL: Section Deleted

1.20 TRANSPORTATION EXPENSES: Section Deleted

1.21 PRE-DELIVERY INSPECTION: After completion of the first apparatus, the contractor shall contact the CDF to schedule a pre-delivery inspection of the apparatus at the contractors manufacturing facility. The pre-delivery inspections may be scheduled in conjunction with the required factory inspection trips.

Pre-delivery inspections on remaining apparatus that are not conducted at the manufacturing facility will be conducted at the manufacturers closest Service Shop in Northern California. It is to the manufacturer's benefit to have as many apparatus completed during the time of the required factory inspections so that any pre-delivery inspection deficiencies may be corrected prior to delivery.

All items noted during these inspections shall be repaired, refinished or replaced prior to delivery. If items listed on the inspection list have not been repaired / replaced prior to delivery to the CDF Mobile Equipment Facility it shall be CDF's prerogative to reject the apparatus at the time of delivery until all repairs have been successfully completed to the satisfaction of the CDF.

1.22 FINAL ACCEPTANCE / DELIVERY: The vendor shall deliver all completed CDF apparatus to the CDF Mobile Equipment Facility, 5950 Chiles Road, Davis, Ca. 95618.

The completed apparatus as presented to the CDF for the "final" acceptance shall be cleaned, internally and externally (freshly washed and chamois) and delivered <u>full of fuel</u>.

The final acceptance and operational check shall be accomplished within five (5) working days by the CDF after delivery.

This inspection shall include: specification compliance, workmanship, appearance, proper operation of all components and systems, pump test, re-inspection of items/repairs noted during the pre-delivery inspection and that all documents are present. In the event that deficiencies were not corrected and/or additional deficiencies are detected, the apparatus shall be rejected and the delivering dealer shall be required to make the necessary repairs, adjustments or replacements.

If the dealer receives notice that the apparatus is not acceptable, whether written or oral, the apparatus shipped to the purchase order destination shall be removed within seven (7) calendar days. If the dealer fails to remove said apparatus from the

State's facilities within the specified period, the State may forward said apparatus to the dealer's repair center by common carrier at the dealer's expense and risk.

Payment and/or commencement of a discount period (if applicable) shall not be made until all defects are corrected and the apparatus is accepted. The dealer/contractor shall be responsible for any and all costs associated with returning a rejected apparatus to their designated repair center and the return to CDF.

Completion of the final acceptance and operational check by the CDF shall in no way release the contractor from satisfying the requirements of the contract, specifications or warranty.

1.23 REPEAT INSPECTIONS: If additional inspections are required by the contractor or necessary because of vendor scheduling, inspection rejections or other contractor related cases, such repeat inspection trips shall be at the expense of the contractor at the rate as follows:

$50.00 per hour including all travel and transportation expenses (includes travel time). The hourly rate shall be for a minimum eight (8) hour day if overnight travel is required. All expense claims for needed repeat inspection trips as described above shall be calculated at actual costs incurred, with receipts furnished to the contractor along with a reimbursement request/claim.

Transportation expenses for repeat inspections may consist of the charges for commercial carrier fares, private or State vehicle mileage allowances, overnight and day parking charges, bridge and road tolls, necessary taxi, bus or street car fares and all other charges essential to the transportation of the CDF Representative from Davis, Ca. to the contractor's manufacturing facility and return.

NOTE: Out of State travel expense and transportation for repeat inspection trips shall be arranged and pre-paid for by the vendor, the CDF hourly inspection rate shall be deducted from the invoice for the particular apparatus that requires a repeat inspection.

1.24 VEHICLE WEIGHT RATING AND PAYLOAD: CDF is extremely concerned about the curb weight, payload allowance, center of gravity, weight distribution and side hill performance due to the equipment to be carried and the unique operating conditions encountered. The chassis manufacturer's published gross vehicle weight rating for the vehicle shall not be altered.

At the pre-construction conference, the bidder shall provide the CDF with the calculated axle weights and center of gravity projections that predict the degree of allowable tilt for the completed apparatus as supplied by the manufacturer.

The apparatus as supplied by the manufacturer shall have a loaded weight distribution of 60% rear and 40% front, plus or minus 10% and a side to side tire

load variation of no more than 7%.

Upon delivery, a certified weight slip shall be provided to the CDF showing total tare weight along with front axle, rear axle, left and right side weights for the first delivered apparatus for each agency.

1.25 SIDE HILL PERFORMANCE: Upon completion of the first apparatus, the CDF requires that the first completed model be "Tilt Table" tested in a fully loaded condition with the engine not running. Fully loaded condition shall be defined as stated in NFPA 1901, Section 4.12, Vehicle Stability. The apparatus must meet the minimum required CDF side hill performance requirement of 30 degrees tilt in a fully loaded condition before lifting a front or rear tire. The tilt table test must be conducted with a CDF Representative in attendance and all cost associated with this testing shall be the responsibility of the contractor.

If the completed apparatus fails to meet the minimum side hill performance requirements, the contractor shall have no more than a total of 30 business days to correct all deficiencies and re-submit a compliant apparatus. If the contractor cannot deliver a compliant apparatus within the 30 business day time frame, the State shall initiate termination for default.

1.26 TEST FACILITY: During construction and at the time of the pre-delivery inspection, a product test area shall be provided by the contractor at the contractor's site for use of both the contractor and the CDF Representative. The test area shall be paved, adjacent to which shall be the pump testing facility. The pump test facility shall have all equipment and provisions, including water capacity to perform a NFPA 1911 compliant pump test from draft.

1.27 APPARATUS CERTIFICATIONS: The contractor shall make a final inspection and operational test of each complete apparatus prior to notifying the CDF Representative that a unit has been completed and is operationally ready for the CDF pre-acceptance inspection.

The contractor shall provide documentation that each completed apparatus has been tested and certified, meeting all requirements in the "Performance, Testing and Delivery Data Requirements" chapters of NFPA # 1901, latest edition, and also includes an inspection of all fabrication, construction and assembly for details and completeness.

1.28 MANUFACTURERS REPRESENTATIVE: The successful bidder shall identify a qualified manufacturer's representative and a back-up representative, who must be employees of the company. This provides assurance that the CDF contract will be adequately supported even if the primary representative is unable to perform his/her duties due to illness or other circumstances.

1.29 TECHNICAL SUPPORT: The successful bidder must be able to show evidence

that adequately qualified staff will be readily available to provide timely technical support or training to the CDF at such locations as required by the CDF during the initial warranty period. Support shall be available either through employees of the bidding company or through sub-contracts that are in place at the time of the bid opening. If the bidder is not the manufacturer, the bidder cannot fulfill this requirement with personnel employed by the manufacturer unless the bidder has a binding contract with the manufacturer to provide technical support for this specification. Upon request, the bidder shall identify the name(s) and qualifications of the technical support personnel.

1.30 SERVICE AND PARTS: During the apparatus body or individual component warranty period, repair parts shall be readily available from the contractor. Replacement parts must be made available to the CDF within a 72 hour time limit from the date of the order, whether the order is made by telephone or in writing. Freight or transportation costs for warranted parts are the responsibility of the contractor and the use of overnight delivery is required when an apparatus is out-of-service due to needed parts.

A minimum of two (2) authorized service and repair facilities shall be designated. One (1) authorized service and repair facility must be located in Northern California and one (1) authorized service and repair facility must be located in Southern California. At the time of bid submission, each bidder shall state the locations of their service facilities, including the name of the authorized service representative.

1.31 PREPARATION: The contractor shall service all installed components with the OEM manufacturer's recommended lubricant or coolant. Service shall be prior to initial testing or operation of said components, i.e., air cleaners, gearboxes, pump engines, drivelines, live reels, primer pumps, radiators and etc. The contractor assumes full responsibility for failure or damage to components caused by lack of, or improper service.

1.32 GENERAL WARRANTY: The successful contractor shall warrant each new apparatus manufactured or assembled by, to be free from structural defects in material and workmanship, including the tank cradle for a minimum period of ten (10) years from the date that the apparatus is placed in service by the CDF, except for specified items or components from other manufacturers whose warranties have different time limitations.

The warranty period for components from other manufacturers that carry different time limitations shall start with the in-service date of the apparatus, not the date of component manufacture and shall be the responsibility of the apparatus manufacturer until those warranty periods expire.

Exclusions from the warranty shall include parts or parts of products becoming defective as a result of misuse, negligence, accident, failure to provide routine maintenance or normal wear and tear items.

Warranty certificates and/or cards shall be supplied for each individual apparatus.

CDF's preventive maintenance program shall be considered sufficient to meet all warranty requirements.

Warranty issues during the 10 year general warranty or component warranty periods shall be at the contractor's expense. The contractor shall repair or replace any defective part or materials at no cost to the CDF during these time frames. The contractor may dispatch a traveling mechanic to perform minor warranty repairs. The use of a traveling mechanic in the performance of minor repairs does not relieve the manufacturer from the provision of the required northern or southern California parts and repair facility. Traveling mechanics are to be used to minimize out of service time only, not substitute as a parts and repair facility.

If it is necessary for CDF to deliver the apparatus to the contractor's authorized Northern or Southern California repair facility, the contractor must notify CDF within 24 hours after the apparatus is delivered with an estimate of repair down time.

The contractor shall be responsible for any and all OEM installed chassis component(s) that fail prematurely or are damaged from improper installation or construction by the apparatus manufacturer.

If the contractor does not perform warranty repairs to the satisfaction of the CDF or is not performing these repairs in a timely manner it may be cause for elimination from bidding on future contracts.

The apparatus shall be maintained and serviced by CDF journey level repair technicians in accordance with CDF Mobile Equipment Guidelines. Repair Technicians performing routine service and emergency repairs during the contractor's or subcontractor's warranty period shall not void any warranties.

* As CDF vehicles operate over a large portion of the State and the vehicles must be repaired throughout the State, the bidder must indicate by letter the procedure to be followed by CDF in handling items and conditions covered by warranty or guarantee, ***this information shall be provided upon request.***

Questions concerning the maintenance program should be directed to CDF Fleet Management at (530) 757-2407.

1.33 CDF IN-SHOP WARRANTY REPAIRS: After delivery and during the ten (10) year warranty period, if the contractor is unable to provide major warranty repairs in a timely manner, supply parts or requests to have the CDF perform In-Shop Warranty repairs, the contractor agrees to reimburse the CDF for any and all labor costs and replacement parts charges associated with any authorized CDF In-Shop Warranty Repair.

In an effort to keep apparatus down time to a minimum during emergency conditions, (e. g. “Fire Season”, due to the remote location of various CDF facilities, excessive travel distances to the vendor’s authorized repair facility), the CDF reserves the right, after notifying the vendor, that the CDF may proceed with any emergency repair(s) of vendor responsibility. Contractor pre-approval shall be obtained by the CDF prior to any work being done that exceeds three (3) hours.

A signed copy of the attached CDF In-Shop Warranty Agreement must accompany the bid.

1.34 CAB & CHASSIS WARRANTY*:* The commercial OEM cab & chassis manufacturer's published warranty shall be for a minimum period of twelve (12) months or 12,000 miles, whichever occurs first. The warranty period will commence when each completed apparatus is placed in field service by the CDF.

Additional OEM warranty periods that reflect the cab and chassis as being used in the Fire Service must be applied.

Prior to final acceptance by the State, the apparatus manufacturer shall be responsible for any OEM cab & chassis required service work, warranty repairs or break downs while en-route to the designated final FOB delivery point.

After CDF’s final acceptance of the completed unit from the apparatus manufacturer, it shall be the CDF’s responsibility to facilitate any cab and chassis warranty repairs with the OEM.

1.35 FIRE PUMP WARRANTY: The pump manufacturer’s warranty shall ensure that either pump, including the power unit as supplied by the pump manufacturer shall be free from defects in materials and workmanship under normal use and service for a period of five (5) years from the date the unit is placed in service, and agrees to make good any part thereof, including attached equipment and trade accessories. Established service and parts supply facilities must be located in the State of California.

1.36 PLUMBING WARRANTY: All stainless steel plumbing shall be warranted against leaks, defects in materials, workmanship or structural failure for a period of ten (10) years commencing with the in-service date of the apparatus.

1.37 VALVE WARRANTY: All drop-out discharge and inlet ball valves shall meet all NFPA standards and be warranted to be free from defects in materials and workmanship under normal use and service for a period of ten (10) years.

1.38 BOOSTER TANK WARRANTY: The polypropylene booster tank shall be

warranted for any leaks, manufacturing defects, defects in material or workmanship for the lifetime of the apparatus. If the apparatus is deemed out of service, a tank manufacturer's service technician shall be dispatched within 48 hours to make repairs at any of the various CDF maintenance facilities. The booster tank warranty shall include any and all costs associated with removal and reinstallation of the tank and all transportation costs if the tank requires off site repairs or replacement.

1.39 APPARATUS WIRING WARRANTY: all electrical wiring installed or manufactured by the final stage manufacturer shall be warranted against improper installation, be free of pinched, chaffed, or broken wires and any unforeseen damage caused to the OEM chassis electrical system for a period of ten (10) years.

1.40 EMERGENCY LIGHTING WARRANTY: A five (5) year manufacturer's warranty on the LED emergency warning lights shall be provided.

1.41 AUDIBLE WARNING CONTROL WARRANTY: A five (5) year manufacturer's warranty on the siren control and a two year manufacturer's warranty on the speaker shall be provided.

1.42 PAINT FINISH WARRANTY: The finish paint on the unit will be provided with a five (5) year paint finish guarantee for the following items: Peeling or delaminating of the topcoat or other layers of paint, cracking or checking, loss of gloss, caused by defective materials or improper application.

1.43 OEM CAB & CHASSIS PUBLICATIONS: The following cab and chassis owner/ operators manuals shall be supplied with each delivered apparatus;

- 2 copies of Operator's or Owners Manuals applicable to the OEM cab and chassis shall be supplied for each apparatus.
- 1 copy of the OEM service manual for the make, model, year of the cab and chassis shall be supplied for each apparatus, an electronic version is acceptable.
- 2 copies of line set tickets or a bill of materials of reproducible quality shall be provided. (This ticket shall identify each major component of the vehicle by name, model, and/or part number so as to be usable for obtaining parts once the vehicles are in the field as complete fire engines).
- If the line set ticket or portion thereof is installed in cab, the location will be coordinated with the CDF Representative.

1.44 APPARATUS MANUALS: Prior to completion of the contract, the contractor shall furnish one (1) electronic version of "as built" electrical and plumbing schematics, complete component and parts lists, serial numbers, line setting tickets (or equal), electronic pump governor instructions maintenance requirements and etc.

This information shall be furnished to CDF in a print ready version of "Microsoft Word" (or equal) to match the CDF's 6804 "Green Book" pamphlet. Note: CDF must

be able to add information or "write" to the disk. The CDF shall furnish the contractor with a sample for proper layout and formatting of the pamphlet during the pre-construction conference and upon CDF's acceptance of the contractor's supplied information and format, the CDF shall provide for the printing of the "Green Book" pamphlet.

