

**CITY OF SANTA FE  
GENERAL SERVICES CONTRACT**

Goods New ARFF Truck

THIS AGREEMENT is made and entered into by and between the City of Santa Fe, herein after referred to as the "City", and, E-One Inc. herein after referred to as the "Contractor."

**IT IS MUTUALLY AGREED BETWEEN THE PARTIES:**

**1. Definitions**

A. In response to your request for quotation, E-One Inc. Is pleased to this proposal for one E-One Titan 6x6 Aircraft Rescue and Fire Fighting Vehicle, the unit shall conform the FAA10-E and NFPA 414-2020 standards for delivery FOB Santa Fe Regional Airport in Santa Fe New Mexico

B. "Business Hours" means 8:00 a.m. to 5:00 p.m. Mountain Time.

C. "You" and "your" refers to (Contract Name Source Well and Rev Group 113021). "We," "us" or "our" refers to the City and whose accounts are created under this Agreement.

**2. Scope of Work**

A. The Contractor shall perform the following work:  
Build ARFF truck and deliver with in compliance of exhibit A Product and Specifications.

**3. Compensation**

The City shall pay to the Contractor based upon fixed prices for each Deliverable item as listed here.

<u>Deliverable item:</u>	<u>U/I (unit of issue)</u>	<u>Price</u>
01 \$ One ARFF Truck		1,194,852.00

The total compensation under this Agreement shall not exceed one million one hundred ninety-four thousand eight hundred fifty-two dollars (\$1,194,852.00).

4. **Payment Provisions**

All payments under this Agreement are subject to the following provisions.

- A. Acceptance - In accordance with Section 13-1-158 NMSA 1978, the City shall determine if the product or services provided meet specifications. Until the products or services have been accepted in writing by the City, the City shall not pay for any products or services. Unless otherwise agreed upon between the City and the Contractor, within thirty (30) days from the date the City receives written notice from the Contractor that payment is requested for services or within thirty (30) days from the receipt of products, the City shall issue a written certification (by letter or email) of complete or partial acceptance or rejection of the products or services. Unless the City gives notice of rejection within the specified time period, the products or services will be deemed to have been accepted.
- B. Payment of Invoice - Upon acceptance that the products or services have been received and accepted, payment shall be tendered to the Contractor within thirty (30) days after the date of invoice. After the thirtieth day from the date that written certification of acceptance is issued, late payment charges shall be paid on the unpaid balance due on the contract to the Contractor at the rate of 1.5 % per month. Contractor may submit invoices for payment no more frequently than monthly. Payment will be made to the Contractor's designated mailing address. Payment on each invoice shall be due within 30 days from the date of the acceptance of the invoice. The City agrees to pay in full the balance shown on each account's statement, by the due date shown on said statement.

5. **Term**

THIS AGREEMENT SHALL NOT BECOME EFFECTIVE UNTIL APPROVED IN WRITING BY THE CITY. This Agreement shall begin on date approved by the City, and end on two years from date of PO being issued. The City reserves the right to renew the contract on an annual basis by mutual Agreement not exceed a total of four years in accordance with NMSA 1978, §§ 13-1-150 through 152.

6. **Default and Force Majeure**

The City reserves the right to cancel all or any part of any orders placed under this contract without cost to the City, if the Contractor fails to meet the provisions of this contract and, except as otherwise provided herein, to hold the Contractor liable for any excess cost occasioned by the City due to the Contractor's default. The Contractor shall not be liable for any excess costs if failure to perform the order arises out of causes beyond the control and without the fault or negligence of the Contractor; such causes include, but are not restricted to, acts of God or the public enemy, acts of the State or Federal Government, fires, floods, epidemics,

quarantine restrictions, strikes, freight embargoes, unusually severe weather and defaults of sub-contractors due to any of the above, unless the City shall determine that the supplies or services to be furnished by the sub-contractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery scheduled. The rights and remedies of the City provided in this paragraph shall not be exclusive and are in addition to any other rights now being provided by law or under this contract.

## 7. Termination

A. Grounds. The City may terminate this Agreement for convenience or cause. The Contractor may only terminate this Agreement based upon the City's uncured, material breach of this Agreement.

B. Notice; City Opportunity to Cure.

1) Except as otherwise provided in Paragraphs 7.A and 17, the City shall give Contractor written notice of termination at least thirty (30) days prior to the intended date of termination.

2) Contractor shall give City written notice of termination at least thirty (30) days prior to the intended date of termination, which notice shall (i) identify all the City's material breaches of this Agreement upon which the termination is based and (ii) state what the City must do to cure such material breaches. Contractor's notice of termination shall only be effective (i) if the City does not cure all material breaches within the thirty (30) day notice period or (ii) in the case of material breaches that cannot be cured within thirty (30) days, the City does not, within the thirty (30) day notice period, notify the Contractor of its intent to cure and begin with due diligence to cure the material breach.

3) Notwithstanding the foregoing, this Agreement may be terminated immediately upon written notice to the Contractor (i) if the Contractor becomes unable to perform the services contracted for, as determined by the City; (ii) if, during the term of this Agreement, the Contractor is suspended or debarred by the City; or (iii) the Agreement is terminated pursuant to Paragraph 17, "Appropriations", of this Agreement.

C. Liability. Except as otherwise expressly allowed or provided under this Agreement, the City's sole liability upon termination shall be to pay for acceptable work performed prior to the Contractor's receipt or issuance of a notice of termination; provided, however, that a notice of termination shall not nullify or otherwise affect either party's liability for pre-termination defaults under or breaches of this Agreement. The Contractor shall submit an invoice for such work within thirty (30) days of receiving or sending the notice of termination. *THIS PROVISION IS NOT EXCLUSIVE AND DOES NOT WAIVE THE CITY'S OTHER LEGAL RIGHTS AND REMEDIES CAUSED BY THE CONTRACTOR'S DEFAULT/BREACH OF THIS AGREEMENT.*

## 8. Amendment

A. This Agreement shall not be altered, changed or amended except by instrument in writing executed by the parties hereto and all other required signatories.

B. If the City proposes an amendment to the Agreement to unilaterally reduce funding due to budget or other considerations, the Contractor shall, within thirty (30) days of

receipt of the proposed Amendment, have the option to terminate the Agreement, pursuant to the termination provisions as set forth in Paragraph 7 herein, or to agree to the reduced funding.

9. **Status of Contractor**

The Contractor, and Contractor's agents and employees, are independent Contractors for the City and are not employees of the City. The Contractor, and Contractor's agents and employees, shall not accrue leave, retirement, insurance, bonding, use of City vehicles, or any other benefits afforded to employees of the City as a result of this Agreement. The Contractor acknowledges that all sums received hereunder are personally reportable by the Contractor for income tax purposes, including without limitation, self-employment tax and business income tax. The Contractor agrees not to purport to bind the City unless the Contractor has written authority to do so, and then only within the strict limits of that authority.

10. **Assignment**

The Contractor shall not assign or transfer any interest in this Agreement or assign any claims for money due or to become due under this Agreement without the prior written approval of the City.

11. **Subcontracting**

The Contractor shall not subcontract any portion of the services to be performed under this Agreement without the prior written approval of the City. No such subcontract shall relieve the primary Contractor from its obligations and liabilities under this Agreement, nor shall any subcontract obligate direct payment from the City.

12. **Non-Collusion**

In signing this Agreement, the Contractor/Contractor certifies the Contractor/Contractor has not, either directly or indirectly, entered into action in restraint of free competitive bidding in connection with this offer submitted to the City.

13. **Inspection of Plant**

The City may inspect, at any reasonable time during Contractor's regular business hours and upon prior written notice, the Contractor's plant or place of business, or any subcontractor's plant or place of business, which is related to the performance of this contract.

14. **Commercial Warranty**

The Contractor agrees that the tangible personal property or services furnished under this Agreement shall be covered by the most favorable commercial warranties the Contractor gives to any customer for such tangible personal property or services, and that the rights and remedies provided herein shall extend to the City and are in addition to and do not limit any rights afforded to the City by any other clause of this order. Contractor agrees not to disclaim warranties of fitness for a particular purpose or merchantability.



15. **Condition of Proposed Items**

Where tangible personal property is a part of this Agreement, all proposed items are to be NEW and of most current production, unless otherwise specified.

16. **Records and Audit**

During the term of this Agreement and for three years thereafter, the Contractor shall maintain detailed records pertaining to the services rendered and products delivered. These records shall be subject to inspection by the City, the State Auditor and other appropriate state and federal authorities. The City shall have the right to audit billings both before and after payment. Payment under this Agreement shall not foreclose the right of the City to recover excessive or illegal payments.

17. **Appropriations**

The terms of this Agreement, and any orders placed under it, are contingent upon sufficient appropriations and authorization being made by the City Council for the performance of this Agreement. If sufficient appropriations and authorization are not made by the legislature, this Agreement, and any orders placed under it, shall terminate upon written notice being given by the City to the Contractor. The City's decision as to whether sufficient appropriations are available shall be accepted by the Contractor and shall be final. If the City proposes an amendment to the Agreement to unilaterally reduce funding, the Contractor shall have the option to terminate the Agreement or to agree to the reduced funding, within thirty (30) days of receipt of the proposed amendment.

18. **Release**

The Contractor, upon final payment of the amount due under this Agreement, releases the City, its officers and employees, from all liabilities, claims and obligations whatsoever arising from or under this Agreement. The Contractor agrees not to purport to bind the City, unless the Contractor has express written authority to do so, and then only within the strict limits of that authority.

19. **Confidentiality**

Any confidential information provided to or developed by the Contractor in the performance of this Agreement shall be kept confidential and shall not be made available to any individual or organization by the Contractor without prior written approval by the City.

20. **Conflict of Interest**

A. The Contractor represents and warrants that it presently has no interest and, during the term of this Agreement, shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance or services required under the

Agreement. The Contractor shall comply with any applicable provisions of the New Mexico Governmental Conduct Act and the New Mexico Financial Disclosures Act.

B. The Contractor further represents and warrants that it has complied with, and, during the term of this Agreement, will continue to comply with, and that this Agreement complies with all applicable provisions of the Governmental Conduct Act, Chapter 10, Article 16 NMSA 1978.

C. Contractor's representations and warranties in Paragraphs A and B of this Paragraph are material representations of fact upon which the City relied when this Agreement was entered into by the parties. Contractor shall provide immediate written notice to the City if, at any time during the term of this Agreement, Contractor learns that Contractor's representations and warranties in Paragraphs A and B of this Paragraph 20 were erroneous on the effective date of this Agreement or have become erroneous by reason of new or changed circumstances. If it is later determined that Contractor's representations and warranties in Paragraphs A and B of this Paragraph 20 were erroneous on the effective date of this Agreement or have become erroneous by reason of new or changed circumstances, in addition to other remedies available to the City and notwithstanding anything in the Agreement to the contrary, the City may immediately terminate the Agreement.

D. All terms defined in the Governmental Conduct Act have the same meaning in this section.

21. **Approval of Contractor Representative(s)**

The City reserves the right to require a change in Contractor representative(s) if the assigned representative(s) are not, in the opinion of the City, adequately serving the needs of the City.

22. **Scope of Agreement; Merger**

This Agreement incorporates all the agreements, covenants, and understandings between the parties hereto concerning the subject matter hereof, and all such covenants, agreements and understandings have been merged into this written Agreement. No prior agreements or understandings, verbal or otherwise, of the parties or their agents shall be valid or enforceable unless embodied in this Agreement.