In addition, with each apparatus delivery, the contractor shall supply two (2) each apparatus owners manuals for their respective completed apparatus. The manuals shall be 8 ½" X 11" binders and shall consist of copies of all service and operator manuals including all information required in the CDF "Green Book" pamphlet. One (1) copy shall be labeled "Station Copy" and the other shall be labeled "Shop Copy".

Prior to completion of the contract two (2) additional "master copies" shall be supplied to CDF Fleet Management.

1.45 FINAL MANUFACTURERS I.D. LABEL: A completed vehicle label shall be attached to the completed apparatus in the cab on the driver's side of the vehicle. The label shall be in compliance with the National Traffic and Motor Vehicle Safety Act, Section 114 and Federal Code of Regulations, Title 49.

1.46 IN-SERVICE NOTIFICATION: While apparatus delivered to the CDF may not be placed into service immediately upon final acceptance, the in-service date shall not be longer than 60 days after final acceptance. The CDF shall notify the vendor in writing of the actual in-service date and mileage.

1.47 WEIGHT CERTIFICATE: Upon the delivery of each apparatus, (for registration purposes) the contractor must provide a certified weight certificate showing the total "Tare" weight for each apparatus that is delivered.

1.48 INVOICING REQUIREMENTS: Unless otherwise specified, invoices shall be sent to the address set forth herein. Invoices shall be submitted in triplicate and shall include the purchase order number, item number, unit price, extended item price, any cash discount offered and invoice total amount. State sales tax shall be itemized separately and added to each invoice as applicable.

Processing vendor payments and/or cash discounts (if applicable) shall be defined as beginning only after the apparatus has been delivered and the final acceptance inspection has been performed. If late apparatus delivery charges occur, the penalty charges shall be deducted from each individual invoice. The CDF Representative's travel expenses, if applicable, shall be deducted from each final apparatus invoice.

1.49 VEHICLE REGISTRATION: Registration for each completed apparatus with the California Department of Motor Vehicles (DMV) shall be completed by CDF Fleet Management after the final apparatus acceptance.

CDF IN-SHOP WARRANTY AGREEMENT

Name of Vendor/Manufacturer _____

Warranty Representative (print or type) _____

Street Address _____

City, State, Zip Code _____

Telephone Number _____

Specification #_____ Solicitation # _____

Item (Quantity/Brand/Model) _____

When equipment is purchased for/by CDF, a section of the specifications requires the vendor/manufacturer to enter into an In-Shop Warranty Agreement.

The terms of the In-Shop Warranty Agreement for this equipment are as follows:

1. Labor rate charged by CDF will be $95.00 per hour.

2. Warranty claims will be processed on a CDF Work Order (ME-107) unless the vendor/ manufacturer furnish their standard warranty form.

3. Vendor's/manufacturer's standard flat rate time schedules shall be used as a guide for In-Shop Warranty repair time. If a vendor's/manufacturer's flat rate time schedule is not available, CDF will use the time that is recorded on the CDF Work Order.

4. Replacement parts ordered from the vendor/manufacturer will be available within 5 working days from the date of notification, whether the order is made by telephone or in writing.

5. Replaced parts will be held 60 days for inspection by the vendor/manufacturer.

6. Original Equipment Manufacturers' parts will be used as replacement parts; or, if OEM parts are not available, after-market parts of equal or better quality will be utilized.

7. Copies of invoices for all parts will be provided to the vendor/manufacturer.

CDF will contact the vendor/manufacturer for authorization to perform In-Shop Warranty repairs as stated in this agreement. Only under extreme emergency conditions will In-Shop Warranty be performed without prior authorization. If CDF requests not to perform the warranty work, the supplier shall pick up the unit within 48 hours of notification, written or verbal.

The In-Shop Warranty Agreement shall remain in effect until all conditions of the warranties in this State of California specification and in the original manufacturer's warranty expire.

Signature, CDF Senior Equipment Manager _____

Date

Signature, Vendor/Manufacturer _____

Date

SECTION 2

APPARATUS CAB AND CHASSIS REQUIREMENTS

The apparatus must meet all performance and documentation requirements of NFPA # 1901 and all Federal Motor Vehicle Safety Standards (FVMSS) including all California Air Resources Board (CARB) emission requirements for 2007 and subsequent year diesel powered vehicles.

*

2.1 APPARATUS CHASSIS & BODY DIMENSIONS:

- 4X4 four door commercial conventional cab
- Wheel base: No less than 175” but not to exceed 180”
- Cab to rear axle: Not to exceed 61”
- Horsepower/Torque: Minimum of 330 hp/950 ft lbs. torque
- ***Overall length: Not to exceed 311.5”***
- ***The maximum overall height from ground to the top of the light bar shall not exceed 113”.***
- Overall body width: Not to exceed 98" (not including rub rails or mirrors)
- Overall main body height***:*** Not to exceed 110”
- Hose bed height, floor to ground: Not to exceed 81” (Fully Loaded)
- Crosslay height, floor to ground: Not to exceed 71” (Fully loaded)
- Minimum pump module/running board/under cab compartment ground clearance to be 20”.
- Angle of approach: No less than 30 degrees (Fully loaded)
- Angle of departure: No less than 24 degrees (Fully loaded)
- Manufacturer's gross vehicle weight rating (GVWR) No less than 35,000 lbs.
- Cab to end of frame to be clear and clean with no fuel tanks, air tanks, or air dryers on inside or outside of the frame.
- Cab to end of frame dimensions: Full length frame rails to end of body no less than what is necessary to provide proper body and rear toe eye mounting, add-on frame extensions are not acceptable.
- Bare chassis and cab curb weight with specified tires to be maximum 15,000 lbs.
- Area directly under both rear doors (left and right) to be clear for compartment mounting.

NOTE: All dimensions noted above are estimates and shall be finalized at the pre-construction conference.

2.2 FRONT AXLE: A minimum rating of 12,000 lbs. drive axle, full floating, and single reduction type. The ratio shall be consistent with the rear axle ratio. It shall be equipped with O.E.M. hydraulic power steering. The axle shall be O.E.M. approved for this application.

2.3 REAR AXLE: Full floating; hypoid or spiral bevel; single reduction, rated not less than 23,000 lbs. Axle ratio to provide for 72 mph at engine governed RPM, "0%" road grade.

2.4 TRANSFERCASE: The 4X4 chassis shall include a cast iron two (2) speed transfer case with OEM auxiliary oil cooler (with a minimum 10,000 ft. pound rating), of the proper configuration and capacity to match the related drive train components. Aluminum cases shall be rejected.

NOTE: All drive train components on the 4X4 chassis must be O.E.M. chassis manufacturer installed. After market installed components shall be rejected.

2.5 DRIVESHAFTS: Heavy duty Spicer #SPL170XL series. (or equal)

NOTE: The drive axles and transfer case shall be provided with synthetic oil.

2.6 BRAKES: A four channel, dual air “ABS” air brake system for straight trucks with “S” cam drum brakes and automatic slack adjusters shall be provided. The front brake shoe dimensions shall be 16.5”X5” and the rear brake shoe dimensions shall be 16.5”X7”. The entire brake system shall meet all Federal and State of California requirements for air brakes.

2.7 AIR TANKS: The contractor shall use the OEM air tanks supplied with the chassis only if said tanks fit within the body buildup space constraints. Otherwise, new DOT approved tanks meeting the space constraints must be supplied and installed by the contractor that meet the minimum air volume specifications required by the chassis manufacturer. No component of the original air brake system is to be moved or modified without consulting the CDF Representative.

2.8 PARKING: Rear wheel spring brakes with spring brake control shall be provided. The parking brake is to be set with "pull" action and released with "push" action and shall also be properly labeled.

2.9 SERVICE: Full air, to be the maximum capacity available for the axle(s) bid. The air compressor shall be a minimum of 13 cubic feet capacity, water-cooled, and the compressor air source shall be routed from the engine air cleaner.

2.10 AIR DRYER: A Bendix AD-IP air dryer shall be provided. The dryer height shall be no greater than the frame rail depth.

2.11 BRAKE DRUMS: All brake drums shall be outboard mounted.

2.12 BRAKE HOSES: D.O.T. approved rubber brake hoses shall be provided at all brake chambers. All synflex air hose that is routed below the frame rails shall be

wrapped with “Storm King Mountain” Fire Wrap Lagging, (or equal)

2.13 CAB and DOORS: Shall be an OEM manufactured commercial, conventional “Crew Cab” four door cab with front fenders and a swept back front bumper.

*** 2.14 CAB COMPLEMENT:**

- OEM air-conditioning with integral heater/defroster and HVAC fresh air filter and if available OEM floor mounted rear seat auxiliary HVAC.
- ***One piece hi-strength composite tilt hood or tilt hood and fenders with stationary chrome grille. A chrome grille that is not stationary is acceptable in lieu of the stationary chrome grille specified as long as it does not interfere with front extended bumper. (Example: With hood up, front center hose box shall be accessible)***
- OEM bug screen mounted behind the grille.
- Two (2) adjustable non-suspension light gray vinyl hi-back front bucket seats a matching hi-back rear bench seat for three (3) persons. Upholstery with cloth inserts is unacceptable.
- Cab Sound Insulation package.
- Black or grey rubber cab floor covering.
- Tinted glass all windows.
- Tilt steering wheel.
- Arm rest, all doors.
- Two adjustable sun visors.
- Dual electric 2-speed windshield wipers and washers.
- Dual electric horns.
- Fresh air heater and defroster.
- ***Data case in each front door requirement deleted***.
- Entry grab handle for each door w/ Anti-Slip rubber inserts.
- Keyed ignition switch shutoff.
- Electronic high idle control-See Section 9.6
- OEM logos or badges shall be shipped loose.
- Low air (brake) pressure warning device.
- Transmission quadrant (T-Handle design) back lighted and selector positions marked.
- Two electric, bright finish, adjustable, heated, swing away, reset type exterior rear view mirror assemblies with brackets appropriate to cab structure. The mirror heads are to be one piece frame, at least 6" X 16", with a minimum 7.44 sq. inch adjustable convex mirror mounted below mirror head.
- There shall be safety belts/shoulder harnesses installed for each seating position, with metal-to-metal buckle, positive pelvic restraint where available. All belts and mounting must be FMVSS approved. The four outside belt ends shall be equipped with OEM floor mount retractors. Three point belts shall be provided for each outboard seat position.
- The seat belts shall be “Red” or “Orange”, to comply with NFPA standards.

2.15 INSTRUMENTS & GAUGES: (Minimum Complement)

All gauges to be in dash mounted.

- Indicating voltmeter.
- Air pressure gauge.
- Oil pressure gauge.
- AM/FM radio w/ single disc CD player and weather band with multiple speakers and antenna.
- Engine coolant temperature gauge and low level warning.
- Transmission oil temperature gauge. (Allison)
- Fuel level gauge.
- Speedometer, with trip meter, odometer.
- Intake air restriction gauge vacuum activated, meter type, resettable, dash mounted or intake (under hood) mounted air restriction indicator with dash mounted warning light.
- Tachometer, factory installed, dash mounted.
- Electronic hour meter.
- PTO hour meter.

Where required, warning devices shall be visual and audible.

* **2.16 ELECTRICAL SYSTEM:** Shall be 12 volts with a heavy-duty alternator, rated at minimum 270 amps at 14 volts, internally regulated, automatic circuit breaker system protection standard and provided with the minimum features as listed.

- Increased alternator output at idle for Fire Service Truck Applications.
- Heavy duty OEM wiring harness that provides separate stop/turn configuration that terminates at the end of the frame rails.
- Remote body builder interface for remote engine speed controls.
- Battery disconnect switch positive type, lever operated, mounted on the cab floor driver's side. OEM chassis manufacturer supplied disconnect is acceptable.
- ***Delco Remy MT 42 starter motor or Delco Remy MT39 starter motor is acceptable.***
- Fan drive override switch.
- A 120 volt 1200 watt (or as recommended by the engine manufacturer) engine block heater and receptacle mounted below the driver's door.
- 2-Way Radio wiring effects. Wiring with minimum 20 amp fuse protection. Includes ignition wire with 5 amp fuse. Wire ends heat shrink and 10' coil taped to base harness. (If available from the OEM, if not, vendor must install)
- Lighted 4X4 engage switch.
- Electric over hydraulic PTO controls at the pump panel.
- Hi-Lo halogen sealed beam headlights with daytime running lights. The headlights shall be provided with a flash to pass feature.
- OEM clear fog lights or a fog light accommodation package.
- Parking lights.
- Two rear stop and taillights.

- Instrument panel lights.
- Interior (courtesy) dome lighting, door switch operated (on all doors).
- Side marker lights.
- Clearance and identification lights.
- Two front mounted turn signal lights.
- Hazard warning light switch.
- Self-canceling flashing turn signal light switch (OEM).
- Three each BCI Group 3l, minimum 2280 CCA total, 12-volt batteries.
- Air horn accommodation package, less horn.
- All lighting to meet FMVSS.
- Provisions for electronically remote mounted engine controls.
- 102 DBA back-up alarm.
- A dash mounted minimum 40 AMP dual output switch(s) that controls hi-amperage loads such as a lightbar and emergency lighting.
- The OEM chassis manufacturer or apparatus manufacturer shall supply an electrical system that includes “Multiplex” wiring and components. The electrical system shall incorporate the necessary switches with legends to be incorporated by the body builder for application and operation of installed scene or work lights, load sequencing and other devices.
- The OEM chassis manufacturer or apparatus manufacturer shall supply a dash or center console switch panel that shall be “HOT” when the ignition switch is in the “ignition on” or “accessory” position. The purpose and location of these switches shall be discussed during the pre-construction conference prior to ordering the chassis.

2.17 ENGINE: Shall be an inline six (6) cylinder diesel, turbocharged w/air-to-air intercooling with a minimum of 330 hp, and 950 lb-ft of torque that meets all California Air Resources Board (CARB) emissions requirements for the State of California. The engine air intake shall be equipped with a two stage, dry micronic air cleaner with safety element. The air intake shall be equipped with an O.E.M. ember protection screen as per NFPA standards. The CDF will provide information if requested on this requirement.

A full flow oil filter meeting the O.E.M. engine manufacturer’s recommendation is required. The engine governor shall be set at the manufacturer’s recommended governed speed. The engines crankcase and oil pressure system shall be designed to provide full pressure lubrication when ascending or descending a 36% grade or traversing a side slope within manufacturer’s tolerances.

2.18 AUXILIARY BRAKING: An auxiliary braking device that supplements the vehicle wheel braking system and provides the <u>maximum</u> vehicle retardation available for the specified engine/transmission combination shall be provided.

The CDF prefers an O.E.M. installed electronically controlled engine compression brake/exhaust brake combination with a two position switch that

can be turned OFF in either the LO or HI position. (Ref. Jake Brake)
If a "Jake" style engine brake is not available, an O.E.M. installed hydraulic output retarder with controller for the Allison World Transmission, fully modulated, with manually foot operated control and a dash mounted on-off switch shall be provided.

2.19 TRANSMISSION: Shall be a fully automatic 5 speed, Allison 3000EVS P. The transmission shall have provisions for PTO operations, a water to oil transmission cooler and should also be equipped with an electronic oil level indicator. The shift quadrant shall be a "T-Bar" style control handle. The transmission fluid shall be Allison's "TranSynd" synthetic oil.