23. **Notice**

The Procurement Code, Sections 13-1-28 through 13-1-199 NMSA 1978, imposes civil and criminal penalties for its violation. In addition, the New Mexico criminal statutes impose felony penalties for bribes, gratuities and kickbacks.

24. **Equal Opportunity Compliance**

The Contractor agrees to abide by all federal and state laws, and local Ordinances,

pertaining to equal employment opportunity. In accordance with all such laws, rules, and regulations, the Contractor agrees to assure that no person in the United States shall on the grounds of race, religion, color, national origin, ancestry, sex, age, physical or mental handicap, or serious medical condition, spousal affiliation, sexual orientation or gender identity, be excluded from employment with or participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity performed under this Agreement. If Contractor is found not to be in compliance with these requirements during the life of this Agreement, Contractor agrees to take appropriate steps to correct these deficiencies.

25. **Indemnification**

The Contractor shall hold the City and its employees harmless and shall indemnify the City and its employees against any and all claims, suits, actions, liabilities and costs of any kind, including attorney's fees for personal injury or damage to property arising from the acts or omissions of the Contractor, its agents, officers, employees or subcontractors. The Contractor shall not be liable for any injury or damage as a result of any negligent act or omission committed by the City, its officers or employees.

26. **New Mexico Tort Claims Act**

Any liability incurred by the City of Santa Fe in connection with this Agreement is subject to the immunities and limitations of the New Mexico Tort Claims Act, Section 41-4-1, et. seq. NMSA 1978, as amended. The City and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies or waives any provision of the New Mexico Tort Claims Act.

27. **Applicable Law**

The laws of the State of New Mexico shall govern this Agreement, without giving effect to its choice of law provisions. Venue shall be proper only in a New Mexico court of competent jurisdiction in accordance with NMSA 1978, § 38-3-2. By execution of this Agreement, Contractor acknowledges and agrees to the jurisdiction of the courts of the State of New Mexico over any and all lawsuits arising under or out of any term of this Agreement.

28. **Limitation of Liability**

The Contractor's liability to the City, for any cause whatsoever shall be limited to the purchase price paid to the Contractor for the products and services that are the subject of the City's, claim. The foregoing limitation does not apply to paragraph 25 of this Agreement or to damages resulting from personal injury caused by the Contractor's negligence.

29. **Incorporation by Reference and Precedence**

If this Agreement has been procured pursuant to a request for proposals, this Agreement is derived from (1) the request for proposal, (including any written clarifications to the request

for proposals and any City response to questions); (2) the Contractor's best and final offer; and (3) the Contractor's response to the request for proposals.

In the event of a dispute under this Agreement, applicable documents will be referred to for the purpose of clarification or for additional detail in the following order of precedence: (1) amendments to the Agreement in reverse chronological order; (2) the Agreement, including the scope of work and all terms and conditions thereof; (3) the request for proposals, including attachments thereto and written responses to questions and written clarifications; (4) the Contractor's best and final offer if such has been made and accepted by the City; and (5) the Contractor's response to the request for proposals.

30. **Workers' Compensation**

The Contractor agrees to comply with state laws and rules applicable to workers' compensation benefits for its employees. If the Contractor fails to comply with the Workers' Compensation Act and applicable rules when required to do so, this Agreement may be terminated by the City.

31. **Inspection**

If this contract is for the purchase of tangible personal property (goods), final inspection and acceptance shall be made at Destination. Tangible personal property rejected at Destination for non-conformance to specifications shall be removed at Contractor's risk and expense promptly after notice of rejection and shall not be allowable as billable items for payment.

32. **Inspection of Services**

If this contract is for the purchase of services, the following terms shall apply.

A. Services, as used in this Article, include services performed, workmanship, and material furnished or utilized in the performance of services.

B. The Contractor shall provide and maintain an inspection system acceptable to the City covering the services under this Agreement. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the City and for as long thereafter as the Agreement requires. The City has the right to inspect and test all services contemplated under this Agreement to the extent practicable at all times and places during the term of the Agreement. The City shall perform inspections and tests in a manner that will not unduly delay or interfere with Contractor's performance.

C. If the City performs inspections or tests on the premises of the Contractor or a subcontractor, the Contractor shall furnish, and shall require subcontractors to furnish, at no increase in contract price, all reasonable facilities and assistance for the safe and convenient performance of such inspections or tests.

D. If any part of the services do not conform with the requirements of this Agreement, the City may require the Contractor to re-perform the services in conformity with the requirements of this Agreement at no increase in contract amount. When the defects in services cannot be corrected by re-performance, the City may:

- (1) require the Contractor to take necessary action(s) to ensure that future performance conforms to the requirements of this Agreement; and
- (2) reduce the contract price to reflect the reduced value of the services performed.

E. If the Contractor fails to promptly re-perform the services or to take the necessary action(s) to ensure future performance in conformity with the requirements of this Agreement, the City may:

- (1) by contract or otherwise, perform the services and charge to the Contractor any cost incurred by the City that is directly related to the performance of such service; or
- (2) terminate the contract for default.

### 33. **Insurance**

If the services contemplated under this Agreement will be performed on or in City facilities or property, Contractor shall maintain in force during the entire term of this Agreement, the following insurance coverage(s), naming the City as additional insured.

**A. Commercial General Liability insurance** shall be written on an occurrence basis and be as broad as ISO Form CG 00 01 with limits not less than \$2,000,000 per occurrence and \$2,000,000 in the aggregate for claims against bodily injury, personal and advertising injury, and property damage. Said policy shall include broad form Contractual Liability coverage and be endorsed to name the City of Santa Fe their officials, officers, employees, and agents as additional insureds.

**B. Broader Coverage and Limits.** The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement, or (2) the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of Contractor hereunder.

**C.** Contractor shall maintain the above insurance for the term of this Agreement and name the City as an additional insured and provide for 30 days cancellation notice on any Certificate of Insurance form furnished by Contractor. Such certificate shall also specifically state the coverage provided under the policy is primary over any other valid and collectible insurance and provide a waiver of subrogation.

### 34. **Impracticality of Performance**

A party shall be excused from performance under this Agreement for any period that the party is prevented from performing as a result of an act of God, strike, war, civil disturbance, epidemic, or court order, provided that the party has prudently and promptly acted to take any and all steps that are within the party's control to ensure performance. Subject to this provision, such non-performance shall not be deemed a default or a ground for termination.



35. **Invalid Term or Condition**

If any term or condition of this Agreement shall be held invalid or unenforceable, the remainder of this Agreement shall not be affected and shall be valid and enforceable.

36. **Enforcement of Agreement**

A party's failure to require strict performance of any provision of this Agreement shall not waive or diminish that party's right thereafter to demand strict compliance with that or any other provision. No waiver by a party of any of its rights under this Agreement shall be effective unless express and in writing, and no effective waiver by a party of any of its rights shall be effective to waive any other rights.

37. **Patent, Copyright and Trade Secret Indemnification**

A. The Contractor shall defend, at its own expense, the City against any claim that any product or service provided under this Agreement infringes any patent, copyright or trademark in the United States or Puerto Rico, and shall pay all costs, damages and attorneys' fees that a court finally awards as a result of any such claim. In addition, if any third party obtains a judgment against the City based upon Contractor's trade secret infringement relating to any product or services provided under this Agreement, the Contractor agrees to reimburse the City for all costs, attorneys' fees and amount of the judgment. To qualify for such defense and or payment, the City shall:

- 1) give the Contractor prompt written notice within 48 hours of any claim;
- 2) allow the Contractor to control the defense of settlement of the claim; and
- 3) cooperate with the Contractor in a reasonable way to facilitate the defense or settlement of the claim.

B. If any product or service becomes, or in the Contractor's opinion is likely to become the subject of a claim of infringement, the Contractor shall at its option and expense:

1) provide the City the right to continue using the product or service and fully indemnify the City against all claims that may arise out of the City's use of the product or service;

- 2) replace or modify the product or service so that it becomes non-infringing;

or,

3) accept the return of the product or service and refund an amount equal to the value of the returned product or service, less the unpaid portion of the purchase price and any other amounts, which are due to the Contractor. The Contractor's obligation will be void as to any product or service modified by the City to the extent such modification is the cause of the claim.

38. **Survival**

The Agreement paragraphs titled "Patent, Copyright, Trademark, and Trade Secret Indemnification; Indemnification; and Limit of Liability" shall survive the expiration of this Agreement. Software licenses, leases, maintenance and any other unexpired Agreements that were entered into under the terms and conditions of this Agreement shall survive this Agreement.



39. **Disclosure Regarding Responsibility**

A. Any prospective Contractor and any of its Principals who enter into a contract greater than sixty thousand dollars (\$60,000.00) with any City for professional services, tangible personal property, services or construction agrees to disclose whether the Contractor, or any principal of the Contractor's company is presently debarred, suspended, proposed for debarment, or declared ineligible for award of contract by any federal entity, state agency or local public body.

B. Principal, for the purpose of this disclosure, means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity or related entities.

C. The Contractor shall provide immediate written notice to the City if, at any time during the term of this Agreement, the Contractor learns that the Contractor's disclosure was at any time erroneous or became erroneous by reason of changed circumstances.

D. A disclosure that any of the items in this requirement exist will not necessarily result in termination of this Agreement. However, the disclosure will be considered in the determination of the Contractor's responsibility and ability to perform under this Agreement. Failure of the Contractor to furnish a disclosure or provide additional information as requested will be grounds for immediate termination of this Agreement pursuant to the conditions set forth in Paragraph 7 of this Agreement.

E. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the disclosure required by this document. The knowledge and information of a Contractor is not required to exceed that which is the normally possessed by a prudent person in the ordinary course of business dealings.

F. The disclosure requirement provided is a material representation of fact upon which reliance was placed when making an award and is a continuing material representation of the facts during the term of this Agreement. If during the performance of the contract, the Contractor is indicted for or otherwise criminally or civilly charged by any government entity (federal, state or local) with commission of any offenses named in this document the Contractor must provide immediate written notice to the City. If it is later determined that the Contractor knowingly rendered an erroneous disclosure, in addition to other remedies available to the Government, the City may terminate the involved contract for cause. Still further the City may suspend or debar the Contractor from eligibility for future solicitations until such time as the matter is resolved to the satisfaction of the City.

40. **Suspension, Delay or Interruption of Work**

The City may, without cause, order the Contractor, in writing, to suspend, delay or

interrupt the work in whole or in part for such period of time as the City may determine. The contract sum and contract time shall be adjusted for increases in cost and/or time associated with Contractor's compliance therewith. Upon receipt of such notice, Contractor shall leave the jobsite and any equipment in a safe condition prior to departing. Contractor must assert rights to additional compensation within thirty (30) days after suspension of work is lifted and return to work is authorized. Any compensation requested for which entitlement is granted and the contract sum adjusted, shall have profit included (for work completed) and for cost only (not profit) for Contractor costs incurred directly tied to the suspension itself and not otherwise covered by Contract remedy. Any change in Total Compensation must be reflected in an Amendment executed pursuant to Section 8 of this Agreement.

41. **Notification**

Either party may give written notice to the other party in accordance with the terms of this Paragraph. Any written notice required or permitted to be given hereunder shall be deemed to have been given on the date of delivery if delivered by personal service or hand delivery or three (3) business days after being mailed.

To the City: The City of Santa Fe Fire Department/ Airport

To the Contractor: E-One Inc.

Either party may change its representative or address above by written notice to the other in accordance with the terms of this Paragraph. The carrier for mail delivery and notices shall be the agent of the sender.

To the Contractor: E- One Inc.

42. **Succession**

This Agreement shall extend to and be binding upon the successors and assigns of the parties.

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date of the signature by the required approval authorities below.

CITY OF SANTA FE:

CONTRACTOR:

*AM*

CITY MAYOR/MANAGER

DATE: May 24, 2022

SEE ATTACHED

NAME

TITLE

DATE:

CRS#

Registration #

ATTEST:

*Kristine Bustos Mihelcic*

KRISTINE BUSTOS MIHELICIC, CITY CLERK *KB*  
GB MTG 05/11/2022

CITY ATTORNEY'S OFFICE:

*Marcos Martinez*

Marcos Martinez (Apr 29, 2022 1:57:19 MDT)

SENIOR ASSISTANT CITY ATTORNEY

APPROVED FOR FINANCES:

*Alexis Lotero*

Alexis Lotero (May 24, 2022 08:59 MDT)

MARY MCCOY, FINANCE DIRECTOR

Org.Name/Org.#



**E-ONE, INC.**



**TITAN 6X6  
AIRCRAFT RESCUE FIREFIGHTING VEHICLE**

**PRODUCT SPECIFICATIONS**

**FOR**

**SANTA FE REGIONAL AIRPORT  
SANTA FE, NEW MEXICO**

**APRIL 15, 2022**

## Table of Contents

<b>TESTING COMPLIANCE STANDARD</b> .....	1
Testing Compliance .....	1
Overall Height Restriction .....	1
Overall Length Restriction.....	1
Overall Width.....	1
<b>INSPECTIONS</b> .....	1
Final Inspection.....	1
<b>BUMPERS</b> .....	1
Bumper.....	1
License Plate Holder .....	1
<b>FRAME ASSEMBLY</b> .....	2
Frame construction.....	2
Shackles .....	2
<b>AXLE OPTIONS</b> .....	2
Front Steer Axle.....	2
Rear Bogey Axles .....	3
Differential Lock.....	3
<b>SUSPENSIONS</b> .....	3
Front Suspension.....	3
Rear Suspension.....	4
Sway Bar.....	4
<b>TIRE OPTIONS</b> .....	4
Tires 6x6 .....	4
<b>BRAKE SYSTEMS</b> .....	4
Brake System .....	4
<b>AIR SYSTEM OPTIONS</b> .....	5
Auxiliary Air Tank.....	5
Tank Drains w/Pull Cords ARFF [Qty: 4].....	5
Auto Moisture Ejectors Heated ARFF [Qty: 4].....	5
Air Inlet Auto-Eject .....	5
<b>ENGINES &amp; TRANSMISSIONS</b> .....	6
Engine/ Transmission/Torque Converter.....	6
Twin Disc Extended Warranty.....	6



EXHAUST OPTIONS .....	6
Exhaust.....	6
COOLING PACKAGE.....	7
Cooling System.....	7
FUEL SYSTEMS.....	7
Fuel System.....	7
Fuel / Water Separator Alarm.....	7
BATTERIES .....	7
Battery System.....	7
CHASSIS OPTIONS .....	8
Mud Flaps .....	8
Dual Air horns.....	8
Drivelines .....	8
Engine Coolant Heater.....	8
CAB .....	8
ARFF Cab .....	8
Cab Exterior.....	9
Cab Interior .....	10
Cab Doors .....	10
Cab Instruments and Controls.....	11
Fast Idle System.....	11
Electrical System .....	11
Cab Crashworthiness Requirement.....	12
Seat Mounting Strength .....	13
Seat Belt Anchor Strength .....	13
ISO Compliance.....	13
CAB DOOR OPTIONS .....	13
Cab Door Reflective Material.....	13
MIRRORS.....	13
Convex Mirror .....	13
Cab Mirrors.....	14
MISC EXTERIOR CAB OPTIONS.....	14
Windshield.....	14
Mud Flaps .....	14

Cab ARFF Durabak .....	14
HVAC .....	14
HVAC .....	14
SEATS .....	15
Cab Seats.....	15
Seating Capacity Tag .....	15
Seat Cover Material .....	15
Seat Fabric Color .....	15
Seat, Driver .....	16
Seat, Officer .....	16
Seat, Forward Facing .....	16
Seat, Forward Facing .....	17
Seat Cavity Cover [Qty: 3] .....	17
Universal Bracket for Air Pack Bottles [Qty: 4].....	17
MISC INTERIOR CAB OPTIONS .....	18
Cab Door Windows.....	18
Sun Visors.....	18
Inclinometer .....	18
Headset Hanger Hook [Qty: 4] .....	18
Step Cover Plates .....	18
Cab Interior Color Scheme .....	18
CAB ELECTRICAL OPTIONS .....	18
Auto-Eject Battery Charger Receptacle.....	18
Battery Charger 24v .....	19
Auto-Eject Block Heater Receptacle .....	19
12 Volt (or 24 Volt) Outlet [Qty: 2].....	19
Antenna Base [Qty: 3] .....	19
Gauge Cluster.....	19
Steering Wheel Switches .....	20
LG Alert.....	20
Dome Lights.....	20
Cab Turn Signals.....	20
LED Cab Headlights .....	21
BODY MODEL .....	21

ARFF P811 6x6 Body.....	21
Plumbing Module.....	22
DOORS.....	22
Roll Up Compartment Door [Qty: 6].....	22
Roll Up Compartment Door [Qty: 2].....	23
TRAYS / TOOLBOARDS .....	23
Roll-Out Tray [Qty: 2].....	23
Roll-Out/Tilt Down Tray [Qty: 2] .....	23
WATER TANK .....	24
Water/Foam Tank .....	24
TANK PLUMBING.....	25
Tank Fill-Drain Water 2.5 [Qty: 2].....	25
Tank Fill 5 in. Gated Valve.....	25
Tank to Pump.....	26
FOAM TANK OPTIONS .....	26
Foam Tank Fill/Drain .....	26
MISC BODY OPTIONS.....	26
Floor Matting .....	26
Anodize Aluminum Trim.....	26
Body ARFF Durabak .....	27
REELS AIR AND HYDRAULIC .....	27
Air Reel.....	27
Air Reel Rewind Switch .....	27
Bracket and Reel Rollers .....	27
SCBA BOTTLE STORAGE .....	27
Zico SCBA Storage Rack Large [Qty: 4] .....	27
PUMPS .....	28
Water Pump .....	28
PUMP OPTIONS.....	28
Master Drain Valve.....	28
DISCHARGES AND PRECONNECTS .....	29
Pre-connect 1.5 Automatic Discharge .....	29
Flow Rating.....	29
Light Pre-connect Deployment.....	29

DISCHARGE OPTIONS.....	29
Under Truck Nozzle.....	29
Windshield Deluge.....	30
Bleeder Valve [Qty: 3].....	30
Discharge/Intake Bezel .....	30
ADAPTER THREAD 2.5 SANTA FE.....	30
BOOSTER REEL .....	30
Booster Hose Reel.....	30
GAUGES .....	31
2.5 Pressure Gauge.....	31
Tank Level Gauge Package .....	31
FOAM SYSTEMS .....	32
Foam System.....	32
FOAM SYSTEM OPTIONS .....	33
Foam Transfer Pump.....	33
ECO-Logic Test Port Connection.....	33
TURRET .....	33
Turret Interlock Switch .....	33
Flow Rating.....	33
Bumper Turret.....	33
Flow Rating.....	35
Roof Turret.....	35
DRY CHEMICAL /HALOTRON SYSTEMS .....	36
Dry Chemical System .....	36
Nitrogen Bottle with Gauge.....	36
Nitrogen Winch System.....	37
ELECTRICAL SYSTEMS .....	37
Multiplex Electrical System.....	37
Multiplex Display .....	40
Multiplex Pump Panel Display .....	41
LIGHT BARS .....	41
Light Bar [Qty: 2] .....	41
WARNING LIGHTS .....	41
Warning Lights [Qty: 10].....	41

LED Beacon Light [Qty: 4] .....	41
SIRENS .....	42
Electronic Siren .....	42
SPEAKERS .....	42
Speaker .....	42
ARFF RADIO EQUIPMENT .....	42
Radio Installation [Qty: 2] .....	42
Wireless Gateway Installation .....	42
DOT LIGHTING .....	42
License Plate Light .....	42
Marker Light Package .....	43
Stop/Tail/Turn LED Lights .....	43
Third Brake Light .....	43
LIGHTS - COMPARTMENT, STEP & GROUND .....	43
Ground Lights .....	43
Step Lights .....	44
Compartment Light Package .....	44
Pump Compartment Light [Qty: 2] .....	44
LIGHTS - DECK AND SCENE .....	45
LED Deck Lights .....	45
Scene Lights [Qty: 2] .....	45
Deck Light [Qty: 2] .....	45
LIGHTS - NON-WARNING .....	45
Spot Light [Qty: 4] .....	45
Engine Compartment Lights .....	45
CONTROLS / SWITCHES .....	46
Master Pre-connect Switch .....	46
Door Ajar Alarm .....	46
Foot Switch .....	46
Foot Switch .....	46
CAMERAS / INTERCOM .....	46
Intercom 4 Cab .....	46
TIC, 12 Monitor and Back-up Camera Package .....	47
MISC ELECTRICAL .....	48

Alternating Headlights .....	48
12 Volt DC Power Distribution Module .....	48
<b>GENERATOR .....</b>	<b>48</b>
Generator 10KW Hydraulic .....	48
<b>BREAKER BOXES .....</b>	<b>49</b>
Breaker Box .....	49
<b>LIGHTS - AREA .....</b>	<b>49</b>
Pioneer Flood Light [Qty: 2] .....	49
<b>RECEPTACLES .....</b>	<b>50</b>
Receptacle [Qty: 2] .....	50
<b>ELECTRIC CORD REELS .....</b>	<b>50</b>
Electric Cord Reel .....	50
Cord Connector .....	50
Cord Connector .....	50
Electrical Junction Box .....	51
Cord Reel Rewind Switch .....	51
<b>ADAPTERS .....</b>	<b>51</b>
Adapter 5 Storz x 5 FNST .....	51
<b>HOSE / NOZZLES .....</b>	<b>51</b>
Assault Pistol Grip Nozzle .....	51
Double Jacket Hose [Qty: 4] .....	51
Nozzle .....	51
Booster Hose .....	52
<b>MISC LOOSE EQUIPMENT .....</b>	<b>52</b>
Spare Tire .....	52
Funnel Dry Chemical Fill CFR .....	52
Purple K Dry Chemical [Qty: 10] .....	52
Nitrogen Bottle Shipped Loose .....	52
Headset [Qty: 2] .....	52
Headset [Qty: 2] .....	53
<b>EXTERIOR PAINT .....</b>	<b>53</b>
Durabak Package .....	53
Undercoating .....	53
Paint Custom Cab .....	53



Paint Cab Two-Tone Color .....	54
Paint Body Small .....	54
Paint Body Two Tone Color .....	55
Painted Water Tank.....	55
<b>INTERIOR PAINT .....</b>	<b>56</b>
Zolatone [Qty: 8].....	56
<b>LETTERING.....</b>	<b>56</b>
Scotchlite Letter [Qty: 60] .....	56
Scotchlite Letter [Qty: 3] .....	56
<b>STRIPING.....</b>	<b>57</b>
Cab and Body Stripe .....	57
Chevron Striping Rear of Body / Engine Cover .....	57
Chevron Striping Front Approach Panel.....	57
<b>GRAPHICS.....</b>	<b>57</b>
Logo [Qty: 2] .....	57
Graphics Drawing .....	57
<b>SUPPORT, DELIVERY, INSPECTIONS AND MANUALS .....</b>	<b>58</b>
Approval Drawings .....	58
Electronic Manuals .....	58
Fire Apparatus Safety Guide.....	59

## **TESTING COMPLIANCE STANDARD**

### **Testing Compliance**

This vehicle shall meet the requirements of FAA AC150/5220-10E Standards.