NOTE: If the transmission is bid with a retarder, it shall include pricing and description of an O.E.M. split cooler system for cooling of the retarder circuit separately of the transmission circuit. (Allison option) Non OEM external transmission coolers to meet this requirement are NOT ACCEPTABLE.

2.20 COOLING SYSTEM: Shall be the manufacturer's maximum option available for the specified engine/transmission combination, thermostatically controlled with a pressure regulated overflow system, and a spin-on type coolant conditioner or 100,000 mile coolant. The system shall be designed to provide maximum cooling efficiency and circulation of coolant when ascending, descending, or parked (engine idling) on grades or side slopes within manufacturer's suggested tolerances when the engine is the power source for the fire apparatus high pressure water pump.

2.21 FAN DRIVE: Horton Drivemaster with override switch.

2.22 FRAME: Shall be straight channel side rails.

- Frame rails shall be heat treated alloy steel, RBM to be minimum of 3,217,000 RBM.
- Full length frame reinforcement, outer or inner "C" channel, heat treated alloy steel, 120,000 psi yield, maximum OAL.
- Frame shall have O.E.M. integral front frame extensions a minimum of 16" from front of grill.
- Two (2) frame mounted front tow hooks.

NOTE: Stepped frames are not an option and will be rejected.

2.23 SUSPENSION:

- Front springs: semi-elliptical or taper leaf with a total rated capacity at the ground equal to the maximum rating of the front axle.
- Front and rear heavy duty shock absorbers.
- Rear springs: semi-elliptical, total rated capacity at ground equal to the

maximum rating of the rear axle, with 4,500 pound semi-elliptical auxiliary springs, the auxiliary springs shall begin load bearing at a maximum of 2" vertical travel of the main frame of the bare cab and chassis.

2.24 WHEELS: Seven each (7), ventilated, hub piloted, 10 hole, for flange nut installation steel disc wheels shall be provided for each chassis. Rim size for the single fronts, dual rears, and a spare wheel shall be 22.5 X 8.25 rated for 11R22.5 tires. All wheels shall be interchangeable with each other. The wheel type and size must assure proper overall and compatible front and rear tread width. Both sides of all wheels shall be painted body color.

2.25 TIRES: Seven each (7) 11R22.5 - load range "H", non-directional heavy duty truck and bus, single front, dual rears and a spare tire shall be provided for each chassis.

The tread design on the four wheel drive chassis shall be matching M&S rated traction tread front and rear. The spare tire must be same brand and tread design and shall be shipped loose with the completed fire apparatus.

2.26 FUEL TANK & FILLER: A 70-gallon minimum top draw steel tank shall be provided and mounted under the cab on the left side, or dual 50 gallon saddle tanks. The tank mounting must not extend rearward past vertical alignment with the back of the cab. The fuel filtration equipment shall meet the engine manufacturer's requirements.

2.27 FUEL TANK VENTING: The OEM fuel tank vent line(s) shall be extended from the fuel tank(s) and vented to the atmosphere. The vent line(s) shall extend vertically from the tank(s) to the bottom of the cab rear window and then bend 180 degrees towards the ground. A vent plug orifice (#60 drill size) shall be installed into the upper end of each line. No fuel tank roll over protection check valves shall be removed from the fuel system.

Any chassis fuel system modifications shall be fully compliant with the California Air Resources Board (CARB) standards.

All contractor installed fuel vent lines shall be cooper, steel, or Aeroquip hose, and shall be loomed, grommet, and firmly clamped in position to prevent chafing or damage and all synflex fuel hoses shall be wrapped with “Storm King Mountain” Fire Wrap Lagging, (or equal)

The fuel tanks and lines shall be protected as necessary from exhaust heat through the use of heat shields or baffles. Use only metal fasteners, coated or insulated for maximum fuel line protection.

2.28 FUEL TANK IDENTIFICATION: All fuel tanks will be labeled with a “DIESEL ONLY” label. The type of label and mounting locations shall be determined at the pre-construction conference.

2.29 AIR INTAKE SCREEN: Stainless steel wire cloth screens shall be installed on the apparatus fresh air intake system, air filter housing and outside cab vent. The air intake and outside cab vent shall be protected so to prevent particulate matter greater than .039 inches in diameter from entering the intake system. Particular attention is required on screening of the remote through the hood style intake systems. The wire cloth specification shall be as follows: .014 inch, 304 stainless steel, 20 meshes per lineal inch. This requirement also applies to the auxiliary pump engine air intake.

NOTE: Requirement to be finalized at the pre-construction conference.

2.30 BUG SCREEN: An OEM bug screen shall be furnished and installed behind the front grill, if not OEM installed.

2.31 EXHAUST SYSTEM: Depending on the chassis supplied, the OEM muffler(s), and tail pipe(s), may require replacement, relocation and/or modification. The tail pipe(s) and muffler(s) shall be mounted in a fashion as to provide as much ground clearance as possible (no lower than specified by the OEM) and be routed over the rear axle housing terminating at the left or right rear corner of the body.

The routing and termination of the exhaust system outlet must be compliant with the OEM chassis manufacturer's emission requirements and will be finalized at the pre-construction conference

Due to high exhaust temperatures, the exhaust outlet shall not terminate near storage compartments. Care must be exercised to protect such items as fuel line speedometer cable, electrical wiring, remote control cables, brake hoses, compartment floors, batteries, fuel tanks, gear boxes and starter motors from high exhaust system heat created when the fire engine is in a stationary pumping mode. To accomplish this purpose, heat shielding and or baffles shall be added as needed.

NOTE: Any modifications to the exhaust system must be OEM chassis manufacturer approved and in no way shall void any OEM chassis manufacturer warranties.

SECTION 3

FIRE PUMPS

3.1 MAIN FIRE PUMP: The contractor shall provide and install a PTO operated 500 G.P.M. fire service rated 2-stage centrifugal pump that provides water pressure to all discharges.

The pump unit shall be fully capable of meeting the National Fire Protection Association (NFPA) # 1901, latest editions, standards for initial attack fire apparatus. The fire pump that the bidder is proposing must be PREQUALIFIED prior to bid submission by virtue of a CDF approved 100 hour Certification Test. Currently, the Waterous CPK3-500 and Darley JMP 500 are PREQUALIFIED.

NOTE: The fire pump must be provided with the OEM pump manufacturer's transfer valve air cylinder assembly or electric transfer valve actuator assembly, bracketing and wiring harness. **NO EXCEPTIONS**

The main pump shall be a two stage, centrifugal type, designed for use in the fire service and supply water pressure to all discharge valves. It shall be designed so repairs can be made by replacement of normal repair parts, i.e., seals, bearings, impeller and wear rings. The impeller and wear rings shall be made of bronze material. The pump pressure shall be tested to a minimum of 600 psi. The impeller shaft seal shall be a mechanical, self-adjusting type.

The contractor shall install on the apparatus, all gauges, plumbing, suction and discharge valves, pressure governor, primer pump, unions, hose fittings, and pump controls necessary to make the entire fire pump operational and tested in full compliance with NFPA # 1901 Chapter 16, latest editions.

3.2 INTAKE RELIEF: An adjustable 2 ½" intake relief dump valve Elkhart # 4040 (or equal) shall be provided and plumbed into the intake side of the main pump. The valve shall be preset from the factory at 125 psi. The pressure setting controls for the valve shall be accessible from or beneath the pump compartment. The valve shall be installed to allow operation from any intake and the discharge side of the relief valve shall be plumbed to NFPA Title 1901 requirements. The discharge pipe shall terminate with a 2 ½" NST male adapter and labeled "Do Not Cap".

3.3 PRESSURE GOVERNOR: A Fire Research "Pump Boss" electronic engine/pump pressure governor/throttle system Model # PBA100 with a 600 psi pressure transducer that is connected directly to the apparatus electronic control module (ECM), shall be installed and wired in accordance to the specific requirements by the OEM and NFPA # 1901, latest edition. **NO EXCEPTIONS**

The pump pressure governor display must be furnished with a flip up cover equal to Class 1 #107882 "Sun Guard".

3.4 PUMP COOLER: A 3/8" line with will be run from the discharge side of the main pump to the water tank to help keep the pump cool when water is not being discharged. This line will be designed to by-pass water when the by-pass valve is open and to maintain the pump water temperature at a safe level. The by-pass cooler valve (Class 1 or equal) shall be located on the left pump operator's panel.

3.5 MAIN PUMP DRIVE: A transmission mounted pressure lubed, electric over hydraulic PTO, Chelsea # 277SM or equal shall be provided. The pump transmission shall be engaged by a guarded toggle switch that locks in the road or pump mode. The pump shift controls shall be located in the cab within easy reach of the operator and shall include indicator lights as mandated by NFPA # 1901 latest editions.

The fire pump and gear case shall be mounted in such a manner that the PTO driveline angles do not exceed the manufacturer's recommended angles for the u-joints and shall be of the proper series and type specified by the pump and PTO manufacturer's. The driveline(s) shall be automotive style, with slip yokes and u-joints or if necessary, constant velocity joints to ensure smooth operation and be both statically and dynamically balanced.

3.6 AUXILIARY FIRE PUMP: A Darley 1-1/2 AGE**,** Waterous E-511 A, auxiliary fire pump, shall be provided for pump and roll operations, and shall only provide pressure to all 2" discharge valves including the hose reel and be capable of recirculating tank water through the 2" tank filler valve.

The pump casing shall be manufactured of hard anodized aluminum alloy with a bronze impeller and wear rings, stainless steel impeller shaft and provided with a self adjusting mechanical pump seal and drain cock to drain the pump body. Additionally a 3/8" pump cooler line with one way check valve to keep the pump cool when not discharging water is required.

The pump and water cooled diesel power unit assembly shall be mounted on a sub-frame on the upper right side of the apparatus above the main pump module and in such a manner so as to eliminate vibration while operating and will provide suitable access for performing routine maintenance. The pump and power unit assembly shall be designed so the entire assembly may be easily removed as a unit to gain access to plumbing or components below.

A louvered hinged cover with suitable latches shall be provided over the pump and power unit assembly. The area around the assembly shall remain open for maintenance and air circulation and the radiator shall be located behind a removable or swing-away expanded metal screen. All parts (e.g. auxiliary pump, power unit and bracketing) shall be commercially available-no proprietary parts.

The pump power unit shall be a minimum 26 H.P. 3 cylinder in-line, overhead valve four cycle, water cooled diesel engine.

Typical minimum pump performance shall be as follows:

- 180 GPM @ 100 PSI
- 150 GPM @ 130 PSI
- 80 GPM @ 210 PSI

The pump power unit shall be furnished as follows:

- Dry element, direct mounted air filter.
- Stainless steel air intake ember screen.
- Exhaust system equipped with USDA approved spark arrestor and appropriate heat shields to protect various components and personnel from heat related damage/injuries from high exhaust pipe temperatures. The exhaust system shall be routed vertically above the fire apparatus discharged away from any working surfaces and be manufactured from heavy duty aluminized steel exhaust pipe to meet the manufacturer's specifications. (CDF to approve design)
- Spin on automotive type fuel and oil filters that meet the engine manufacturer specifications.
- Fuel system shall be designed to draw fuel from the apparatus fuel tank thru the use of an inline 12 volt automotive electric fuel pump, Stewart Warner #235A-D. The fuel tank pick-up tube shall be designed so as to assure the auxiliary engine will not exhaust the fuel supply of the vehicle. (minimum 10 gallon reserve)
- A marine grade one way check valve shall be installed in the fuel line to eliminate the possibility of air locks in the fuel line.
- A ½" crankcase oil drain extension line routed below the frame to facilitate oil changes, with Aeroquip style hose, threaded fittings and drain plug.
- 12 volt electric start.
- Removal of the auxiliary engine alternator is acceptable if an OEM fan belt idler is available and installed.

NOTE: The auxiliary pump unit shall be capable of continuous operation while ascending or descending a 36% slope without causing internal engine damage due to the lack of oil or oil pressure.

3.7 FIRE PUMP MOUNTING: The pump gear case(s) shall be mounted directly to the fire pump. All pump mounting brackets are to be a minimum 3/8" steel plate with SAE Grade 8 bolts. Care should be used in the manufacture of the mounting brackets to ensure that the fire pump(s) may be easily removed for repairs without having to cut or distort the mounting brackets and the installation of the air cylinder, hoses, and wiring, for the fire pump pressure/volume controls shall not interfere with removal.

NOTE: To insure proper ground clearance due to the off road capabilities of the apparatus, the main pump and required pump drivelines shall not extend below the chassis driveline or interfere with the chassis brake over angles. All related plumbing and components shall be mounted as high as possible between the chassis frame rails. Pump location to be finalized at the pre-construction

conference.

3.8 ANODES: Easily replaceable sacrificial catalytic action ¾" magnesium anodes shall be installed to protect the pump and plumbing manifolds.

3.9 TEST PLATE: A main pump test plate shall be provided at the left pump operator's panel that states the rated discharges and pressures as determined by the pump certification test.

SECTION 4

PUMP CONTROLS

4.1 PUMP PANELS: Two (2) brushed 14 gauge T304L polished stainless steel or black finished pump control panels shall be fabricated and installed on the left and right side of the apparatus and connected with gauges, valves, switches, lights, and fittings as per the bid solicitation and shall be attached using stainless steel fasteners.

The left pump panel size shall be 26" X 48" (plus or minus 3”). The right pump panel shall be 10" X 48" (plus or minus 3”). The following outlets and inlets shall be vertically mounted on the right pump panel: one (1) 2 ½" discharge and one (1) 2 ½" gated suction inlet.

The pump operators control panel shall be located on the left side of the apparatus and feature a full width vertically hinged gauge access panel. Quarter turn fasteners, Southco #62-40-211-2 or equal shall be used to allow access. Both side pump panels shall be designed to be completely removable for easy access and servicing of valves, plumbing or related pump components.

Pump panel trim plates fabricated from 14 gauge T304L polished stainless steel shall be provided around each discharge and suction intake valves and control handles. The trim plates shall be designed to allow accessibility to the respective valve for service or repairs.

Both pump panels shall have an 8" deep by panel width running board, manufactured of aluminum, galvanized steel, painted body color, or stainless steel grip strut that matches the rear bumper.

4.2 CAB CONSOLE: A center console fabricated from minimum .125” 5052 or .187” 3003H14 sheet aluminum, with a black powder coat finish shall be mounted to the cab floor between the front bucket seats with bolts and nylon lock nuts. The console shall have a two-piece top, a removable back panel, and a form/map book compartment. The console dimensions may vary due to the chassis manufacturer or seat style, but shall be the maximum size that will fit between the front bucket seats, while ensuring allowances for seat belt access, engine dog house removal and rear seat leg room. The overall height shall not exceed the height of the front seat cushions.

The console shall have a removable form/map box sized to utilize the maximum space available and that is deep enough to house 8 ½” X 11” binders. The map box shall include a black powder coat aluminum lid hinged at the rear with two (2) full length adjustable dividers, and have a positive latch. The removable left top side of the console shall be a suitable location for mounting of the required auxiliary pump controls as identified in Section 4.7, “Auxiliary Pump Controls”.