### **Overall Height Restriction**

The apparatus shall have no overall height restrictions.

### **Overall Length Restriction**

The unit has no overall length restrictions.

### **Overall Width**

The apparatus shall have no overall width restrictions.

## **INSPECTIONS**

### **Final Inspection**

A final inspection shall be performed at the factory prior to shipment to dealer/customer.

## **BUMPERS**

### **Bumper**

A heavy-duty three-piece bumper shall be provided to protect the front cab face and lighting options as specified. The design will permit the cab to maintain a minimum of 30-degree approach angle as required by industry standards.

### **License Plate Holder**

There shall be a license plate holder mounted on the officer side of the front approach panel.

## **FRAME ASSEMBLY**

### **Frame construction**

The frame shall consist of two (2) tubular or fully boxed frame rails with heavy-duty cross-members. Each frame rail shall have the following minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

- Dimensions: 12" X 4" X 3/8" (305mm x 101mm x 9.5mm)
- Material: 80,000 psi (551,724 KPA) minimum yield
- Section Modulus: 30.83 cu. in. per rail
- Resistance to Bending Moment (RBM): 2,467,000 in. lbs. per rail

The cross-members shall be a combination of a tubular design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The cross-members shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the cross-member load into the rail and minimize stress concentrations.

All frame fasteners shall be high-strength Grade 8, flanged-head threaded bolts and nuts for frame strength, durability, and ease of repair. The frame fasteners shall be tightened to the proper torque at the time of assembly.

The frame rails shall be finished with black paint. The frame cross-members and frame mounted components (suspensions, axles, air tanks, fuel tank, etc.) shall be painted black.

The apparatus manufacturer shall supply a full lifetime frame warranty including cross-members against defects in materials or workmanship. Warranties that provide a lifetime warranty for only the frame rails, but not the cross-members, are not acceptable.

### **NO EXCEPTIONS.**

### **Shackles**

Shackles shall be provided with one pair at the front and one pair at the rear of the apparatus.

## **AXLE OPTIONS**

### **Front Steer Axle**

The vehicle shall be supplied with a Kessler Model LT81 front rigid drive steering axle.

The gross axle weight rating (GAWR) is 31,000 lbs. or 14,061 kg. and shall be equipped with a set of coil springs at each wheel end. The axle will utilize Knorr-Bremse 17.1" (434mm) disc brakes for maximum braking performance.

The power steering system shall permit the ARFF vehicle to meet all applicable performance standards as specified in NFPA 414.

### **Rear Bogey Axles**

The vehicle shall be supplied with two Kessler rear rigid drive axles.

The gross axle weight rating (GAWR) for each is 29,000 lbs. or 13,154 kg. and shall be equipped with a set of coil springs at each wheel end. The axle will utilize Knorr-Bremse 17.1" (434mm) disc brakes for maximum braking performance.

The ARFF axle shall meet all applicable performance requirements of NFPA 414.

### **Differential Lock**

A driver controlled locking differential switch shall be provided within easy reach of the driver to increase traction in off-road applications of the ARFF vehicle. The switch shall be a three-position guarded toggle clearly labeled and illuminated.

Switch positions shall be as follows:

- Differential Lock
- Transfer Case
- Normal

## **SUSPENSIONS**

### **Front Suspension**

The suspension system shall be designed to allow the vehicle, loaded or unloaded, to travel at highway speeds over improved road surface and at moderate speeds over rough, unimproved terrain. The suspension design shall be straight axle single-coil variable rate springs. Special consideration shall be made to cushion road shocks and provide 14" (356 mm) of wheel travel by installing heavy-duty direct double acting shock absorbers and energy absorbing rubber bump stops at all wheel ends.

The design of the axles and suspension system shall be such that the total un-sprung weight of the vehicle will not be greater than 10% of the gross weight of the vehicle when fully loaded.

Stops shall be installed to prevent damage to axles, drive shafts, the engine oil pan, or any other portions of the chassis, which may be damaged by bottoming.

### **Rear Suspension**

The suspension system shall be designed to allow the vehicle, loaded or unloaded, to travel at highway speeds over improved road surface and at moderate speeds over rough, unimproved terrain. The suspension design shall be straight axle single-coil variable rate springs. Special consideration shall be made to cushion road shocks and provide 14" (356 mm) of wheel travel by installing heavy-duty direct double acting shock absorbers and energy absorbing rubber bump stops at all wheel ends.

The design of the axles and suspension system shall be such that the total unsprung weight of the vehicle will not be greater than 10% of the gross weight of the vehicle when fully loaded.

Stops shall be installed to prevent damage to axles, drive shafts, the engine oil pan, or any other portions of the chassis, which may be damaged by bottoming.

### **Sway Bar**

Anti-sway bar and kit shall be installed on the front and rear axles of the 4x4 ARFF.

## **TIRE OPTIONS**

### **Tires 6x6**

The tires shall be 24R21 radial mud and snow tread mounted on a 21" (533 mm) x 18" (457 mm) steel disc wheels.

## **BRAKE SYSTEMS**

### **Brake System**

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 414 Standard.

A brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 414 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver's instrument panel.

The braking system shall be provided with a minimum of three (3) air tank reservoirs: one (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

Spring-actuated emergency/parking brakes shall be installed on the rear axle.

An ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally sealed for protection against water, weather and vibration.

## **AIR SYSTEM OPTIONS**

### **Auxiliary Air Tank**

There shall be an auxiliary 1738 cubic inch air tank installed.

### **Tank Drains w/Pull Cords ARFF [Qty: 4]**

Manual Drain valves with pull cords routed to side of cab/body shall be provided for each air tank.

### **Auto Moisture Ejectors Heated ARFF [Qty: 4]**

Each of the air reservoirs shall be equipped with a Bendix DV-2 automatic reservoir drain valve which shall automatically eject moisture and contaminants from the reservoirs. The moisture ejectors shall be heated.

### **Air Inlet Auto-Eject**

A Kussmaul Air Auto-Eject #091-28 airline disconnect shall be installed for the air inlet connection. The airline will automatically disconnect when the vehicle is started. A Red weatherproof gasketed cover, which automatically closes when the airline is ejected, shall be supplied.



The Auto-Eject shall be located driver side forward wheel well offset rearward.

## **ENGINES & TRANSMISSIONS**

### **Engine/ Transmission/Torque Converter**

The vehicle shall utilize a Scania DC 16 engine electronic engine as described below:

- EPA Tier IV Final Compliant engine
- 770 horsepower
- Eight (8) cylinders
- 16.4 liter
- Scania EMS (Engine Management System)
- 24v starting system
- SCR (Selective Catalytic Reduction)
- EGR (Exhaust Gas Recirculation)
- Turbocharger (VGT)
- Dual alternators - (1) 150 amp and (1) 100-amp alternators
- 38-liter reductant tank (DEF)
- Scania 720 cc air compressor (34 CFM)

### **Twin Disc Automatic Transmision Model TD61-1179**

- Full time all-wheel drive w/ differential lock
- Six forward speed power shift
- Maximum gross input torque 2420 lb-ft (3280 Nm)
- TDEC-500 Electronic control system
- High-capacity PTO clutch

### **Twin Disc Torque Converter**

- Model 8MLW-1758-1

### **Twin Disc Extended Warranty**

Twin Disc Transmission warranty extended to five years.

## **EXHAUST OPTIONS**

### **Exhaust**

Stainless steel exhaust shall terminate to the rear of the vehicle.

## **COOLING PACKAGE**

### **Cooling System**

The cooling system shall consist of separate heavy duty cooling cores for the charge air cooler, engine radiator, transmission oil cooler, and air conditioning condenser. These units are stacked horizontally and bolted in place to provide a modular cooling package. A separate surge tank shall be mounted to the top. The water pump shall be an integral part of the engine. The system shall utilize a coolant bypass that allows circulation through the block with the thermostat closed, until the normal operating temperature is reached. The system will be filled with a 50/50 glycol/water mix.

## **FUEL SYSTEMS**

### **Fuel System**

One (1) 90-gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with Grade 8 hardware. This design allows for tank removal from below the chassis.

The tank shall have a minimum useable capacity of 90 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

### **Fuel / Water Separator Alarm**

A sensor with indicator light and audible alarm shall be provided for the Racor fuel/water separator. The indicator light shall be mounted in the dash with the unit located inside the pump module. The unit will alert the driver of high-water content in the separator bowl.

## **BATTERIES**

### **Battery System**

The vehicle shall utilize four (4) heavy-duty 12-volt batteries with 1000 cold cranking amp rating each, 12v units shall have the batteries wired in parallel and 24v will require one pair wired in parallel then wired in series to the other pair, all batteries shall be suitably installed in a ventilated and protected area that is accessible for maintenance.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

## **CHASSIS OPTIONS**

### **Mud Flaps**

Two (2) black linear low-density polyethylene (proprietary blend) mud flaps shall be installed on the rear body wheel wells. A reflective logo shall be adhered to the flap itself. The design of the mud flap shall have corrugated ridges to distribute water evenly.

### **Dual Air horns**

Two (2) chrome plated air horns installed under the cab to allow the sound to transmit forward of the vehicle.

### **Drivelines**

Drivelines shall have a heavy-duty metal tube and shall be equipped with Spicer 1810 series universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

### **Engine Coolant Heater**

A 120v 3000w thermosiphon heater will be provided for the Scania engine coolant.

## **CAB**

### **ARFF Cab**

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed cab. The cab shall be designed exclusively for aircraft rescue firefighting service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety.

The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded sub frame. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load bearing, welded aluminum outer skins provide a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect and shall be designed to effectively transmit roof loads downward into the sub frame structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The sub frame structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side 3" x 1.5" .375 thick C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width cross member tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the sub frame structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 6063-T5 aluminum extrusions. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

### **Cab Exterior**

The exterior of the cab shall be large enough to allow sufficient room in the occupant compartment for up to four (4) fire fighters. The cab roof shall be approximately 120" above the ground.

The cab windshield shall be a single piece design for increased visibility. The windshield shall be made from laminated safety glass with a 75% light transmittance automotive tint. Forward visibility to the ground for the average (50th percentile) male sitting in the driver's seat shall meet or exceed NFPA 414 standards.

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements.

## **Cab Interior**

The interior of the cab shall be of the open design with an ergonomically designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 414.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dba) level for the cab interior is within the limits stated in the current edition of NFPA 414. The insulation shall consist of 2 oz. wadding and 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

An overhead console shall be mounted to the cab ceiling for placement of siren and radio heads. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.