All power for the auxiliary pump controls/lights shall be master disconnect switch controlled. The console shall be vented to allow heat dissipation from the electrical components mounted within. If a Class 1 (or equal) electrical sub panel is required, it shall be mounted to the cab floor beneath the center console and shall be accessible from the removable top and rear back panel.

Four (4) "handi-talki" holders shall be fabricated from .125 5052 aluminum and shall be mounted on the rear side of the center console. The holders shall be mounted low enough so the "handi-talki" body does not protrude above the top surface of the center console.

NOTE: Final left and right pump panel and in-cab console control layouts must be approved by the CDF Representatives prior to construction. Proposed layouts shall be reviewed by CDF at the pre-construction conference.

4.3 MAIN PUMP PRESSURE GAUGES: All main pump pressure gauges shall be a 30/0/600 lbs. liquidless style, stainless steel or zytel nylon case, a chrome bezel with a white face and black numerals. (no substitute) Two (2) 4 ½" diameter gauges shall be mounted on the pump operator's panel to reflect pump intake and discharge pressure and shall be properly labeled to their function. (Class 1, Span, or equal)

4.4 AUXILIARY PUMP PRESSURE GAUGES: All auxiliary pump pressure gauges shall be 0/400 lbs. liquidless style, stainless steel or zytel nylon case, a chrome bezel with a white face and black numerals. Two (2) gauges shall be supplied; one (1) 2" liquidless style shall be mounted on the pump operator's panel and one (1) 2-1/2" liquid style shall be mounted inside the cab within clear view of the vehicle operator's position and shall be properly labeled as to their function. (Class 1, Span, or equal)

The in-cab gauge shall be an LED back lighted style gauge, (red in color). The light shall be controlled by the auxiliary pump ignition switch and both gauges shall be properly labeled as to their function. (Class 1, Span, or equal)

All main and auxiliary pump pressure gauges shall be plumbed with Aeroquip hose (or equal) with crimped stainless steel fittings and swivels at both ends. Synflex hose, push-on or barbed type fittings will be rejected.

4.5 MAIN PUMP CONTROLS: The main fire pump shift controls shall be mounted in the cab and identified as "PUMP SHIFT" and shall include a permanently inscribed pump shift instruction I.D. plate. The pump shift controls shall include indicating lights located on the in-cab and left pump panels that advise the operator that the pump shift has been completed and it is O.K. to pump and meets all requirements of NFPA # 1901. The indicating lights shall be as follows:

- A "Pump Engaged" light located in the cab and on the left pump panel to indicate that the pump shift has been successfully completed.

- An “O.K. to Pump” light located on the left pump panel and in the cab to indicate that the pump is engaged, the transmission is in neutral and the parking brake is set.
- A “Throttle Ready” light located on the left pump operators panel to indicate the apparatus is in the O.K. to Pump mode.

The main pump throttle shall be controlled by an electronic pressure governor located on the left pump operator’s panel and properly labeled. See Section 3.3, “Pressure Governor”.

An electronic hour meter shall be provided and located on the left pump operator’s panel to record the main pump operating hours and shall be labeled.(e.g. Main Pump Hours)

The main pump shall be used for stationary pumping only

The main pump shall include a lock-out system that is interfaced with the apparatus electrical and parking brake systems and is designed to keep the main pump from being used in pump and roll operations.

NOTE: The exact mounting location of the pump shift controls shall be finalized at the pre-construction conference.

4.6 TRANSFER VALVE CONTROLS: An air cylinder or electric motor that is pump manufacturer supplied that allows the main pump to transition between the pressure and volume modes shall be provided. The transfer valve controls shall be mounted on the left pump operator’s panel, featuring indicator lights and nomenclature plates that identify the respective pressure and volume mode. If the transfer valve is air actuated, it shall feature heat shielded air hoses and utilize the largest cylinder practical to ensure a positive transition between the pump modes. See Section 3.1 “Main Fire Pump”.

4.7 AUXILIARY PUMP CONTROLS: An auxiliary pump control panel and a back lighted pressure gauge shall be provided inside the apparatus cab located in an area readily accessible to the vehicle operator. A second set of controls and pressure gauges shall be located on the left exterior main pump operator’s panel.

The auxiliary pump engine control switches shall be marine grade weather proof toggle type switches. See Section 9.8 “Toggle Switches/Door Switches/Solenoids/ Pilot Lights”. Key type ignition switches are unacceptable. The apparatus electrical system (Master Switch) shall provide the power for the operation of the auxiliary pump assembly.

The wiring for the auxiliary pump assembly shall be run in a separate loom isolated from the main apparatus wiring loom. The pump engine ignition circuit shall be wired so that the pump may be started from either control panel without regard to

the position of the same switch at the other location. The mounting locations for the pump controls and pressure gauge(s) shall be discussed during the pre-construction conference.

The in-cab and left pump panel controls shall each consist of the following:

- Vernier cable type adjustable throttle controls on both pump panels. (lockable type) Electronic throttle controls shall be rejected.
- Ignition and Kill switch.
- Ignition "on" green panel light.
- Starter button.
- Low oil pressure indicator lamp.
- Coolant overheat indicator lamp.
- Pump pressure gauges, shall be located in the cab and on the left pump panel. The in-cab pressure gauge shall be back-lighted Red and the light shall be controlled by the auxiliary pump ignition switch.

Note: Glow plugs (if necessary) shall be automatically controlled by the ignition switch.

An electric hour meter shall be provided for the auxiliary pump for the recording of pump operating hours. The hour meter shall be remote mounted on either pump panel and must be labeled Auxiliary Pump Hours and in a location where it can be easily read.

4.8 PRIMER PUMP / CONTROLS: An environmentally correct, Hale ESP (or equal) 12 volt electrically driven, oil-less primer pump and control valve shall be provided that primes both the main pump and auxiliary pumps simultaneously.

The primer pump shall be engaged thru the use of a 12 volt Waterous model # 82507-2T priming valve. The primer pump priming valve shall be controlled at the left pump operator's panel with an electric push button switch or T-handle. The single primer pump system shall also be engaged by a separate push button switch located on the in-cab center console within easy reach of the vehicle operator and both priming switches shall be labeled Primer Pump.

4.9 AIR CONTROL SYSTEM: A pressure protection valve and pressure regulator shall be installed in the first tank (wet tank) of the air system to control all air-operated accessories. All air line fittings shall be DOT approved brass or stainless steel, steel fittings or lines are not acceptable, and bulkhead fittings are required on air lines that are routed into the cab. The air lines shall be DOT approved, and shall be properly loomed, clamped and protected from heat and/or damage from abrasion.
NO EXCEPTIONS

4.10 PUMP TEST PORTS: U.L. approved vacuum and pressure test ports shall be installed on the left pump operator's panel for NFPA fire pump performance testing.

4.11 NOMENCLATURE PLATES: 5/8” X 3” metal, Vision Mark (or equal) individual nomenclature plates shall readily identify all switches, valves, and controls. The lettering shall be deeply etched, enamel paint filled or anodized aluminum-etched color-coded tags and shall describe the function of all the pump panel controls, switches, discharge and suction valves. The plates shall be attached with stainless steel nylock nuts and machine screws. (Plastic I.D. plates, rivets, adhesive backed plates, and/or self-tapping screws are unacceptable if not pre-approved by the CDF). Label colors shall be in accordance with NFPA # 1901 requirements.

SECTION 5

VALVES AND PLUMBING

5.1 DISCHARGE / SUCTION VALVES: All 1" and larger in-line suction and discharge valves shall be Akron or Elkhart brand full flow, one quarter turn, drop out style ball valves with stainless steel ball.

All valves shall be controlled at the valve except where noted and must be appropriately labeled as to their size and function. (e.g. Suction, Discharge, Direct Tank Fill and etc.)

The use of Class 1 locking, remote push-pull T-handle controls and linkages, may be necessary to control specific valves. If control rod extensions are required they shall be ½" stainless steel with ½"-20 SAE threads. See Section 5.9, "2" Pump to Tank Filler Valve" (To be discussed at the pre-construction conference)

All valve end caps or adapters shall be chrome plated brass and of the same manufacturer as the valves. Add-on reducers or adapters of another manufacturer are not acceptable unless otherwise specified.

The shutoff positions of the handles are to be 90 degrees to the flow of water. If not 90 degrees, the handle position needs to be labeled "open" and "closed".

All exposed valves shall be painted body color with chrome plated handles. All 2 ½" discharge outlets, the 2" rear pre-connect and direct tank fill valves shall have 30 degree chrome plated discharge and suction elbows that bolt directly to the valve body.

NOTE: Suction valve inlets, discharge valve outlets or their control features shall not extend beyond the exterior body sides of the apparatus.

5.2 4" DIRECT SUCTION INLET: There shall be one (1) 4" pump suction inlet, male NH threads with a removable zinc screen and chrome small rocker lug cap located on the left pump operator's panel.

5.3 2 ½" GATED SUCTION INLETS: Two (2) gated full flow suction valves, Akron 8600 series one quarter turn full flow ball valves and twist lock handles shall be provided. The valves shall have 2 ½" NH threads with female swivels, chrome plugs with chains and removable screens. One (1) each shall be located on the left and right pump panels. Both 2 ½" gated inlet valves shall be recess mounted behind the pump panels. If the gated suction intake valve locations on the pump panel(s) are higher than the top of the frame rail, chrome 30 degree inlets with 2 ½" NH female swivels shall be supplied.

5.4 2” TRANSVERSE DISCHARGE VALVES: Two (2) 2” Akron 8800 Self-Locking series, one quarter turn full flow ball valves controlled at the valve with “TSC” style handles shall be provided with 1 ½" NH male thread adapters. One (1) each discharge outlet shall be located adjacent to the transverse hose tray, set back from the panel edge, on the left and right side.

5.5 2” REAR DISCHARGE VALVE: One (1) 2” Akron 8800 Self-Locking series one quarter turn full flow ball valve with “TSC” style handle shall be provided with a 2” NPT X1 ½" NH male thread adapter. The valve shall be exterior mounted below the right rear pre-connect hose tray and be controlled at the valve body. The 2” plumbing shall be routed along the hose bed floor and shall not to protrude any higher than the hose bed slats, thus creating a flat hose bed floor. Alternatively, the 2” plumbing may be routed through the water tank via a sleeve in the booster tank, but preferably not through any compartment.

5.6 2” FRONT DISCHARGE VALVES: Two (2) 2” Akron 8800 Self-Locking series one quarter turn full flow ball valves with “TSC” style handles and Elkhart # 348 90 degree swivels with 1 ½" NH male threads and chrome caps and chains shall be provided. **No Exception to Elkhart swivel.**

The valve for the center and left front bumper hose baskets shall be located on the left side of the front bumper outboard of the frame rail, be vertically mounted behind the bumper and controlled at the valve.

The valve for the right side hose basket shall be located outboard of the frame rail, be vertically mounted behind the bumper and controlled at the valve.

The discharge swivel locations shall provide adequate clearance for the use of 1 ½" gated wye’s and be designed so as not to interfere with the opening and closing of the hood. The swivels shall feature stops to prevent them from rotating 360 degrees and impacting the hood.

5.7 2 ½” SIDE DISCHARGE VALVES: Two (2) 2 ½” Akron 8800 series, one quarter turn full flow ball valves with twist lock handles shall be provided. Both discharge valves shall have 2 ½" NH male threads with chrome 30 degree outlets, chrome caps and chains. One (1) each shall be located on the left and right side pump panels.

5.8 3” TANK SUCTION VALVE: The 3" booster tank to main pump line shall have a 3” Akron 8800 series with “R-1” style handle, one quarter turn, full flow ball valve. The tank suction valve shall be controlled by an air actuated cylinder, the cylinder shall be large enough to assure positive opening and closing of the valve. The controls shall be located on the left pump operator’s panel, be labeled “Tank Suction” and feature a “green” valve open and “red” valve closed indicator light. A 3" stainless steel Techno Check (or equal) one way full flow check valve shall be provided in the tank suction line to prevent back flow to the tank.

5.9 2” PUMP TO TANK FILLER VALVE: A tank filler line shall be provided from the discharge side of the pump and plumbed to the top of the tank. The plumbing shall be 2" with a 2" Akron 8600 series one quarter turn full flow ball valve, and may be controlled at the left pump panel by a Class 1 twist lock push/pull T-handle and linkage.

5.10 2” DIRECT TANK FILLER VALVE: A direct tank filler valve shall be provided and plumbed to the upper left front or the upper left rear side of the tank. The plumbing shall be 2 ½” with a 2” Akron 8800 self-locking series, one quarter turn full flow ball valve, controlled at the valve with a “TSC” style handle complete with a chrome plated 2 ½" NH female swivel, screen, plug and chain. The valve shall be exterior mounted at the left rear of the apparatus. The plumbing may be routed along the hose bed floor but shall not protrude any higher than the hose bed slats, thus creating a flat hose bed floor. Alternatively, the plumbing may be routed directly to the upper left rear of the tank, but preferably not through any compartment.

5.11 BACK PUMP FILLER VALVE: Class 1 brass, ¾”, quarter turn ball valve with chrome T-handle shall be supplied and labeled “Back Pump Filler”. The valve shall be installed on the left lower forward side of the pump panel with the discharge hose terminating at the outside of the apparatus body. The valve plumbing shall be ¾” I.D. Aeroquip type hose with swivel fittings properly routed and clamped from the tank sump to the filler valve.

5.12 CHECK VALVES: Stainless steel spring loaded full flow one way Stainless Flow Technologies (SFT) brand (or equal) style check valves are required to isolate the auxiliary and main pump pressure from each other and to ensure that the auxiliary pump does not loose prime.

The pump suction line shall have a 3” brass or stainless steel full flow check valve to prevent back flow to the booster tank.

5.13 DRAIN VALVES: Class 1 brass, ¾” quarter turn ball valve drains with chrome T-handles shall be provided on all 2" and larger discharge and suction valves.

The drain valves shall have ¾” NPT female inlets and outlets, ¾” I.D. Aeroquip hose (or equal) with threaded fittings that shall connect the suction and discharge valves to the drain valve inlets and neoprene discharge drain hose from the valve outlets for discharging water onto the ground. The drain hoses shall be properly clamped and routed below the running boards of the apparatus.

All drain valves shall be located on the lower side of their respective pump panels and labeled as to their function. Additional petcock type drains may be necessary to completely drain the pump housings.

A 1 ½” drain valve shall be provided in the tank sump for flushing of the booster tank.

5.14 MASTER DRAIN VALVE: A Class 1 brass manual master drain valve shall be provided to drain the main and auxiliary pump plumbing and pump housings. The master drain valve shall be located on the lower side of the left pump panel.

5.15 FOAM TANK DRAIN VALVE: One 1" or 3/4" brass or stainless steel foam tank drain valve and hose shall be provided to completely drain and flush the foam tank. The drain hose (Aeroquip or equal) shall terminate below the left pump panel and have brass or stainless steel swivel fittings at the drain valve to facilitate valve removal. The Akron or Class 1 T-handle drain valve shall be located on the lower side of the left pump panel and be labeled "Foam Tank Drain".

5.16THERMAL RELIEF VALVE: A Waterous Overheat Protection Manager model # 82516-1D with overheat indicator light shall be provided with the return line plumbed to the area below the left pump panel. The nameplate, test switch and light shall be located on the left pump panel.

5.17 HOSE REEL: One (1) polished aluminum Hanney Reel model # SBSEPF17-28-29 RT, with # KDF 2677 stainless steel manifold, electric rewind hose reel, latest edition, with a 1" Akron 8800 series, one-quarter turn, full flow ball valve with "TSC" style handle, CDF-type brakes, 2/3rd hp/imp high torque motor, w/70 amp circuit protection, constant duty relay and a stainless steel hub assembly (manifold) with 1" NPSH hose fittings shall be provided. (No Exceptions)

The rewind buttons (Cole Hersee # M-608) shall be located on the left and right pump operator's panel and be labeled "Hose Reel".

The hose reel shall be installed on the left side of the apparatus above the pump operator's panel. The hose reel shall be sized to carry 150 feet of ¾" hardline and shall include a 3" ID nozzle pocket that will be mounted by the CDF. The hose reel shall include two horizontal and two vertical chrome fairlead rollers. The top and bottom horizontal rollers shall be backed up with a 5/16" steel rod to prevent the roller mounts from spreading. Two (2) additional sets of fair lead rollers shall be located on the auxiliary pump cover for guiding the hose across the top of the apparatus.

The installed hose reel assembly and wiring harness shall be easily removable to allow access to various components below and behind the pump panel.

5.18 PLUMBING, GENERAL: Victaulic plumbing connections shall be utilized where vibration or chassis flexing may damage or loosen plumbing or where plumbing exits the pump enclosure. Victaulic couplings shall also be installed as required for component removal and maintenance operations.

All rigid plumbing shall be schedule 10 welded T304L Stainless Steel. The manifolds shall be designed with victaulic couplings to facilitate manifold/pump or valve removal and shall also meet all NFPA pressure requirements. In order to

minimize friction loss, sweep type elbows shall be utilized.

All flexible discharge lines other than in the suction plumbing shall be Class 1 SBR synthetic hose, or Aeroquip brand (or equal), with a minimum of 300 psi working pressure and 1200 psi burst pressure, and shall include full flow stainless steel couplings/fittings.

All plumbing for the 2" discharge valves shall be 2" pipe except for the front discharges, which can be Class 1 SBR synthetic hose equal to 2" pipe. The plumbing between the two (2) front discharge valves shall be T304L stainless steel pipe. The plumbing for the 2 ½" intake and discharge valves shall be 3".

All plumbing must meet the requirements of NFPA # 1901.

NOTE: Stainless Flow Technologies (SFT) or equal full flow one way check valves are required to isolate the auxiliary and main pump discharge pressure from each other. **NO EXCEPTIONS TO REQUIREMENT**

5.19 MAIN PUMP SUCTION PLUMBING: The plumbing between the tank, the tank suction valve and the main pump intake shall be Gates 4864CF Series 4" I.D. flexible wire reinforced suction hose (or equal). The hose must have the same I.D. as the O.D. of the pipe nipples and be attached with Dixon Series "King" plated malleable clamps. The pipe nipples must be aligned toward each other to provide hose-to-nipple concentricity for a minimum of 2" past the end of each nipple.

The use of rubber hump hoses, (a schedule 10 stainless steel manifold with stainless steel constant tension band clamps) is acceptable.

5.20 AUXILIARY PUMP PLUMBING: The auxiliary pump shall be plumbed in common with the main pump and shall only provide discharge pressure and foam concentrate to all 1" and 2" discharge valves. Plumbing between the tank sump or main manifold and the auxiliary pump suction eye shall be 2" schedule 10 stainless steel with victaulic couplings, Gates 4684CF 2" flexible wire reinforced suction hose (or equal) with threaded fittings or a combination of both.

A Stainless Flow Technologies (SFT) or equal**,** 2" one way full flow check valve shall be installed in the auxiliary pump suction hose as close to the tank sump as possible to ensure that the auxiliary pump remains primed at all times. It is acceptable to provide flexible Class 1 SBR or Aeroquip brand hi-pressure hose (as described in Section 5.18, "Plumbing, General") when connecting the main discharge of the auxiliary pump to the main plumbing manifold.

SECTION 6

FOAM PROPORTIONER SYSTEM

6.1 FOAM SYSTEM: A Foam Pro, model 1600 direct injection foam proportioning system shall be provided and installed as per the manufacturer's installation guidelines. The system shall be plumbed to direct Class A foam concentrate only to all 2" discharge valves including the hose reel while operating either the main or auxiliary fire pumps.

NOTE: The location of the foam pump operating controls shall be finalized at the pre-construction conference.

General foam system requirements

- The foam pump shall be 12 volt, 1/3rd hp with a rated capacity of 1.7 gpm at 200 psi and a maximum operating pressure of 400 psi.
- Must maintain accurate proportion and injection rate over a water discharge range of 5 to 250 psi.
- All fittings and connections shall be stainless steel or brass.
- All hose shall be high pressure hydraulic. (Aeroquip or equal)
- The wiring harness, pump switches and controls and etc. shall be sealed and protected from contaminates.
- Capable of continuous operation in wet and dusty environments.
- Proportioning rate shall be adjustable from 0.1% to 1.0%.
- Electronic flow sensing and controls.
- A 2" full flow, high pressure 400 psi, spring closing check valve shall be installed upstream of the injection port to prevent foam from back filling into the pump or plumbing.
- A manual drain valve shall be provided at the lowest point of the concentrate storage tank. The drain line shall be piped to drain directly beneath the apparatus without contacting any part of the apparatus or components.
- A strainer shall be installed in the foam concentrate supply line between the foam concentrate tank and the foam pump.
- A green "foam pump on" indicator light shall be installed near the foam pump control panel.

NOTE: For firefighter safety an ASCO valve, part # 8262G1-12V D/C (or equal) and Solid State Advanced Controls, SSAC part # TDI 12D (or equal), (1-1023 seconds) shall be installed in the 2" discharge manifold after the foam system check valve to discharge trapped manifold water pressure upon pump shut down.
NO EXCEPTIONS TO THIS REQUIREMENT

6.3 FOAM TRANSFER SYSTEM: The foam system shall incorporate a pre-plumbed transfer system, Hale EZ-Fill or Fire Foam Equipment, model # FT-500**,** that enables the operator to re-fill the on-board foam tank from ground level with “Class A” foam. The transfer system pump shall be controlled by a guarded momentary switch and all controls shall be properly labeled and mounted on the left pump operator’s panel. The system shall include a 6 foot quick disconnect filler hose with stainless steel or brass fittings and debris screen.

The transfer pump shall be 12 volt, minimum of 5 gpm with auto shut-off and a pump-on indicator light. All materials must be compatible with FSF and AFFF fire fighting chemicals that require 1.0% or less foam concentrate.

The pump, wiring harness, all switches and controls shall be sealed and capable of operating in wet or dusty environments at temperatures from 0 to 200 degrees. All hoses shall be Aeroquip type with stainless steel or brass fittings. (barbed fittings or automotive style hose clamps are unacceptable)

NOTE: The foam concentrate fill line shall be a separate line and not plumbed into the foam pump supply line.

6.4 FOAM CONCENTRATE TANK: A 20 gallon capacity foam concentrate tank shall be provided. The foam tank shall be either polypropylene manufactured by United Plastics (UPF) or T-304 L welded stainless steel with a 4" overboard tank filler and have a 3/16" mesh filler screen of stainless or poly recessed 4" to 6" to allow overboard filling without backsplash.

The tank shall be equipped with a positive sealing pressure/vacuum vent type cap, a low foam concentrate sensor that turns off the foam pump at a pre-set level, a visual sight gauge, an easily accessible brass or stainless steel drain valve located at the lowest point of the foam tank and an accessible brass or stainless steel cleanable strainer installed in the supply line from the foam tank to the foam pump.

The foam tank shall be mounted on a removable sub-structure located in the right-forward portion of the hose bed floor behind a removable bulkhead wall to protect the tank or below the hose bed floor in a notch that is provided in the upper right forward portion of the booster tank. The float switch harness and the foam concentrate supply and fill lines shall have connections located adjacent to the tank to facilitate foam tank removal.

SECTION 7

BOOSTER TANK

7.1 MATERIAL: All material used in fabricating the water tank and assemblies shall be polypropylene and meet all construction and operational requirements of NFPA 1901.

NOTE: Due to variations in engineering from apparatus manufacturers, all booster tank specifics, i.e. design, sump size and location, inlet and outlet fitting locations and sizes shall be finalized at the pre-construction conference.

7.2 BOOSTER TANK: A United Plastics Fabricating (UPF), 500 gallon booster tank (Poly Tank) shall be fabricated from a minimum of .500" polypropylene complete with a minimum of .375" polypropylene internal full height baffles that are raised 4" off the tank floor for maximum water flow between baffles.

In addition, provisions for the main pump outlet, direct tank filler inlet, a pump to tank filler/churn valve inlet, a back pump filler outlet, a fitting for an electronic water level gauge sensor and clean outs for manual tank flushing shall be provided.

The tank shall be structurally reinforced and restrained to prevent deformities or damage to the tank or apparatus body during stressed off road operations.

The booster tank shall be a rectangular design with a certified capacity of 500 gallons of water and shall be completely removable from the body without cutting or bending of any components.

7.3 BOOSTER TANK MOUNTING: The tank and cradle assembly must be mounted to the chassis frame in strict accordance to the tank manufacturer's installation guidelines. Utmost attention must be given to the manufacturer's off-road/severe service mounting guidelines to ensure that the tank assembly's lifetime warranty is not compromised. **NO EXCEPTIONS**

In order to achieve proper axle weight distribution, the booster tank must be mounted forward of the rear axle as far as possible. This may cause the tank to extend into the pump module assembly area.

7.4 TANK SUMP & OUTLETS: A one (1) cubic foot (minimum) polypropylene sump, with anti-swirl baffles shall be provided. The sump shall be located as close to the center of the tank floor as the chassis cross members, differential driveline will allow.

One (1) 3" or 4" NPT outlet and plug shall be provided in the sump floor for flushing of the tank. In addition, four (4) 3" (minimum size) clean outs and plugs shall be located on the top of the booster tank, above each baffled compartment to assist in

manual flushing of the tank and shall be accessible by removing the hose bed slats. The sump shall also be provided with a 1” NPT outlet for the back pump filler hose.

The tank shall include a minimum 3” NPT outlet and internal pick-up tube located in the forward side of the tank wall which shall be utilized for the main pump suction line. In an effort to eliminate water shortages due to the angular operating requirements of the fire apparatus, the pick-up tube shall be located as close to the center of the tank sump as possible. Due to space constraints, it may be necessary to locate the main pump suction outlet in the tank sump.

A minimum 3” direct tank fill NPT inlet and internal manifold shall be provided on the left rear of the tank. If the direct tank fill inlet is located on the rear tank wall, the inlet manifold shall pass through the first baffle and feature a turn down to eliminate any possible damage to the tank or baffles while filling the tank.

7.5 TANK OVERFLOW & VENT: Provisions shall be made for the necessary overflow and venting of the booster tank that meet all current NFPA 1901 requirements. The overflow vent manifold and attaching hardware shall be polypropylene and be of appropriate size to allow proper venting of the tank. The vent/overflow manifold shall be within the confines of the tank and be designed to allow excess overflow to be directed aft of the rear axle.

7.6 OVERBOARD TANK FILL TOWER: A square polypropylene overboard fill tower with hinged lid and strainer shall be provided and located as close to the left front of the booster tank as possible. If the filler tower is incorporated in the hose bed a hinged access door shall be properly labeled and provided on the hose bed cover.

7.7 WHEEL WELLS: In an effort to keep the center of gravity as low as possible it may be necessary to incorporate the rear wheel wells into the rectangular tank and if this is necessary it must be designed with a minimum of 8" rear tire clearance in a loaded condition to assure adequate clearance for the installation and use of tire chains.

7.8 WATER LEVEL GAUGE: Two (2) full size Class 1 “Intelli-Tank” water level gauges shall be provided. One (1) mounted on the left pump operator’s panel and a second tank level indicator shall be remote mounted either on the dash near the auxiliary pump pressure gauge or on the center console.

SECTION 8

APPARATUS BODY

* **8.1 MATERIAL:** All sheet steel (except where T304L stainless steel or 10 gauge is specified) used in fabricating the apparatus body shall be minimum of "hot-zinc-coat" mill treated. (***e.g. Redi Kote or Jet Kote, A-60 or A 40***) ***A40 shall be the minimum coating accepted.*** All exterior aluminum used in fabrication shall be Tread Brite Alloy # 3003H14.

A 12 gauge T304L "formed" stainless steel fire body is acceptable. Aluminum, Polystyrene, Composite or "bolt together" fire bodies shall be rejected.

* **8.2 PUMP PANEL MODULE:** ***The pump panel/auxiliary pump module sub frame shall be a self supported structure mounted independently from the apparatus cab.*** The design must allow for the CDF required frame deflection without imposing stress on the pump panel structure or side running boards. The module shall be a welded frame utilizing structural steel components properly braced to withstand the rigors of off road operations.

8.3 BODY INSTALLATION: Particular attention should be directed to the method of the body to chassis mounting. Due to the severe loading requirements and rigors of off road operations the entire body assembly shall not rest directly on the frame rails, and all body mounting hardware shall be a minimum of SAE Grade 8. The compartment doors must open even when the vehicle is parked on the side of a hill on terrain that is not level.

To provide the required amount of diagonal body flex, the body support system shall be designed, engineered and tested to reduce the natural flex stresses of the chassis from being transmitted to the body. The fire body (on a rigid under body frame) shall be mounted to the truck chassis frame in such a manner that the fire body frame can travel relative to the truck chassis frame. The fire body mounting system must be capable of lifting off of the frame rails.

The test of the apparatus diagonal flex shall be conducted by raising the tires a minimum of 12 inches at opposite corners of the apparatus. Measurements shall be recorded at the opposite front and rear axles and all compartments doors are required to open without binding. **NO EXCEPTIONS**

NOTE: Proposed body to frame mounting system shall be finalized at the pre-construction conference. The bidder may be required to provide evidence that the fire body to chassis mounting system design offered will meet the CDF's required performance requirements. Documentation may include names and phone numbers of customers using a Type 3 fire apparatus with the proposed mounting system in a comparable working environment.

8.4 COMPARTMENTS, GENERAL CONSTRUCTION: The right and left upper side compartments, side and rear compartment sections, and the hose bed compartment shall be fabricated of 12-gauge zinc-coated steel or stainless steel and be welded construction. Bolt together construction will be rejected.

Access holes with cover panels will be provided in compartments as necessary for access to body mounting bolts, spring pins and etc.

A minimum 2" single "Weber" style polished stainless steel swivel vent with four (4) ¼" vent holes shall be provided in all compartments except the under cab boxes. These vents shall have a stainless steel center bolt to lock the vent in either the open or closed position and be located in the upper rear area of the compartment walls.