The front cab steps shall be no more than 22.0" above the ground in the unloaded condition per NFPA 414 standards. A handle shall be provided on the interior to ensure proper hand holds while entering and exiting the cab.

## **Cab Doors**

There shall be reflective chevron on each cab door in compliance with all NFPA requirements.

Two (2) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16" (0.188") aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

Black steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 414.

## **Cab Instruments and Controls**

Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit.

Cab controls shall be located on the cab instrument panel in the dashboard on the driver's side where they are clearly visible and easily reachable. Emergency warning light switches shall be installed in removable panels or within the Vista screen. The following gauges and/or controls shall be provided:

- Master battery switch/ignition switch (rocker with integral indicator)
- Starter switch/engine stop switch (rocker)
- Heater and defroster controls with illumination (Vista)
- Marker light/headlight control switch with dimmer switch
- Self-canceling turn signal control with indicators
- Windshield wiper switch with intermittent control and washer control
- Master warning light switch (Vista)
- Transmission oil temperature gauge
- Air filter restriction indicator (when specified)
- Pump shift control with green indicator lights
- Parking brake controls with red indicator light on dash
- Automatic transmission shift console
- Electric horn button at center of steering wheel
- Cab ajar warning light on the message center enunciator

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

### **Fast Idle System**

A fast idle system shall be provided and controlled by the cab-mounted switch within the Vista screen. The system shall increase engine idle speed to a preset RPM for increased alternator output.

### **Electrical System**

The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the alternator size shall be provided. Automatic-reset circuit breakers shall be used for

directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3" on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

A Vehicle Data Computer (VDC) shall be supplied within the electrical system to process and distribute engine and transmission Electronic Control Module (ECM) information to chassis system gauges, the message center, and related pump panel gauges. Communication between the VDC and chassis system gauges shall be through a 4-wire multiplexed communication system to ensure accurate engine and transmission data is provided at the cab dash and pump. The VDC shall be protected against corrosion, excessive heat, vibration, and physical damage.

Two (2) dual round LED headlight bezels shall be installed on the front of the cab. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

### **Cab Crashworthiness Requirement**

The apparatus cab shall meet and/or exceed relevant NFPA 414 load and impact tests required for compliance certification with the following:

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS.**



A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

### **Seat Mounting Strength**

The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207.

### **Seat Belt Anchor Strength**

The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210.

### **ISO Compliance**

The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.

## **CAB DOOR OPTIONS**

### **Cab Door Reflective Material**

Reflective Red/Fluorescent Yellow Green 3M Diamond Grade material striping shall be supplied on each of the cab doors. The stripes shall run from the lower outer corner to the upper inside corner of the panel, forming an "A" shape when viewed from the rear. The material shall meet NFPA 1901 requirements for size (96 square inches) and reflectivity.

## **MIRRORS**

### **Convex Mirror**

One (1) 8" (203 mm) convex mirror shall be mounted driver side front of cab below windshield outboard, officer side front of cab below windshield outboard to view the lower front of the truck area.

## **Cab Mirrors**

There shall be a pair of Retractable Aerodynamic mirrors model 613305 with remote top glass and heat shall be provided on the driver and officer cab door.

## **MISC EXTERIOR CAB OPTIONS**

### **Windshield**

The non-heated one-piece windshield measures 110.250" wide x 35.415" tall and is .219" thick laminated composite of clear semi-tempered glass. It shall provide an unobstructed view conforming to the Federal Motor Vehicle Safety Standard number 205 and the appropriate test requirements of the American National Standard Safety Code for Safety Glazing materials operating on Land Highways.

Laminated green tinted glass per ANSI Z26.1-1983-AS2, 75% Transparency

Monograms on Safety glazed parts required by various safety standards must be clear, legible and permanently marked, and shall be applied to each part. Monograms may be read from each side of the glass.

### **Mud Flaps**

Two (2) black linear low-density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheel wells. The design of the mud flap shall have corrugated ridges to distribute water evenly.

### **Cab ARFF Durabak**

Front bumper, front headlight light bezels, cab steps, front brow of cab, driving and fog light bezels (if applicable) shall be painted with black Durabak coating.

## **HVAC**

### **HVAC**

An overhead air-conditioner / heater system with a radiator mounted condenser and roof mounted evaporator shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid-cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air

delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

A serviceable filter shall be installed on the A/C evaporator. The filter shall consist of a steel perimeter frame with a foam filter.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be radiator mounted and have a minimum capacity of 65,000 BTU's and have dual fans with a built-in receiver drier.

Performance Data: (Unit only, no ducting or louvers)

- AC BTU: 60,000
- Heat BTU: 60,000
- CFM: 1300 @ 13.8V (All blowers)

## **SEATS**

### **Cab Seats**

All cab seats shall be Bostrom brand.

### **Seating Capacity Tag**

A tag that is in view of the driver stating seating capacity of four (4) personnel shall be provided.

### **Seat Cover Material**

All seats shall have Durawear seat cover material.

### **Seat Fabric Color**

All seats shall be gray in color.

### **Seat, Driver**

One (1) H. O. Bostrom 400 Series Sierra Air-30RX4 suspension seat with ABTS and high back styling shall be supplied for the driver position.

The ABTS (All-Belts-To-Seat) design shall include a bright red 3-point integrated seat belt with an additional 8-12" of additional useable belt webbing for easy access and comfort—increasing seat belt usage amongst firefighters and rescue personnel.

Features shall include:

- Air-30 suspension assembly with weight, height and ride adjustment
- Built in lumbar support.
- 1.5" vertical suspension motion
- 5" fore and aft adjustment

### **Seat, Officer**

One (1) Bostrom Tanker 450 ABTS seat with high back SCBA storage shall be provided in the officer position.

The ABTS (All-Belts-To-Seat) design shall include a bright red 3-point integrated seat belt with an additional 8-12" of additional useable belt webbing for easy access and comfort—increasing seat belt usage amongst firefighters and rescue personnel.

Seat features shall include:

- Removable "Store-All" side cushions
- Auto-pivot and return headrest to open for improved exit with SCBA
- 12.5" wide SCBA cavity to store leading SCBA brands
- Shoulder strap holder
- Replaceable seat, side and headrest cushions

### **Seat, Forward Facing**

One (1) Bostrom Tanker 450 ABTS seat with high back SCBA storage shall be provided in the forward-facing position over the driver side wheel well.

The ABTS (All-Belts-To-Seat) design shall include a bright red 3-point integrated seat belt with an additional 8-12" of additional useable belt webbing for easy access and comfort—increasing seat belt usage amongst firefighters and rescue personnel.

Seat features shall include:

- Removable "Store-All" side cushions
- Auto-pivot and return headrest to open for improved exit with SCBA
- 12.5" wide SCBA cavity to store leading SCBA brands
- Shoulder strap holder
- Replaceable seat, side and headrest cushions

### **Seat, Forward Facing**

One (1) Bostrom Tanker 450 ABTS seat with high back SCBA storage shall be provided in the forward-facing position over the officer side wheel well.

The ABTS (All-Belts-To-Seat) design shall include a bright red 3-point integrated seat belt with an additional 8-12" of additional useable belt webbing for easy access and comfort—increasing seat belt usage amongst firefighters and rescue personnel.

Seat features shall include:

- Removable "Store-All" side cushions
- Auto-pivot and return headrest to open for improved exit with SCBA
- 12.5" wide SCBA cavity to store leading SCBA brands
- Shoulder strap holder
- Replaceable seat, side and headrest cushions

### **Seat Cavity Cover [Qty: 3]**

A cavity cover shall be provided for a SCBA seat. The cover shall match the seat in brand, color and material.

### **Universal Bracket for Air Pack Bottles [Qty: 4]**

A Ziamatic bottle bracket model KD-ULLH consisting of a back plate, short footplate, two non-mar double-coated clips and a "Load & Lock" adjustable strap assembly shall be provided. The back plate and footplate will be black thermo-plastic coated. The clips will be double coated as to not mar cylinders. The bracket shall fit all U.S. made 30 to 60 minute rated self-contained breathing apparatus.

Brackets shall be located officer's seat, inboard driver's side rear wall, rear jump seat driver's side, rear jump seat officer's side.

## **MISC INTERIOR CAB OPTIONS**

### **Cab Door Windows**

Provide Driver and Officer fore-aft sliding windows in cab forward doors. Glass shall be non-tinted safety glass. Includes lower cab door fixed windows

### **Sun Visors**

Lexan sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

### **Inclinometer**

This unit shall be supplied with a phosphorescent illuminated Inclinometer with 20-0-20 side slope indicator fabricated aluminum case with glass tube marked in (5) five-degree increments. The inclinometer shall have colored zones with green representing from 0 to 8 degrees, yellow from 8 to 12 degrees and red from 12 to 20 degrees of slope.

### **Headset Hanger Hook [Qty: 4]**

Hooks shall be installed to store headsets for communication system on the unit.

### **Step Cover Plates**

Interior steps in cab step well shall have black Durabak painted bolt-on cover plates.

### **Cab Interior Color Scheme**

Cab interior walls, the dash housing, cab step wells and rear crew area floor shall be painted grey Zolatone.

## **CAB ELECTRICAL OPTIONS**

### **Auto-Eject Battery Charger Receptacle**

The battery charger receptacle shall be a Kussmaul 20-amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located behind driver's side cab door and the cover color shall be Yellow.

### **Battery Charger 24v**

An E-ONE LPC 45 battery charger.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120-volt, 50/60 hertz, 3.5-amp AC input with an output of 45 amps 24 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

One (1) Kussmaul model 091-194C-IND-WT-BLK digital battery display with black housing shall be provided adjacent to the shoreline receptacle.

### **Auto-Eject Block Heater Receptacle**

The battery charger receptacle shall be a Kussmaul 30-amp 120-volt NEMA Super Auto-Eject #091-159-30-120. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located below L1 offset rearward and the cover color shall be Yellow.

### **12 Volt (or 24 Volt) Outlet [Qty: 2]**

A plug-in type receptacle for handheld spotlights, cell phones, chargers, etc. shall be installed driver side dash, officer side dash. The receptacle shall be wired battery hot.

### **Antenna Base [Qty: 3]**

There shall be a Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style) with RG58U coax cable. The antenna shall be located driver side rearward with coaxial cable terminating at the center of the dashboard, officer side forward with coaxial cable terminating at the center of the dashboard, officer side rearward with coaxial cable terminating at the center of the dashboard.

### **Gauge Cluster**

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- Speedometer/Odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer



- Dual read air pressure gauge with a warning light and buzzer (front air and rear air)
- Fuel gauge
- DEF gauge (when applicable)
- Voltmeter
- Transmission oil temperature gauge

This panel shall be backlit for increased visibility during day and nighttime operations.

### **Steering Wheel Switches**

The steering wheel shall be supplied with two (2) switch pods. Each switch pod shall include five (5) switches. The pods shall include switching for wipers, master warning, air horns and auxiliary engine brake (on/off) (when applicable). In addition, there shall be three (3) auxiliary switches that can be programmed to meet department specified functions.

The wiper switches shall include high / low speed, intermittent, wipe / wash and off. The wiper motors shall be synchronized so as to wipe each windshield simultaneously.

### **LG Alert**

A dual axis accelerometer shall be installed forward of the driver inside of the cab with a user selectable lateral sensitivity display module. The device can give audible and visual warning when the set-operating limit for the vehicle is being exceeded helping reduce vehicle dynamic instability and potential accident or rollover situations. The output shall be displayed on the vehicle's cab Vista screen and shall take priority when pre-set conditions are met.