The compartment walls, floor and ceiling joints shall be fit for maximum dust protection and all compartment floors shall be flush sweep-out style. (no lip).

* ***The interior of all compartments shall be finished in rhino liner (or equal).***

Brushed stainless steel covers (scuff plates) shall be installed on all compartment thresholds (lower door frames). The scuff plates shall extend below the lower door frames to protect painted surfaces. In addition, full height stainless steel covers shall be installed on the forward corners of the main body,

All aluminum compartment shelves shall have a brushed finish.

All compartment floors and shelves shall be provided with black "Turtle Tile" or comparable modular cushion tiles except the slide out brass tray.

Each compartment shall be equipped with lights activated by individual door switches.

All compartment dimensions quoted are plus or minus 3", except the minimum depth specified for the long tool compartments. Final compartment dimensions shall be finalized at the pre-construction conference.

8.5 LEFT AND RIGHT UNDER CAB COMPARTMENTS: These two (2) compartments shall be constructed and mounted under the left and right rear cab doors. The two (2) compartments shall include running boards and cab steps to be used as entrance steps into the cab. The steps shall utilize 12-gauge galvanized steel, aluminum or stainless steel grip strut material and shall meet all NFPA step height requirements.

The grip strut steps shall be designed so as not to collect debris between the step and mounting surface. The CDF shall consider an all brushed stainless steel construction for these two compartments with painted doors.

Each compartment shall have double vertically hinged doors with no center post and a separate divided envelope section for storage of a chock block. The chock block section shall feature a flat aluminum threshold to prevent the chock from sliding out when the compartment door is opened.

A minimum 10” wide chock block section shall be located behind the first opened door in the forward portion of each compartment.

The left under cab compartment, in addition to the chock block section, shall have these additional items installed, a 10-gauge reinforced plain anodized aluminum sliding drawer-type tray with a 4" vertical flange on all sides to be utilized for the storage of nozzles and adapters The tray shall utilize the maximum available space within this compartment and have extra heavy duty 500 pound lock-in/lock-out roller glides with stops to prevent it from sliding all the way out and to hold it securely in place when the compartment door is opened or closed (Austin Hardware # 9310 roller guides or equal). The brass box tray shall feature a 16 section adjustable 4" high egg-crate divider designed for vertical storage of various nozzles and adapters.

Provisions for the storage of a hydrant wrench and forestry style hose clamps shall be provided on the interior compartment side wall or the inside compartment door. The interior compartment dimensions shall be 41" wide, 18" high and 21" deep.

* ***Left under cab compartment that is 28” wide due to chassis fuel tank (dictated by exhaust components) is acceptable.***

*** 8.6 LEFT AND RIGHT HORIZONTAL COMPARTMENTS:** Compartments shall be provided that include a single horizontally hinged door with one (1) D-ring latch on each door. ***The interior compartment minimum dimensions shall be 60” wide X 35” high X a minimum of 12” deep, tolerance does not apply.*** These compartments must be deep enough to house four (4) MSA 3,000 SCBAs with regulators and face shields. Allowances shall be made for MSA 4,500 psi bottles.

The left and right compartments shall have full height vertical uni-strut tracks (or equal) installed so that a fully adjustable shelf with a minimum 2" vertical lip on all sides may be installed in either compartment. The shelf bracketing and track locations in either compartment shall be mirrored so that the shelf may be relocated using basic hand tools.

Four (4) each Ziamatic SCBA “Walkaway” brackets model # UH-6-30-2-SF with safety straps shall be provided for the vertically mounting of four (4) MSA 3000 SCBA’s. The SCBA brackets shall be mounted by the vendor on two horizontal uni-strut tracks to allow for fore and aft adjustment of the MSA brackets. Each horizontal compartment shall feature the horizontal uni-strut tracks to allow for mounting of the SCBA’s in either compartment.

Both compartment doors shall have a center mounted nylon pull strap attached to the inner panel to aid in closing the door. Provisions (tool holders) for the storage of the CDF basic complement of long handle tools including chain saw mount shall be provided. The tool holders shall be mounted by the vendor as required by the CDF. See attachment #1 for a list of the CDF basic complement of long handle tools.

* **8.7 LEFT AND RIGHT SIDE REAR COMPARTMENTS:** Full height vertically hinged single door compartments shall be located on both rear sides of the apparatus, aft of the rear wheels. ***The clear door opening of these compartments shall be 24" wide X 53" high, +/- 3 inches. The compartment dimensions of the lower section shall be 28" wide, 23" high and 22.88" deep +/- 3 inches and the upper section dimensions shall be 28" wide, 34" high and 12" deep for and overall interior height of 57".*** The upper and lower section in each compartment shall have a fully adjustable shelf as described in Section 8.15, "Compartment Shelves/Trays". A fixed shelf shall separate the two sections.

8.8 HI-SIDE HOSE BED COMPARTMENTS: No specific requirements at this time.

8.9 CENTER REAR COMPARTMENT: A vertically hinged double door compartment with no center post shall be provided at the rear of the apparatus. The dimensions of the upper portion of the compartment shall be 70" wide X 20" high X 27" deep. The lower portion of the compartment shall be 23" high X 51" wide X 27" deep for an overall compartment height of 43". The lower section shall have a fully adjustable shelf as described in Section 8.15, "Compartment Shelves/Trays".

* **8.10 RIGHT SIDE VERTICAL PUMP PANEL COMPARTMENT:** A vertically hinged single door compartment painted body color shall be provided and located between the right pump panel and main apparatus body (normally the right side pump panel). ***The interior compartment dimensions shall be 15" wide, 48" high and 14" deep, +/- 3 inch tolerance does not apply.***

This compartment shall have two (2) fully adjustable shelves as described in Section 8.15, "Compartment Shelves/Trays". This compartment shall be manufactured to be part of the right pump panel/auxiliary pump assembly module. The compartment door shall be hinged on the rear side and the forward and inner compartment walls shall have full height removable access panels. A full width minimum 8" deep running board shall be provided along the lower portion of this compartment/pump panel.

8.11 S.C.B.A. BOTTLE STORAGE: Provisions shall be made for the storage of four (4) spare S.C.B.A. MSA 3000 bottles, but allowances should be made for 4500 psi bottles. The preferred storage location shall be fore and aft of the rear wheel well areas of the fire body. Alternative locations shall be considered at the Pre-Construction conference. Drain holes shall be provided at the bottom of the tubes to prevent water collection. Rubber matting to cushion the bottles and nylon tethers shall be installed to secure the bottles in the storage tubes. The doors shall be

industry standard cast aluminum. (Cast Products or equal)

8.12 IN-CAB COMPARTMENTS: Storage compartments beneath both the front bucket and the rear bench seats shall be provided.

The areas beneath the front and rear seat pedestals shall be fully enclosed and vertically hinged locking overlap doors shall be installed on the outboard side of each seat frame. If any open areas exist on the sides of the rear bench seat they shall be fully enclosed.

The area beneath the rear bench seat shall also be enclosed with two (2) swing down, full width compartment doors across the forward side of the rear passenger seat frame. These compartments shall have a center vertical jamb, be properly reinforced, provided with positive latches so they will not open under hard braking and mounted to the cab floor with a full length polished stainless steel hinge.

The under seat enclosures and doors shall be a minimum of .125 orbital sanded sheet aluminum.

8.13 COMPARTMENT DOOR CONSTRUCTION: All compartment doors shall be fully enclosed double panel style with covered access to the compartment latch and be fabricated from 12-gauge zinc-coated steel on the outer panel and 14-gauge zinc-coated steel inner panel or a minimum .125" orbital sanded removable aluminum inner panel fastened to the inner door frame with, phillips or torx head stainless steel counter sunk machine screws. The machine screws shall be threaded into flush fitting steel nut zerts evenly spaced on the inner door frame.

Compartment doors constructed of aluminum shall be an acceptable alternative to the above. The aluminum door design shall allow it to fit "flush" in the compartment opening. Alternatively, an "overlap style" door is acceptable. The exterior aluminum door shall have alloy and temper strength of 5052 H32 and have a minimum wall thickness of .125 in. The overall thickness shall be at least 2 in. but shall not exceed 2.25 in.

A hat section for additional strength to ensure that all doors remain flat shall be installed between the panels on all large compartment doors.

All compartment doors shall be flush fitting or "lap style" in design with heavy duty polished stainless steel continuous type hinges, with minimum 1/4" pins and minimum 1" joint length.

Hinges shall be attached to the doors and compartment jambs using stainless steel fasteners.

All compartment doors must be designed to ensure that no binding occurs while opening or closing when the apparatus is in a stressed off road environment.

On single vertically hinged doors, the doors shall be hinged on the forward jamb unless otherwise specified. All polished stainless steel hinges and door handles shall not be painted. There shall be a polished stainless steel or anodized aluminum drip rail installed above all compartments and a minimum 4" polished stainless steel scuff plate or an anodized aluminum diamonette scuff plate fastened with machine screws and lock nuts to the lower edge of any compartment doors close to step surfaces.

All vertically hinged doors shall have over center door stays located in the upper jamb area. Cleveland model # 2395AA double spring chrome plated door stays. The two (2) horizontal doors shall have two (2) gas shocks for securing the door in the open position. The gas shocks must be heavy duty with metal pivot points, shocks with plastic pivots will be rejected.

All compartment door seals shall be an automotive closed cell door seal that will ensure a watertight compartment. Norton V510 Series closed cell (or equal)

NOTE: Rubber bumpers shall be installed on all surfaces where compartment doors may contact other doors or surfaces when opened.

8.14 DOOR LATCHES: The compartment door latches shall be lockable, keyed alike, removable, flush mounted, polished stainless steel, round cup style with retractable "D" ring handles, Eberhard # 9000-SSPL series with 206 slam lock (or equally rated, like-type latch system). Door latches shall be secured with stainless steel Phillips head machine screws and lock nuts. Pop riveted latches shall be rejected. Double doors may utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle*.*

All enclosed latches shall have an interior removable covers to prevent equipment from jamming the mechanism.

Dissimilar metal insulating gaskets shall be placed between the door handles and outer door panels to prevent any electrolytic reaction between dissimilar metals to protect painted surfaces.

NOTE: The latch and striker assembly must be of a style that must keep the compartment doors from springing open while operating over rough terrain.

8.15 COMPARTMENT SHELVES / TRAYS: The shelving and trays shall be manufactured from minimum .125" brushed aluminum with a minimum 2" vertical flange on four sides. The shelves shall be vertically adjustable, full height infinite, through the use of a heavy duty slotted uni-strut type (or equal) track material. The shelf tracks shall be welded or fastened (with a two-piece fastener) to the compartment walls. The horizontal compartment shelves shall be a tilt down style so they may be manually adjusted from flat to a 30 degree outward down angle.

The minimum capacity rating for compartment shelving shall be 500 pounds.

8.16 TRANSVERSE HOSE STORAGE: A vertically divided transverse hose bed shall be located above the pump panel on top of the pump module as far forward as possible. The hose bed shall be large enough to accommodate 150 ft. of 1 ¾" pre-connected double jacket fire hose in each side and be a minimum of 5" wide X 24" high, X full pump module width. The hose bed shall be provided with a single, full width, aluminum diamondette cover, be hinged on the forward side with a polished stainless steel hinge, complete with end skirts, straps, and quick release buckles.

Each transverse discharge shall be plumbed individually with 2" piping and separate 2" discharge valves. The plumbing for each discharge outlet shall terminate adjacent to the exterior rear side of the crosslay tray with 1 ½" NH adapters. The 1 ½" discharge outlets shall be located to allow easy coupling of the hose with a gloved hand and ensure that the coupled hose does not extend past the body exterior.

* The transverse hose bed floor shall be provided with removable aluminum slats spaced ½" apart for proper hose ventilation. ***Perforated brushed aluminum floor in lieu of specified slats is acceptable.***

*** 8.17 APPARATUS HOSE BED:** Two (2) each main hose storage compartments shall be fabricated and installed on either side of the ladder/hard suction storage compartment. ***Main hose storage compartments shall be large enough to accommodate 500 ft of 3" supply line, 1000 ft of 1-1/2" attack line and one 20 ft 3-section ladder. In addition, 150 ft of pre-connected attack line shall fit in the apparatus hose bed. The ladder shall be stored in the center of the hose bed and the pre-connected attack line shall be separately divided.***

Orbital sanded aluminum slatted hose racks shall be installed in each hose bed compartment floor manufactured from extruded aluminum spaced ½" apart for proper hose ventilation. The left hose bed shall have an adjustable divider in the forward portion of the bed. This divider shall be adjustable fore and aft 36".

NOTE: The slatted hose bed racks shall not directly rest on the top of the polypropylene booster tank and be removable for tank access.

8.18 HOSE BED COVERS: Two (2) separate aluminum tread plate hose bed covers shall be installed, (.125 ST aluminum alloy diamond plate) reinforced with a .125 ST aluminum alloy hat section. The covers shall be hinged on the outboard side using full length polished stainless steel hinges with a minimum 3/8" pin and 1" joint length and installed with acorn nuts and bolts.

The hose bed covers shall have full length handrails installed along the rear lip, two (2) additional grab handles mounted on the top side of the covers and two (2) 45 #

counter balance spring assemblies on each cover to assist with opening and closing, the rear spring assembly shall feature a positive latch lever to keep the covers in the upright position (Darley part # W499 or equal). The counter balance spring assemblies mounted in the forward and rear portion of the hose bed compartments shall have protective stainless steel or aluminum covers installed. The forward spring assembly shall be a non-locking 45 # counter balance spring assembly to aid in opening the cover. CDF will consider alternate hose bed assist and latching designs. Final details of proposed designs will be finalized at the pre-construction conference.

Red vinyl end skirts with three (3) straps, and quick release thumb spring buckles will be installed on each hose bed cover. Astrup # 207668 cadmium plated buckles and nylon tie down straps shall be attached to the end skirts. The use of rubber coated hooks and stainless steel footman loops will secure the end skirts/bed covers to the main body. **NO EXCEPTIONS**

Each hose bed cover shall have a bolt on hat section fabricated on the inside of the cover to house an industry standard back board. The approximate size of each hat section shall be 3" high X 20" wide X 72" long. Each hat section shall have drain holes on the lower side and two (2) nylon Velcro straps and loops to secure the back boards within the hat section.

NOTE: The covers shall be reinforced so that they will support the weight of a person walking on the cover and shall be sloped to the outboard side of the apparatus to aid in water run-off.

8.19 RIGHT REAR PRECONNECTED HOSE STORAGE: A separate adjustable hose bed divider shall be installed in the outboard side of the right main hose bed for storing of 200 feet of 1 ¾" pre-connected double jacket fire hose and combination nozzle. The divider shall be bolted to three (3) uni-strut channels, two (2) mounted on the hose bed floor and one (1) mounted horizontally on the forward hose bed bulkhead while utilizing the hose bed aluminum rack as the floor. Bolt ends or other sharp projection extending into the hose compartment which may interfere with, or damage hoses is not acceptable. Use of "acorn" nuts is acceptable. The minimum size shall be 5" wide, 24" high and full bed in length. The divider shall be manufactured from brushed aluminum and the outside edges will be fabricated with a double break flange with welded corners.

8.20 FRONT BUMPER PRECONNECTED HOSE STORAGE: A hose compartment to accommodate 100 feet of 1 ¾" pre-connected double jacket fire hose and combination nozzle shall be provided. The compartment shall be manufactured and installed behind the 16" extended front bumper. The compartment shall be full width between the frame rails, shall not extend below the bumper, and shall include Black Turtle Tiles (or comparable) and drain holes on the floor. The hose shall be accessible from the top of the compartment and this compartment shall have an aluminum diamond plate cover to match the gravel shield, be hinged on the rear and

secured with a twist or thumb latch. The cover shall be designed as to allow for the hose to be pre-connected from either front discharge or not impact the front grill while held in the open position with a gas shock.

8.21 FRONT BUMPER PRECONNECTED MOBILE ATTACK LINES: Two (2) hose baskets to accommodate 100 feet each of 1 ¾" pre-connected double jacket fire hose and nozzle shall be provided. The baskets shall be located behind the front bumper extension, outboard of the left and right frame rails. They shall be incorporated into the construction of the left and right sides gravel shields and not extend below the front bumper. The hose shall be accessible from the top of the open basket and secured in the basket with nylon straps, cadmium plated quick release thumb spring buckles, rubber coated hooks and footman loops. The baskets shall be properly reinforced from the underside to prevent flexing or vibration and be provided with drain holes and a removable aluminum rack or a slotted floor for air circulation.

*** 8.22 SUCTION HOSE / LADDER COMPARTMENT:** A double door, vertically hinged hard suction hose/ladder compartment shall be fabricated and installed centered within the hose bed. ***This compartment shall be divided and the dimensions shall be no longer than the hose bed X 19" wide X 29" high or sufficient size to allow storage of a 20 ft 3-section ladder, suction hose and pike pole.*** The hard suction hose portion shall be located on the right side with three (3) trays to accommodate three lengths of 4" light weight suction hose with short rocker lug couplings and suction screen.

Provisions to store a digging bar and pike pole shall be provided with a locking pin to secure each item. An NFPA approved grab handle shall be mounted horizontally across the upper rear edge of this compartment.

The ladder portion shall be on the left side, which will accommodate a Duo Safety model # 912, 20 foot, three (3) section extension fire service ladder. A minimum 3/16" UMHW plastic plate shall be attached to the floor for ease of ladder removal. ***Both sections of this compartment have separate vertically hinged steel or aluminum doors and lockable "D" ring latches.*** The hinges shall be on the outboard side with the doors latching in the center section.

8.23 CHOCK BLOCK STORAGE: Provisions for storing of the chock blocks shall be provided in separate compartments on the main body. These compartments shall be aft of the rear wheel wells below the left and right horizontal compartments, one chock shall be stored on each side. The sizes of the CDF specified chocks are 9" H X 8" W X 12" L. An alternate storage location in a separate section of the under cab compartments maybe considered. Final location will be finalized at the pre-construction conference.

8.24 FUEL TANK SKID PLATE: A 1/8" (minimum size) removable steel skid plate that is painted body or frame color shall be fastened to the bottom side of the fuel tank hangers.

8.25 BATTERY COMPARTMENT: The OEM supplied battery compartment may need to be re-configured to provide additional room for under cab compartments, if it is necessary to remount the batteries in a compartment, the compartment shall be vented and be provided with slide out trays. If the OEM battery compartment is not painted the specified color, in lieu of painting, an overlay of polished aluminum tread plate shall be considered.

8.26 BODY RUB RAILS/SCUFF PLATES: Sacrificial brushed stainless steel or aluminum rub rails shall be installed along the base of the base of the main body, and stainless steel scuff plates shall be installed across the rear of the hose bed opening and below all compartment openings to protect these areas from wear.

8.27 EXTERIOR CAB TRIM: If provisions allow on the chassis, a 12 gauge brushed stainless steel trim piece shall be installed full length along the lower body seam below the cab doors. The trim shall be fastened to the body seam with evenly spaced 10/32 stainless steel phillips head machine screws and nylock nuts.

8.28 HOSE ROLLER MOUNTS: The contractor shall provide two (2) 2" hitch receivers for the mounting of a removable hose roller. They shall be flush mounted on the bottom side of the front bumper and rear tailboard. The reinforced hose roller mounts shall be welded to the proper size of stock to fit a standard 2" hitch receiver.

8.29 WHEEL WELL LINER: Wheel well liners shall be provided and fabricated from minimum 12 gauge steel plate and mounted in the arch of each rear wheel well for booster tank, rock and tire chain protection. The liners shall be mounted in a fashion as to provide the required 8" minimum tire clearance.

8.30 MUD FLAPS: Two (2) each heavy-duty plain black, "fabric inserted", mud flaps shall be provided with one (1) each installed behind each rear wheel and if necessary, mini flaps shall be attached to the leading edge of the hood to eliminate debris from being deposited on top of the front bumper area.

8.31 FENDERETTES: The exterior front and rear wheel well arches shall be trimmed with bolt-in, replaceable type heavy-duty rubber fenders. If the chassis of choice has plastic factory front wheel well arch fenders they shall be replaced with bolt in heavy duty rubber fenders to match the rear wheel fenders.

8.32 I-ZONE BRACKETS: There shall be two (2) easily removable or flip out I-Zone brackets mounted on the rear of the apparatus, one on each side. The brackets shall be designed with adequate reinforcement to eliminate flexing of the body (oil canning) and not interfere with any rear facing lights when carrying hose. The exact design and mounting location shall be finalized at the pre-construction conference.

8.33 REAR STEPS: There shall be six (6) surface mount 8" x 8" cast aluminum rear steps with hand hold, (Cast Products # SP2012 or equal) provided to allow access to the hose bed and upper rear body areas. The upper steps shall incorporate Hella Picador # 90645 or equal 55 watt halogen light assemblies with swivel brackets. Both lights shall be controlled by a lighted rocker switch on the center console switch bank. These steps shall feature a designed in grab handle to supplement the NFPA required access rails and have polished stainless steel scuff plates attached with stainless steel machine screws and nylock nuts above each step.

8.34 FRONT TOWING EYE: A horizontal full frame width, ¾" thick steel plate, center pull, front tow eye shall be furnished and installed through or below the 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.

8.35 REAR TOWING EYE: A single, frame mounted, 3" X 4" diameter, rear towing eye shall be provided. It shall be manufactured from ¾" thick steel plate and bolted between the rear frame rail webs with a minimum of eight (8), four (4) on each side, 5/8" SAE Grade 8 frame bolts and lock nuts. The tow eye shall be braced and gusseted to prevent damage to the frame rails, bumper or apparatus body while being towed from various angles. Access to the tow eye shall be below the bumper and designed not to interfere with the required angle of departure. If a single rear tow eye is not achievable the CDF shall consider two (2) frame mounted tow eyes.

NOTE: <u>The front and rear tow eye designs shall be finalized during the pre-construction conference and CDF reserves the right to accept or reject the manufacturers proposed design and if necessary the contractor shall redesign the tow eyes at no additional cost to the CDF.</u>

8.36 REAR BUMPER: The rear bumper shall be 12 gauge galvanized steel or aluminum grip strut, or tread plate with diamond edge punch encased in a painted (body color) steel frame and will be full body width X a minimum 8" deep stand off type. When mounted, the loaded rear departure angle will be no less then 24 degrees.

The contractor shall provide designs that incorporate a 34" wide, removable center hinged drop step. All steps are to meet NFPA step height requirements. The CDF reserves the right to accept or reject the design of the rear step and if necessary the contractor shall redesign the step at no additional cost to the CDF.

8.37 LICENSE PLATE INSTALLATION: A predrilled backing plate and legal light shall be installed on the right rear for mounting of the license plate.

8.38 AIR HORN: A Grover Model # 1512 or #1510 Stutter Tone air horn activated by a cab floor mounted foot valve (driver's side) shall be supplied and installed forward of the cab. All tubing shall be loomed and clamped the entire length. The horn supply

line, DOT approved synflex air hose, if routed from an air tank shall terminate at a threaded bulkhead connector at the cab firewall. The air horn mounting location shall be determined at the pre-construction conference.

A separate weatherproof air horn button shall also be mounted on the left pump panel and be properly labeled.

NOTE: If the OEM provides a factory air horn control switch on the steering wheel, the air horn shall be interfaced with this switch and floor mounted foot valve may be eliminated.

8.39 ACCESS HANDRAILS: In addition to the grab handles on the rear body steps, access handrails shall be provided at the following locations; each cab entrance, if not OEM supplied, above each pump panel, rear of each hi-side hose bed compartment, the rear edge of each hose bed cover, top rear of the ladder box, below the rear traffic advisor and at each position where steps for climbing are located. The handrails shall be constructed of slip resistant, non-corrosive material. Access handrails shall comply with NFPA # 1901, latest edition. The exact location of the handrails shall be determined at the pre-construction conference.

8.40 CHOCK BLOCKS: Two (2) chock blocks, Worden Safety Products # 7HY HD Yellow w/ grab handle shall be supplied. **NO EXCEPTIONS**

8.40 AIR COUPLING: The left pump panel shall be provided with provisions to accept an industry standard 3/8" air chuck and hose and be properly labeled. The air supply for this provision shall be plumbed from the chassis air system.

8.41 MANUFACTURER'S I.D. PLATE: A metal manufacturer's body serial number nomenclature plate shall be installed on the lower right corner of the left pump panel.

8.42 SAFETY / INSTRUCTION LABELS OR PLATES: All required safety and/or instruction, signs, labels or plates shall be permanent in nature, securely attached (stick on signs, labels or plates are not acceptable) and must be capable of withstanding the effects of extremes of weather and temperature. All exterior mounted labels or plates must be engraved metal.

If any OEM warning or instruction labels in the cab need to be removed for component mounting, new labels shall be installed. In addition to the OEM safety labels, signs or plates, the following plates shall be provided and installed in the appropriate areas of the apparatus.

- Fasten Seat Belts
- Do Not Ride on the Tail Board
- Apparatus Dimension Plate
  (located within driver's view)
- Apparatus Body Manufacturer I.D. Plate
- Pump I.D. and Rating Plate

- Air Filter Ember Protection Screens
  Require Routine Inspection (located on dash)
- Chassis Fluid Plate that shows the specific type of fluid for the following:
    - Engine Oil
    - Engine Coolant
    - Power Steering
    - Transmission
    - Drive Axle Gear Oil
    - Transfer Case Gear Oil (if applicable)
    - Pump Transmission Oil

SECTION 9

LIGHTS AND ELECTRICAL SYSTEMS

9.1 LIGHTS: Added to the basic chassis lighting complement shall be the lights and components listed below. Wherever applicable, the lights and/or sub-assemblies shall be selected for the maximum degree of interchange ability and commonality. All lights shall be provided and installed with backing plates where necessary, wired, protected, flashed and switched as per the job description. All emergency lights shall be California Vehicle Code and NFPA 1901 approved type. All marker, clearance, turn signal, headlights, stop lights and etc., must meet FMVSS and California Vehicle Code requirements.

9.2 WIRING: The wiring shall be a "Class 1" (or equal) crosslink polyethylene harness that meets SAE J1128 type SXL, function coded every 3 inches and of a gauge that is rated to carry 125% of the maximum current for which the circuit is projected.

All wiring shall be loomed, grommet and routed the maximum distance possible away from high heat sources, and properly clamped to the body or frame members to preclude chafing on other components. Only insulated metal clamps are acceptable for this service, adhesive backed clamps shall be rejected. Where holes are cut and or drilled for wiring, such holes will be smooth edged and have grommets installed.

All wiring looms, electrical components, interior or exterior lighting components, located within compartments or apparatus cab must be protected from internal load damage with removable aluminum covers. The apparatus wiring shall be installed as per the vendor supplied wiring schematic.

The battery cables shall be sized to match the OEM cables with crimped terminals and heat shrink tubing (insulation) installed to protect the terminal ends. The batteries shall be connected in the parallel with red shrink tubing protecting the positive terminals and a black shrink tubing protecting the negative terminals.

All un-insulated terminal ends (starter and battery) shall be square crimped with a Roto Crimp tool (AMP Special Industries Roto Crimp Tool # 600850-1) or equal. The crimp area and cable shall be sealed with heat shrink tubing to protect it from moisture and strain relief. Soldered terminal and connectors are not acceptable. The batteries shall be individually grounded to the truck frame.

The power (positive lead) cable shall connect to a frame mounted terminal block. The OEM sized cable will connect the truck engine battery cable to a terminal block and another 1/0 cable will be routed from the primer motor to the terminal block. All other electrical load (except starters and primers) shall be connected to the frame mounted terminal block through a battery disconnect switch. Electric load cable shall be size 4 gauge.

NOTE: If the OEM chassis supplied features multiplex wiring body circuits, these circuits shall be interfaced with the body and pump module circuitry.

9.3 SPARE WIRING: Two (2) pair of spare wiring shall be provided. One wire shall be 12 volt battery switched and the other shall be a 12 volt 15 amp fused ignition switch controlled circuit. The wiring shall be labeled as to their function, coiled and located within the center console.

9.4 ELECTRICAL INTERFACE PANEL: All body wiring unless interfaced with the OEM multiplex chassis circuits shall be separate and distinct from the chassis wiring. A "Class 1" (or equal) relay and circuit board (power distribution board) with three (3) Deutsch cannon plugs, one each for chassis, pump and body functions, shall be provided and mounted in the center cab console under the right side lift out map box. A "Class 1" ***(***or equal) 150 amp circuit breaker shall be located between the master battery switch and the sub-panel. All terminals on this panel shall be properly labeled and numbered with permanent, moisture and heat resistant material. This board shall contain independently switching relays with selectable input polarity. The relays shall be connected in the normally open or normally closed position depending on application. All relays and circuits shall be protected by re-settable circuit breakers and have protective covers.

9.5 ELECTRONIC LOAD MANAGEMENT: A Kussmaul Electrical Load Manager II (or equal) shall be installed if necessary, that will monitor and control the electrical loads and utilize a priority shutdown when the 12 volt electrical system is overloaded. The system shall include a flashing warning light that will indicate a low voltage or battery discharge condition. The load manager shall only monitor the vehicle's voltage while the transmission is in neutral and the parking brake has been applied. The system shall also sequentially re-energize the electrical systems as voltage recovers. The electrical system shut down priority shall be as finalized at the pre-construction conference.

9.6 HI-IDLE SWITCH: A hi-idle switch shall be provided on the center in-cab console or instrument panel rocker switch panel and be labeled "OK to Engage High Idle". A green indicator light shall be provided adjacent to the switch. The light shall illuminate only when the conditions stated below are met. The switch shall be capable of increasing the engine speed to 1000 rpm only when the transmission is in neutral and the parking brake applied. Safety interlocks are required to drop the engine rpm to idle when placing the transmission in gear or by shifting to the pump mode. If possible this hi-idle function may be interfaced with the electronic load management system.