### **Dome Lights**

A pair of LED dome light assemblies each with one (1) clear lens and one (1) red lens and black plastic housing shall be installed. The clear light activates with appropriate cab door and light assembly switch, the red light activates with light assembly mounted switch only.

Both light assemblies shall be installed in the cab overhead within easy reach of the driver and officer.

### **Cab Turn Signals**

A pair of LED (Light Emitting Diode) turn signal lights with amber lens shall be installed on the front of the cab. The strip type lights shall be 1" high x 20" long and be recess mounted above the headlights.

## **LED Cab Headlights**

Four LED headlights shall be provided. LED headlights shall be installed on the ARFF cab to meet all applicable DOT and NFPA requirements.

## **BODY MODEL**

### **ARFF P811 6x6 Body**

The body skins shall be fabricated from materials designed to provide the lightest weight consistent with strength, heat and corrosion resistance requirements. Rivets or sheet metal screws shall not be used in construction of the apparatus body. Panels shall be welded or bolted to their support structures to allow full range of motion.

Body framing may utilize rugged aluminum or steel extrusion to provide structural support that can withstand five (5) times the gravitational pull of body member loads to assure confident off-road use and body member longevity.

The tank shall be separate and distinct from the body, easily removable as a unit and enclosed by light weight removable on panels.

Each door shall be constructed with aluminum plate and shall be completely sanded and deburred to assure a smooth finish and painted job color.

The doors shall be securely attached to the apparatus body with a full-length stainless steel piano type hinge and shall have a positive closing mechanism and lanyards to prevent the door from opening past 90 degrees.

The top deck walking surface shall be constructed of 1/8" (3.175mm) aluminum plate utilizing a raised embossed tread pattern. This walking surface shall provide access panels for equipment mounted in the body for easy and convenient serviceability.

### **Steps, Walkways and Running Boards:**

Steps, walkways and running boards located at the cab, on top and at the rear shall be provided as required for ascending, descending or servicing the vehicle equipment will utilize anti-slip surfaces.

### **Compartments:**

The compartments shall be of moisture resistant construction and include louvers to facilitate airflow into the compartments. They shall be accessible from the ground by personnel of average height without the aid of steps or ladders. Large lower equipment compartments shall be provided on each side of the body.

Sufficient compartments at ground level specifically designed to contain the required amount of auxiliary equipment shall be provided. These side compartments shall not be used for fuel tanks, pump plumbing, piping or access to plumbing and shall be free and clear for hose and apparatus operating equipment.

They can be made available with separate options for ventilation and for an OEM textured paint interior finish (Zolatone brand name), which is a durable coating that provides protection for the inside the compartments.

### **Plumbing Module**

Plumbing module shall contain the water pump(s), plumbing option, foam system(s) and controls.

## **DOORS**

### **Roll Up Compartment Door [Qty: 6]**

A ROM brand roll up door with satin finish shall be provided on a compartment up to 45" tall. The door(s) shall be installed in the following location(s): L1, L3, L4, R1, R3, R4.

The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be anodized aluminum with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

The doors shall be counterbalanced for ease in operation. A full width latch bar shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

### **Roll Up Compartment Door [Qty: 2]**

A ROM brand roll up door with satin finish shall be provided on a compartment greater than 45" tall. The door(s) shall be installed in the following location(s): L2, R2.

The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be anodized aluminum with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

The doors shall be counterbalanced for ease in operation. A full width latch bar shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

## **TRAYS / TOOLBOARDS**

### **Roll-Out Tray [Qty: 2]**

There shall be a floor mounted roll-out tray provided in a compartment as specified.

The roll-out tray shall be constructed of 3/16" (.187") smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable.

For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas spring to secure the tray in the open or closed position.

The tray shall have a total capacity of 500 lbs.

### **Roll-Out/Tilt Down Tray [Qty: 2]**

A roll-out/tilt-down tray(s) shall be floor mounted in compartment(s) as specified.

The tray(s) shall be constructed of 3/16" (.187") smooth aluminum plate with welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable.

An Innovative Industries SlideMaster (model SMT) steel tip down frame and channel assembly powder coated silver shall be provided for the tray(s) for the ease of operation and long service life. A positive twist lock shall be provided to secure the tray(s) in the stored position. The tray(s) shall roll-out approximately 90% from the stored position and shall tip 30 degrees downward from horizontal.

The capacity rating of the tray, in the extended position, shall be 250 lb. uniformly distributed load.

## **WATER TANK**

### **Water/Foam Tank**

The 3170-gallon (12.000 L) water tank shall be constructed of maintenance-free polypropylene welded sheet. The sides, bottom, and top of the tank shall be a minimum of .5" (12 mm) thick sheet welded at all joints and seams. The tank shall incorporate longitudinal baffles and lateral baffles forming compartments to limit rapid shifting of the water. The baffles shall be 3/8" thick. The baffles shall be designed and located to add support to the outside walls of the tank, preventing distortion under adverse operating conditions.

A 20" (507 mm) x 20" (507 mm) rectangular fill opening shall be located in the top of the tank. The fill cover shall be retained with a quick opening type latch. It shall have a .25" (6 mm) thick polypropylene screen. The water tank shall incorporate a vent overflow tube extending above the tank. The overflow from the water tank shall extend below the frame.

The water tank shall be provided with a deep sump located in the center of the tank. The sump and plumbing connections for water outlet from the tank to the pump shall be of sufficient size to allow water to flow with minimum restriction. The water tank shall be isolated from the flexing of the chassis frame rails by use of compression springs. Reinforced neoprene shall separate the sub frame from the tank material.

The 445-gallon (1684L) foam tank shall be provided. The tank shall be constructed of maintenance-free polypropylene sheet, welded at all joints and seams. The sides, bottom, and top of the tank shall be a minimum of .5" (12 mm) thick. The tank shall have a fill tower with a .25" (6 mm) thick polypropylene screen to prevent debris from entering the tank. A transfer pipe shall extend from the fill tower to a location near the bottom of the tank to minimize air entrapment in the liquid.

A quick opening cover shall be provided, secured with a latch. A baffle shall be provided to suppress the liquid surge due to motion of the vehicle. A 1.5" (38 mm) drain shall be provided. The tank mounting system shall utilize a four (4) point mounting method for stability.

The water and foam tank top deck surface(s) shall be textured to create an anti-slip walking surface that meets or exceeds the Coefficient of Friction requirement as called for in current edition of NFPA 1901.

A lifetime manufacturer's limited warranty shall be included.

## **TANK PLUMBING**

### **Tank Fill-Drain Water 2.5 [Qty: 2]**

One (1) 2.5" (63.5 mm) water tank fill connection shall be provided mounted driver side pump panel, officer side pump panel. The 2.5" (63.5 mm) gated water tank fill/drain connection shall include an inlet strainer, a 2.5" (63.5 mm) FNST chrome inlet swivel and a chrome plug with cable. The 2.5" (63.5 mm) stainless steel pipe and/or high-pressure flexible hose shall connect the valve to the water tank. A check valve shall be installed between the fill connection port and the water tank to prevent water from flowing out of the tank after filling and disconnecting the hose.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times. The valve shall be an Akron 8800HD series with a chrome-plated brass ball for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **Tank Fill 5 in. Gated Valve**

One (1) 5" (127 mm) water tank fill connection shall be provided on the specified side of the vehicle. The connection shall include an inlet strainer, 5" (127 mm) MNST chrome inlet and a chrome long handle cap. A 4" (102 mm) stainless steel pipe and/or high-pressure flexible hose with Victaulic couplings will connect from the side of the vehicle to the water tank.

The valve shall be an Akron 8840HD series with a bronze flat ball design for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

Location: driver side pump panel.

### **Tank to Pump**

One (1) air actuated 8" butterfly valve shall be installed between the pump and the tank.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

An 8" check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

## **FOAM TANK OPTIONS**

### **Foam Tank Fill/Drain**

A 1.5" (38 mm) FNST gated foam tank fill/drain fitting shall be located on the specified side of the vehicle. The plumbing to the foam tank shall be flexible hose and/or stainless steel pipe with Victaulic type fittings. The connection shall include an inlet strainer. Location: driver side pump panel, officer side pump panel

## **MISC BODY OPTIONS**

### **Floor Matting**

This unit shall have all applicable compartment floors, shelves, and trays covered with a heavy-duty Turtle Tile brand Black floor matting.

### **Anodize Aluminum Trim**

A anodize aluminum trim shall be located at the bottom edge of all body compartment openings including pump enclosure with painted edge (as applicable). The trim shall provide added protection of the painted surface of the body when equipment is removed from the compartment.



### **Body ARFF Durabak**

Body top deck, center of rear body, access ladder, rear taillight bezels, side air intake scoops shall be painted with black Durabak coating.

## **REELS AIR AND HYDRAULIC**

### **Air Reel**

A reel with 200` of 3/8" air hose and quick-disconnect couplings shall be supplied. The reel shall be plumbed into the chassis air brake system. Locate reel in L1 back wall up high offset forward.

### **Air Reel Rewind Switch**

A heavy-duty rubber covered electric air reel rewind button shall be installed on the roller assembly bracket.

### **Bracket and Reel Rollers**

Stainless steel dual reel rollers shall be installed and located thru a bolt-on bracket. The reel rewind switches shall be mounted on the bracket.

The rollers shall be located in L1 compartment.

The rollers shall facilitate smooth removal of the air hose and electric cord reels.

## **SCBA BOTTLE STORAGE**

### **Zico SCBA Storage Rack Large [Qty: 4]**

Horizontal for 6.1" to 7.4" cylinder: The QUIC-STORAGE rack system holds SCBA cylinders, fire extinguishers or other cylindrical items safely and neatly. Each unit measures 7-3/4" square by 23" long and holds one cylinder. Units bolt together and may be positioned horizontally. Horizontal racks have one cradle with rubber bumper stops in the front. When one unit is placed on top of another, the bottom of the unit becomes the top for the unit below it. There shall be a top on top of the top unit. The unit shall be PVC coated and Black in color. The rack will be located in R2.

## **PUMPS**

### **Water Pump**

The pump shall be a mid-ship mounted Hale Fire Pump Model 8FGR high performance centrifugal single stage pump, mounted on a gear drive unit, designed to provide discharge rate of 2000 gpm (7570 LPM) @ 225 psi (1552 KPA), or greater.

The entire pump body shall be fine-grain alloy cast iron. The impeller shall be fully enclosed, high strength bronze, fully machined, hand balanced, and keyed on a tapered shaft. The impeller shall have smooth internal waterways and twisted (mixed flow) vanes for highest efficiency. The impeller shall be axially balanced for reduced bearing loads. The clearance rings are renewable, bronze, one (1) front and one (1) rear of impeller for higher efficiency. The pump shaft shall be heat-treated stainless steel for corrosion resistance and high strength.

The pump seal shall be a balanced mechanical seal with a special design super hard seal seat for maximum resistance to thermal shock, sand, and mud. Self-lubricated and self-adjusting for long life, this design shall reduce shaft deflection and bearing stress.

The gear case shall be equipped with heavy-duty ball bearings, pressure lubricated. The gear housing shall be fine grain cast iron with a replaceable oil seal on the drive shaft. The housing shall be fitted with a ventilated filler connection, oil level, and magnetic drain plug. The gears shall be of the highest quality heat-treated chrome nickel steel, accurately cut spur design to eliminate all possible end thrust. The drive shaft shall be heat-treated chrome nickel steel, precision ground to size, spline drive design to carry heavy torque loads.