NOTE: The cruise control feature of the apparatus shall not be disabled to achieve the hi-idle function.

9.7 JUNCTION BLOCKS / PLUGS: One or more Deutsch connectors shall be provided with water tight seals on individual harnesses to allow for the main body, pump panel or various components to be easily removed from the truck chassis. Access to the pump panel Deutsch connector shall be behind the swing-a-way gauge panel. Any additional terminal strips must be a weather proof style.

NOTE: "AMP" CP screw together electrical couplings shall be utilized in all wiring harnesses that are spliced or cut. Crimped butt connectors are not acceptable.

9.8 TOGGLE SWITCHES / DOOR SWITCHES / SOLONOIDS / PILOT LIGHTS: Only Cole Hersee marine grade weather proof constant duty solenoids, relays, door switches and heavy duty toggle switches equal to Cole Hersee # 551800 with screw terminals will be accepted, spade type terminals or plastic switches are unacceptable. All pilot (indicator) lights shall be Dialight # 26131011313 or equal with appropriate lens color and all switches shall meet immersion protection standards IP65.

***** ***9.9 CDF MOBILE RADIO: Section Deleted.***

9.10 RADIO ANTENNAS: The contractor shall supply and install four (4) antenna bases with coaxial cables on the cab roof. Two (2) cables shall terminate in the center of the dash and two (2) under the officer's seat. One (1) high band antenna (Maxrad # MWB1320) and three (3) non-rubber**,** weatherproof caps shall be provided. The exact mounting locations shall be discussed at the pre-construction conference.

9.11 APPARATUS INTERCOM SYSTEM: A six (6) station intercom system shall be vendor supplied, installed and interfaced for a Kenwood TK-790 mobile radio. Five stations are to be located in the cab, and one at the pump panel. All positions shall have voice activated intercom. Both front seat positions and the pump panel shall have push-to-talk radio transmit abilities. (Sigtronics model # US-67D with five (5) # SE-8 headsets, and one (1) supplied 15 foot headset extension cord with push to talk feature on a belt clip)

NOTE: Headset mounting locations shall be finalized at the pre-construction conference.

9.12 APPARATUS BODY LIGHTING: The following body lighting shall be provided:

- Clearance Lights: Peterson LED # 163R (or equal), rubber mounted
- Marker Lights: Peterson LED # 163A (or equal), rubber mounted
- Stop/Tail Lights: Peterson LED # 417R (or equal), rubber mounted
- Turn Signal Lights: Peterson LED # 417R (or equal), rubber mounted
- Back-up Lights: Truck Lite # 4004 halogen (or equal), rubber mounted
- Rear License Plate Light: Del City LED # 73462 (or equal),
- Reflectors, red: Dietz # 8-75200 (or equal),

NOTE: Adhesive backed reflectors are unacceptable.

9.13 AREA LIGHTING: Three (3), Hella Picador model # 90645, or equal 55 watt halogen work lights shall be provided. (with swivel brackets) They shall be mounted on a minimum 2"X2" 11 gauge square steel tube structure mounted to the rear of the cab. The outboard mounted lights shall be controlled individually by labeled and lighted rocker switches located on the OEM dash panel rocker switch module. One (1) light shall be mounted on the left and right side of the cab and one shall be mounted in the center facing the hose bed. All visible access holes inside the cab shall be plugged or covered when the installation has been completed. The lights shall be mounted below the cab roof line. The center mounted light shall be controlled by the hose bed light switch. Alternate area light mounting locations may be considered. Area lighting shall be finalized at the pre-construction conference.

9.14 PUMP PANEL LIGHTING: The left and right pump panels shall be illuminated with six (6), Weldon # 2025-7130-30 or equal (three above each panel) flush mounted lamps, under a stainless steel or polished aluminum hood/shield for night illumination. The on/off switch shall be located on the left pump operator's panel. The center light on the pump operator's panel shall illuminate with main pump engagement.

9.15 COMPARTMENT LIGHTING: 5" Truck-lite #80351, or equal with chrome rings shall be installed in all compartments. Two (2) lights shall be ceiling mounted in each high side horizontal compartment. One (1) light shall be ceiling mounted in all additional compartments, including both under cab compartments and any fixed shelf.

The compartment lighting shall be door activated so that only the light for the compartment that is opened will turn on.

NOTE: Button style compartment switches shall be installed on the jamb side of the compartment door opening. All switches and the wiring harness must be protected from internal compartment damage by the use of removable aluminum or stainless steel covers.

9.16 HOSE BED LIGHTING: Four (4) Weldon # 2025-7130-30 lights or equal shall be installed in the hose bed, two (2) in each bed, evenly spaced and mounted at an angle from the center ladder box, a separate hose bed light on/off switch shall be located on the left pump operator's panel.

Aluminum guards or shields shall be provided on all lights in the hose bed and compartments unless other means of lamp protection is offered and approved by the CDF.

9.17 OPEN COMPARTMENT WARNING: A minimum 2" diameter flashing or rotating red "Open Door" warning light, buzzer and label shall be installed in the cab clearly visible to the driver. The open door warning shall be wired to all compartment doors including the hose bed covers with button type switches, stem style switches are not

acceptable. The open door buzzer and warning light shall activate only when the apparatus parking brake has been released. (Kussmaul Current Sensor # 091-22F-5**,** or equal)

9.18 GROUND LIGHTS: Six (6) Federal-Signal # 607116 or equal, halogen rubber mounted ground illuminating lights shall be provided. One (1) on each side under the cab doors, activated when the cab doors open, one (1) each below each pump panel and two (2) located at the rear step bumper area. The pump panel and rear step area lights shall be wired to the pump panel light switch.

9.19 HAND HELD LIGHT: A Nova Tech model # 2000-101 (or equal) hand held spot/flood light with mounting bracket shall be provided. The light shall incorporate a coil type cord with a handle mounted momentary on/off rocker switch and be hard wired in the apparatus cab. The exact mounting location will be determined at the pre-construction conference.

9.20 REAR DECK LIGHTING: Two (2) 12 volt Havis Shield FX-12, or equal rear deck lights, mounted on cast aluminum stand-off brackets that provides for full light articulation shall be provided. One (1) light shall be mounted on each side at the rear of the apparatus body.

The lights shall be activated by individually lighted rocker switches on the OEM dash mounted rocker switch pack and be properly labeled as to its function. The exact mounting location shall be determined at the pre-construction conference.

9.21 MAP LIGHT: A rheostat controlled map light shall be provided, dash mounted. Federal, Littlite model # LF18ERB (or equal).

9.22 BACK-UP ALARM: An ECCO SA917-PM2 (or equal) back-up alarm shall be installed and wired into the vehicles back-up light circuit.

9.23 12-VOLT OUTLET: Two (2) 12-volt power points will be provided on the center of the dash.

9.24 GROUND: An electrical ground will be installed from the “tank/body” assembly to the truck frame. This ground will be a cable or strap equal to the OEM ground.

SECTION 10

EMERGENCY LIGHTING

10.1 EMERGENCY LIGHTING: An NFPA # 1901, latest edition, emergency lighting package shall be provided. Components of the lighting package shall be as follows:

- Upper Zone-A, low profile, 69" Code 3 LED Light Bar model # 2169-ALRC-113-LED (or equal), w/Cal Steady Front Red
- Lower Zone-A, Two, (2) Code 3 LED model # LXEX1F-RED (or equal), grill or bumper mounted
- Front Lower Zone-B&D, Code 3 LED model # LXEX1F-RED (or equal)
- Rear Upper Zone-B&D, Code 3 LED model # LXEX2F-RED/RED (or equal)
- Rear Lower Zone-B&D, Code 3 LED model # LXEX1F-RED (or equal)
- Upper Zone-C, Two (2) Code 3 LED model # LXEX2F-RED/AMBER (or equal)
- Lower Zone-C, Two (2) Code 3 LED model # LXEX1F-RED (or equal)

NOTE: All perimeter emergency lighting shall be surface mount style and include the appropriate colored lenses with aluminum housings.

The emergency lighting shall be controlled through a "master" lighted rocker switch, mounted on the center console rocker switch panel. The halogen work lights shall be controlled by individually lighted and labeled rocker switches. The "calling for the right away function" including any "white" forward facing emergency lights and the headlight flashers shall be disabled by applying the parking brake. A separate rocker switch shall be provided to allow separate operation of the rear traffic advisor and the rear amber warning lights in the light bar.

In addition any "white" forward facing upper zone lights shall incorporate a separate cut off switch that is wired into rocker switch module should that feature need to be interrupted.

10.2 LIGHT BAR MOUNTING: The light bar shall be flush mounted as low as possible on the forward portion of cab roof with inside cab support structure (minimum 10 gauge steel) added for roof strength.

10.3 TRAFFIC ADVISOR: An amber LED directional traffic advisor, Federal Signal # SMLED-6 or equal, shall be recess mounted into the area below the hard suction/ladder compartment and above the rear compartment and controlled by the appropriate controller. The traffic advisor shall be operable when the "calling for the right away" function has been actuated.

10.4 AUDIBLE WARNING CONTROLS: A Code 3, MicroCom 2, or equal 200 watt siren head with "Sure" noise canceling microphone with radio rebroadcast shall be provided.

The siren shall be wired through the siren control head and the OEM horn ring and be activated only when the “calling for the right away” function has been activated.

10.5 SIREN SPEAKER: Two (2) 100 watt loudspeakers, Federal Signal Dynamax MS-100 (or equal) shall be provided. The loudspeakers shall be mounted in the front bumper.

10.6 HEADLIGHT FLASHER: A Federal-Signal model # FA4C-RDG (or equal) headlight flasher (wig-wag) for vehicles with day time running lights, 90 FPM with high beam override shall be provided. It shall be activated in the “calling for the right of way” mode and be turned off in the “blocking of the right away” mode by applying the parking brake. Should the feature need to be interrupted, the flasher shall also incorporate a separate cut off switch mounted on the center console.

NOTE: The mounting locations of the emergency lighting, siren control and switching components shall be finalized during the pre-construction conference.

SECTION 11

PAINT SPECIFICATION

11.1 GENERAL: The completed apparatus will be subject to severe wildland use and accompanying body abrasion. All visible exterior surface areas shall be free of grind marks, dents, peen marks, paint sag, and/or unsightly workmanship when the finished vehicle is presented for agency acceptance.

To provide a uniform appearance, the apparatus cab and chassis shall also be re-finished each agencies specified color and when completed, all painted surfaces of the entire main body, including the cab and chassis shall be color matched. This includes repainting surfaces that may have already received factory, OEM or pre-delivery painting. All loose items shall be painted prior to installation to ensure finish paint is behind the mounted items. All exterior mounted discharge valves shall be painted body color.

All compartment door interiors are to be well fitted, sprayed with a corrosion prohibitor and painted to the same quality of surface finish as the exterior surface standard. The interior surface of all compartment doors shall be finished to match the exterior color.

11.2 MATERIALS: The highest quality, state of the art, low V.O.C. acrylic urethane finishing system shall be utilized. (Sikkens, DuPont, PPG or equal). The finish coat will be applied in multiple coats to ensure proper paint coverage with a high gloss finish. Priming will be a two (2) stage process. First stage will be a coating with a two part component, self etching and corrosion resistant primer to chemically bond the surface of the metal for increased adhesion. Second stage will be multiple coats of a catalyzed, two component acrylic urethane, primer-surfacer applied for leveling of small imperfections and top coat sealing. Application shall be in strict accordance with the paint manufacturer's instructions, including number of coats and dry mil thickness.

11.3 PAINT SPECIFICATIONS: Colors will be specified on the purchase order whether CDF, OES or another agency is purchasing the apparatus.

- **CDF Red:** Sikkens 2303 Autocryl Acrylic Urethane or equivalent.
- **OES Lime Green:** Sikkens 6038 Autocryl Acrylic Urethane or equivalent.

White: Sikkens 4146 Autocryl Acrylic Urethane or equivalent.

Touch up paint shall be provided for both colors identified at the time of purchase order. Further clarification shall be provided at the pre-construction conference or at time of purchase order.

11.4 PRE-FINISH, BODY: Upon completion of the body assembly, and prior to mounting of assembly on the chassis, the underside shall be properly cleaned, primed and

painted or “Rhino Lined” manufacturer’s red color. Products equal to Rhino lining are acceptable. All external body and interior compartment seams are to be filled-in and sealed with an automotive grade seam sealer, to ensure weather proofing. Paint grade caulking is unacceptable. Glazing and primer surfacer shall be used wherever necessary to provide a smooth surface.

11.5 PRE-FINISH PAINTING, CHASSIS AND UNDERCARRIAGE: After the installation of the fire pump, tow hook, body hold-down brackets, pump module, fuel tank framing, and prior to the mounting of the tank or body assembly, the entire chassis, undercarriage and installed components shall be thoroughly cleaned (steam or spray) to remove all oil, grease, loose paint, and dirt. All unpainted components and plumbing will be cleaned, primed, and the entire undercarriage and all components painted the specified color. Wheels will be surface cleaned and primed for painting on both sides of each wheel. Painting of sub-assemblies prior to assembly is required. See Sections 8.24-Fuel Tank Skid Plate and Section 8.25-Battery Compartment for additional specific requirements for skid plate and battery compartment.

11.6 FINISH PAINTING, CAB ROOF: Prior to finish painting, the OEM cab roof exterior paint surface will be dewaxed (hot soap wash), wet or dry sanded, and sealed with a “primer-sealer”. All surface imperfections shall be repaired as necessary, glazed, primed, and readied for finish painting. The finish paint shall be applied in the exact sequence and in accordance with paint manufacturer’s specifications.

The cab roof will be painted the specified white down to the drip molding on both sides, to the top of the windshield and a line parallel to the top of the rear window. Any brackets, or other items mounted on the roof and requiring painting shall also be painted white.

11.7 FINISH PAINTING, BODY ASSEMBLY: The body assembly will be checked for proper filling of seams, glazing and filler as required, thoroughly cleaned with surface cleaner to remove all grease, oil and other foreign matter. The finish paint shall be applied in the exact sequence in accordance with the paint manufacturer’s specifications.

11.8 FINISH PAINTING, COMPARTMENT INTERIOR: The interior of all compartments shall be finished with grey Rhino Liner (or equal). All non-brushed stainless steel surfaces of the hose bed shall be finished with red Rhino Liner (or equal). Brushed stainless steel surfaces will not require Rhino Liner (or equal) finish.

NOTE: If the OEM supplied fuel tanks, front bumper, steps, battery boxes or wheels are not finished in the specified color they shall be refinished to match the apparatus exterior.

11.9 CHOCK BLOCK FINISH: Chock Blocks shall be finished “Hi-Visibility Yellow”.

11.10 NONSKID COATING: The bumper tow eye, top of the ladder/hard suction compartment, and all other surfaces with the potential to be walked or stepped on (except the hose bed covers) shall be treated with an epoxy type nonskid material. (Black in color) The nonskid material shall be applied in accordance with the manufacturer's recommendation. (Falcon Epoxy, Acron Paper Company, 4062 Hollis St. Emeryville, Ca**,** or equal)