### **Discharge Manifold**

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to all discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

### **Thermal Relief Valve**

The pump shall be equipped with a Hale TRVL-170 thermal relief valve.

## **PUMP OPTIONS**

### **Master Drain Valve**

A manual master drain valve shall be installed on the pump panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal. The master drain shall have a rubber seal to prevent water from running out on the running board.

The manual master drain valve shall have twelve (12) individual-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

## **DISCHARGES AND PRECONNECTS**

### **Pre-connect 1.5 Automatic Discharge**

A 1.5" (38 mm) male NST pre-connect discharge valve(s) shall be installed in the specified compartment with pressure gauge(s). It shall be operated by an air or electric actuator connected to a read-me switch.

A flow switch is required, activated by the cab foam switch that activates the proper foam concentrate to the system when foam solution is needed.

The plumbing shall include pressure a reducer which shall allow for the specified flow rate during hand line operation with a turret discharging at 200 psi (14 bars).

Location: L2

### **Flow Rating**

The Flow Rating for the Pre-Connect discharge shall be 95 GPM.

### **Light Pre-connect Deployment**

Shall provide an indicator light visible to Driver and Officer on Cab Dash to illuminate when Pre-connected Discharge Hose is Fully Deployed and pressurized.

## **DISCHARGE OPTIONS**

### **Under Truck Nozzle**

Four (4) nozzles shall be mounted under the vehicle. The nozzles shall be located to protect the underside of the vehicle from ground fire.

Each of the nozzles shall be aspirating, provide a circular pattern of foam, and discharge 20 gallons per minute.

The under truck nozzles shall be actuated by a dash mounted switch in the cab.

## **Windshield Deluge**

The cab shall be equipped with a windshield deluge system to cool the glass and wash away foam. Water for the system shall be provided from the water tank by a 12-volt electric pump with 17 gpm discharge rate. The pump will be plumbed to adjustable spray nozzles mounted above the windshield. A cab dash mounted switch will control the system.

## **Bleeder Valve [Qty: 3]**

A 3/4" quarter turn line bleeder valve shall be installed two (2) driver side pump panel, one (1) officer side pump panel

## **Discharge/Intake Bezel**

Innovative Controls intake and/or discharge swing handle bezels shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These bezels are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

## **ADAPTER THREAD 2.5 SANTA FE**

All 2.5" discharges/intakes to have adaptors to provide Santa Fe thread ends.

## **BOOSTER REEL**

### **Booster Hose Reel**

An electric rewind booster reel shall be installed in the R1. An electric motor shall be provided for reel rewind which shall include an adjustable brake or drag mechanism. A manual rewind crank shall be mounted in specified compartment with the hose reel. The reel shall hold 100' of 1" twinned booster hose. A shielded rewind switch shall be provided at the reel mounting at the front and switch connections shall be coated to protect against moisture.

Dry chemical plumbing shall be a 1-1/2" flexible line with a 1.5" air actuated valve and the discharge control located at the operator's control panel.

All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel pipe to reduce corrosion of the lines.

## **GAUGES**

### **2.5 Pressure Gauge**

The valve discharge gauges shall be 2 ½"(63mm) diameter Innovative Controls pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from -40F to +160F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

A polished chrome-plated stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels. The gauges shall display a range from 0 to 400 psi with black graphics on a white background.

### **Tank Level Gauge Package**

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. System calibration shall be accomplished via supplied magnet. Each display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature.

There shall be two (2) Whelen PSTank 2 series LED (Light Emitting Diode) strip light installed each side as specified.

The system shall be controlled by an Innovative Control tank level driver module that is integral of the NFPA required pump panel mounted tank level light assembly.

The additional tank level system shall be interlocked through the parking brake assembly so as not to be on while the vehicle is in motion.

The remote strip light shall be arranged as follows:

Full Green  
3/4 Blue

1/2 Amber  
1/4 Red

Location of Whelen PSTank2 Strip Lights: outboard upper corners of center tank skins near top each side of vehicle.

## **FOAM SYSTEMS**

### **Foam System**

Fire Research AutoFoam Model FSB180 Around-The-Pump foam proportioning system shall be installed. The system shall include a control module, proportioning valve assembly, eductor, discharge flow sensor with mount for 3" pipe, and cables. The microprocessor-controlled system shall automatically maintain a selected foam percent mixture at the pump discharge regardless of water flow fluctuations. It shall monitor the flow rate of foam concentrate from the foam tank and the total flow through the discharge.

The system shall provide the following features and capabilities:

- Complete automatic foam proportioning
- Push button control
- Operator selected proportioning percent
- Flow totaling for both foam concentrate and water
- Manual override
- USB port
- Proportioning ratio: 0.5 – 10 %
- Foam concentrate induction rate: up to 180 GPM
- Water flow rate through eductor: 205 GPM @ 150 PSI
- Maximum discharge flow rate: 3000 GPM

The control module shall be panel mounted, waterproof, and have dimensions not to exceed 4 7/8" high by 4 7/8" wide by 1 7/8" deep. All controls, digital displays, and indicators shall be located on the front of the control module. The three LED displays shall show the flow rates and the foam percent selected. The operator shall be able to override automatic control by using the manual override buttons to adjust the proportioning valve.

The proportioning valve assembly shall consist of a specially machined ball valve to match the eductor size, an actuator and an electric motor, valve position sensing with electronic controls, two paddlewheel type flow sensors, and mounting flanges. Foam concentrate flow rates through the proportioning valve assembly shall be controlled to provide the correct amount of concentrate at the eductor. Information is passed between the valve and the control module via a two-wire data link.

It shall be installed in a water by-pass loop between the pump intake and pump discharge. The flow in this around-the-pump loop shall create suction to draw the foam concentrate into the eductor, mix it with the water, and inject it into the intake side of the pump.

The discharge flow sensor shall provide an input signal to the control module that is proportional to the discharge flow rate.

## **FOAM SYSTEM OPTIONS**

### **Foam Transfer Pump**

The vehicle shall be equipped with a minimum 25 gpm foam transfer pump mounted in the vehicle body and switch operated from the driver's side pump panel. The pump shall be used to either fill or drain the foam tank from a 55-gallon drum equipped with pick up hose.

### **ECO-Logic Test Port Connection**

The plumbing between the foam tank and the multi-metering proportioning valve shall be configured in a manner to allow for an inlet connection from an ECO-LOGIC Mobile Cart System. The plumbing connection shall be available between the foam shutoff ball valve and the multi-metering valve to allow the foam supply to be shut off during testing with the ECO-LOGIC Mobile Cart System. This connection point shall be capped and ready for installation of a dealer or customer installed ECO-LOGIC Mobile Cart System inlet kit.

## **TURRET**

### **Turret Interlock Switch**

This unit shall be supplied with a turret interlock switch that will prevent both turrets from flowing high flow simultaneously.

### **Flow Rating**

The bumper turret for this unit shall have a flow rating of 600/1200 gpm.

### **Bumper Turret**

The nozzle sweep assembly shall consist of a double swivel unit allowing the nozzle to sweep in both horizontal and vertical planes. Internal turning vanes shall be cast into the assembly for more efficient flow. The elevation axis shall allow the nozzle to be elevated 90° or depressed 45° either side of center for a 135° vertical sweep (plus 180° rotation to park position). The horizontal axis rotation shall allow the nozzle to be directed either side of center for a



180° horizontal sweep. Both horizontal and vertical drive motors shall be electric with a current-limiting motor protection.

The nozzle shall have an automatic flow mechanism that maintains consistent pressure and includes a self-draining baffle mechanism with a water/foam flow range of 300-1200 gpm [1140 to 4500 lpm] (calibrated to primary turret flow requirements specified by NFPA 414 - latest edition). The nozzle must maintain a constant flow throughout the flow range in straight stream through wide fog patterns.

The nozzle shall be equipped with an automatic leveling device that will keep the nozzle parallel to the ground regardless of boom position. A separate on/off switch near the nozzle joystick shall allow the operator to select automatic or manual nozzle control. The "Auto-Level" function shall be automatically activated when the nozzle boom is lowered. Movement of the joystick shall override the "Auto-Level" function.

A multi-function remote nozzle controls shall be provided, joystick type. The controller shall have dual axis plus soft touch switches for discharge functions. Left and right motion shall control horizontal sweep. Forward and back motion shall be control vertical sweep.

Joystick switch functions shall include the following operations:

Thumb Switches:

- Water/Foam discharge "ON" and "OFF"
- "FOG/STRAIGHT STREAM" selection
- Auxiliary agent discharge "ON and OFF"

Finger Switches:

- Boom "UP and DOWN" function
- "HIGH/LOW" flow selection

Highly visible indicators shall be provided for High/low flow position and nozzle Auto-Level "ON". These indicators shall be positioned so that the operator while keeping his eyes on the nozzle discharge can see them.

All switch functions shall be programmable to operate as either momentary or latching circuits so as to be compatible with the vehicle electrical system and controls.

The boom mechanism shall be capable of lowering the nozzle to near ground level or elevating the nozzle to 30° above horizontal. Boom "UP" and "DOWN" positioning shall be momentary switches on the joystick control handle.

The boom and nozzle shall be capable of folding up and into a PARK position to provided minimum protrusion from the front of the vehicle and maximum driver visibility. This shall also maintain the 30° angle of approach.

The boom shall move by means of an electric-hydraulic pump and hydraulic cylinder. The lift system shall be self-contained and connect directly to the chassis electrical system. Holding valves shall be installed to prevent boom drift when the hydraulic system is turned off.

#### **DRY CHEMICAL DISCHARGE**

When dry chemical agent is specified, discharge shall be through the volume nozzle, designed to encapsulate the dry chemical agent. Supply to the nozzle shall be with a full flow 1.5 inch[38mm] hose attached to a ball bearing swivel joint. A minimum flow rate of 16 lbs. [7.26 kg] per second shall be required throughout the full range of motion.

The volume water/foam nozzle shall be replaced with a combination foam/dry chemical nozzle designed to use the foam solution as a means to propel the dry chemical farther distances than the dry chemical nozzle itself. The combination nozzle shall maintain the specified water/foam flow rates for both the straight stream and dispersed stream settings (**Akro-Chem™** or equal).

#### **Flow Rating**

The roof turret for this unit shall have a flow rating of 600/1200 gpm.

#### **Roof Turret**

The 1500 gpm (5700 lpm) rated monitor is to be an all-electric, single waterway monitor constructed of lightweight Pyrolite. The monitor shall have a 3" (75 mm), 150lb flanged inlet and 2-1/2" (65 mm) NH outlet. The monitor shall have cast-in turning vanes in each elbow. The monitor shall have fully enclosed motors and gears with manual overrides for both horizontal and vertical rotation and may be operated simultaneously. The monitor is not to exceed 15" (381 mm) high and 11-5/8" (295 mm) wide. The vertical travel shall be from 45° below to 120° above horizontal with adjustable stops at -15°, +45° and +90. The horizontal rotation shall be 355° with physical stops at ±45°, ±90°, ±135° and at ±157°. The monitor shall have absolute position feedback to provide programmable soft stops anywhere within the physical travel range. The control system shall also provide programmable oscillation and obstacle avoidance functions. The electronic control system shall be attached to the inlet base of the monitor and be totally encapsulated to prevent moisture intrusion and use locking IP 67 rated electrical connectors for all motor control outputs and control inputs. The control system shall have one environmentally sealed USB port to facilitate control system updates. The control system shall receive commands from J1939 CAN network control devices to control elevation, rotation, nozzle pattern, and electric valve open/close. The control system shall have a built-in wireless transceiver to facilitate operation from wireless remote control devices.

## **DRY CHEMICAL /HALOTRON SYSTEMS**

### **Dry Chemical System**

The dry chemical system pressure vessel shall hold 500 lbs. It shall hold 500 lbs. of Purple K or 550 lbs. of dry chemical. The vessel shall include a pressure valve, a purge valve and a relief valve.

The pressure vessel shall be mounted to minimize the agent from entering the vehicle while refilling. The fill cap shall be provided with a safety vent to vent the vessel and to indicate if an attempt is made to remove the cap while the vessel is under pressure.

The propellant utilized for the agent shall be provided by an externally pressurized nitrogen system.

The system shall be activated by a switch mounted in the cab or by the switch located next to the hose reel. These switches shall operate an air solenoid that feeds air to the valve. Air pressure on the valve operator shall move the operating lever to allow nitrogen to flow into the regulator mounted on the valve.

The nitrogen shall flow from the regulator through a check valve into the storage tank. The storage tank shall contain all necessary plumbing for discharging and recharging the dry chemical.

The close coupling of the regulator to the cylinder shall minimize pressure drop and limit the length of system plumbing exposed to high pressure. The pressure regulator shall be preset and non-adjustable at 200-250 psi. The system shall incorporate a pressure relief valve preset at 300-350 psi.

The hose from the pressure regulator to the dry chemical tank shall be 3/8" (.375) diameter, large enough to allow the system to obtain operating pressure within ten (10) seconds after actuating the nitrogen valve.

The dry chemical system shall be installed between the L1 and R1 compartments.

### **Nitrogen Bottle with Gauge**

A nitrogen cylinder (400 cu ft) with sufficient capacity to discharge the agent and purge the system shall be provided. A UL listed nitrogen cylinder valve shall be provided with the nitrogen cylinder. The relief pressure valve shall limit the pressure to a maximum of 3360 psi.

Location: in propellant lift winch.

### **Nitrogen Winch System**

An electric winch shall be installed to allow for raising and lowering the nitrogen bottle from ground level to the stowed position in the side compartment.

This lift system shall meet the intent of FAA and NFPA guidelines, whereas the bottle shall be capable of being serviced by one person from ground level.

## **ELECTRICAL SYSTEMS**

### **Multiplex Electrical System**

#### **Electrical System**

The apparatus shall incorporate a Weldon V-MUX multiplex 12-volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 414 and 1901 standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

The electrical circuits shall be provided with low voltage over-current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over-current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

#### **Multiplex System**

For superior system integrity, the networked multiplex system shall meet the following minimum component requirements:

- The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application
- Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry

- All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors
- Each module that controls a device shall hold its own configuration program
- Each module should be able to function as a standalone module. No “add-on” module will be acceptable to achieve this form of operation
- Load shedding power management (8 levels)
- Switch input capability for chassis functions
- Responsible for lighting device activation
- Self-contained diagnostic indicators
- Wire harness needed to interface electrical devices with multiplex modules
- The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices

### **Wiring**

All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.

- NFPA 414-Standard for Aircraft Rescue and Fire-Fighting Vehicles and NFPA 1901-Standard for Automotive Fire Apparatus
- SAE J1127 and J1127
- IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products)

All wiring shall be copper or copper alloys of a gauge rated to carry 125% of the maximum current for which the circuit is protected. Insulated wire and cable 8 gauge and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6 gauge and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuits function. Minimum height of imprinted characters shall not be less than .082” plus or minus .01”. The imprinted characters shall repeat at a distance not greater than 3”.

A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.

### **Wiring Protection**

The overall covering of the conductors shall be loom or braid.

Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04” and a tensile strength of 22 lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of

24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.

Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.

### **Wiring Connectors**

All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.

### **NFPA Required Testing of Electrical System**

The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA 414 and 1901. The following minimum testing shall be completed by the apparatus manufacturer:

#### **1. Reserve capacity test:**

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

#### **2. Alternator performance test at idle:**

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

#### **3. Alternator performance test at full load:**

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA 1901 Standard, or a system voltage of less than 11.7 volts DC for a 12-volt nominal system, for more than 120 seconds, shall be considered a test failure.

#### **4. Low voltage alarm test:**

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts DC for a 12-volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

#### **NFPA Required Documentation**

The following documentation shall be provided on delivery of the apparatus:

- A. Documentation of the electrical system performance tests required above.
- B. A written load analysis, including:
  - a. The nameplate rating of the alternator
  - b. The alternator rating under the conditions
  - c. Each specified component load
  - d. Individual intermittent loads

#### **Multiplex Display**

The V-MUX multiplex electrical system shall include a Vista IV touch screen color display.

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Touch screen design with "virtual" switch capability
- Master warning switch
- Engine high idle switch
- Five (5) tactile switches to access secondary menus
- Eight (8) multi-function programmable tactile switches
- Specific door ajar indication
- Real time clock
- Provides access to the multiplex system diagnostics
- Video capability for optional back-up camera(s) and GPS display

The display shall be located center of dash.



## **Multiplex Pump Panel Display**

The multiplex electrical system shall include a weatherproof UltraView color display.

The display shall have the following features:

- IP67 rated
- Aspect ratio of 16:9 (Wide Screen)
- 7" full color display
- Fourteen (14) tactile buttons located seven (7) each side of display screen
- Real time clock
- Video monitor capability for use with optional camera(s)

The display shall be located driver side pump panel.

## **LIGHT BARS**

### **Light Bar [Qty: 2]**

One (1) Kaper II light bar, 24" in length, LED.

Lenses color: clear.

LED color: red side facing (left and right), red all corners, red rear facing.

Location: each side of cab offset rearward angled 20 degrees.

## **WARNING LIGHTS**

### **Warning Lights [Qty: 10]**

Two (2) Federal Signal Micro Pulse model MPS1200U-RR red LED light heads shall be provided. The rectangular flashing lights shall be surface mounted where specified.

Location: front of bumper, (1) each side of body at mid-point, on side of cab down low forward of the front cab doors, rear of body, each side of rear body.

### **LED Beacon Light [Qty: 4]**

Federal Spire 100 LED beacon. Location rear cab corners, top of engine cover driver's side, top of engine cover officer's side, color shall be Amber, Amber, Red, Red.

## **SIRENS**

### **Electronic Siren**

One (1) Federal Signal Model PA300-200MSC solid state electronic siren with attached noise-canceling microphone shall be installed. The unit shall be capable of driving high-power speakers up to 200 watts to achieve a sound output level that meets Class "A" requirements.

Operating modes shall include Hi-Lo, yelp, wail, P.A., air horn, and radio re-broadcast. It shall include a Tap II feature.

The siren shall be installed within the cab as space permits.

## **SPEAKERS**

### **Speaker**

One (1) Federal model ES100 100-watt speaker shall be installed.

The speaker shall produce a minimum sound output of 120 db(A) at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located officer side behind bumper.

## **ARFF RADIO EQUIPMENT**

### **Radio Installation [Qty: 2]**

Tri-Co installation of customer supplied radio, console or remote mounted. Customer will be responsible for providing appropriate interface cables to connect radio(s) to intercom system, if applicable.

### **Wireless Gateway Installation**

Tri-Co installation of wireless gateway system.

## **DOT LIGHTING**

### **License Plate Light**

One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15730 black license plate housing shall be mounted at the rear of the body.

## **Marker Light Package**

LED clearance/marker lights shall be installed as specified.

### **Cab:**

- Upper Cab - Five (5) amber LED clearance lights on the cab above the windshield
- Lower Cab: One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

### **Body:**

- Lower Intermediate: Two (2) amber LED – one (1) turn and one (1) marker located on each side of the body.
- Lower Body: One (1) red LED marker on each side of lower rear body.
- Rear Body: Three (3) red LED clearance on rear of body above the integrated climbing ladder assembly.
- Rear Body: Two (2) red LED clearance on rear of body outboard, up high.

## **Stop/Tail/Turn LED Lights**

LED stop/tail, turn and backup lights and weatherproof connectors.

### **Third Brake Light**

A Kaper II model L03-0063 LED red light shall be supplied to function as a third brake light. The light shall be mounted on the rear body below the center DOT lights.

## **LIGHTS - COMPARTMENT, STEP & GROUND**

### **Ground Lights**

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be EON LED (Light Emitting Diode) with clear lenses. The wiring connections shall be made with a weather resistant plug-in style connector.

- One (1) light shall be supplied to illuminate the ground below each cab door. Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.
- One (1) ground light shall be supplied under each side of the pump panel area (if equipped).
- One (1) ground light shall be installed below each side body staircase (if equipped).

- Three (3) ground lights shall be supplied under the rear of the apparatus.

Ground area lights shall be switched from the cab dash with the work light switch.

### **Step Lights**

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the steps around the apparatus in accordance with current NFPA requirements. The lights shall be EON LED (Light Emitting Diode) with clear lenses. The wiring connections shall be made with a weather resistant plug-in style connector.

The step lights shall be controlled by the work light switch in cab that is accessible by the driver.

### **Compartment Light Package**

Two (2) Hansen compartment light strips shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights, located two (2) each side.

Each light bar shall include white LEDs mounted with a tough polycarbonate tube enclosure to protect the LED circuit board. The lights shall produce 120 lumens per foot and be waterproof up to IP66 rating.

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel.

The wiring connection for the compartment lights shall be made with a weather-resistant plug-in style connector. A single water- and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

### **Pump Compartment Light [Qty: 2]**

One (1) Hansen LED compartment light strip shall be mounted in the specified compartments with a length of 18, 25,30, or 37 inches depending on compartment configuration.

Each light bar shall include white LEDs mounted with a tough polycarbonate tube enclosure to protect the LED circuit board. The lights shall produce 120 lumens per foot and be waterproof up to IP66 rating.

The light shall be wired to the compartment light rocker switch in the cab.

Location: officer side pump module compartment, driver's side upper pump module compartment.

## **LIGHTS - DECK AND SCENE**

### **LED Deck Lights**

Two (2) Rigid-Dually D2 LED floodlights model 50151 shall be installed as location specified. Each light shall provide 2,600 lumens of light and 50,000 hours of lamp life.

Location: driver and officer side front cab brow.

### **Scene Lights [Qty: 2]**

Two (2) TecNiq model K60-SW00-1 surface mounted K60 series high output LED surface mounted scene lights shall be provided.

Each shall have 8 LED diodes with internal light deflecting optics. The internal light deflecting optics shall redirect the light from 0° to 90° and +/- 45° along vehicle.

Requires two (2) model K60-1C00-1 chrome trim and gasket kits.

Each 12-volt light measures 7.9"x 5"x 1.3" and draws 1.1 amps.

Lights shall be located (1) each side of cab centered above roll-up door, each side rear center body/rear body up high and switched in cab (side facing lights switched separately).

### **Deck Light [Qty: 2]**

A pair of LED TecNiq model P04-WBFP-1 shall be installed at the on rear body facing forward to illuminate top deck, engine cover / rear body facing rearward to provide lighting per current NFPA standards. The light shall be switched with the work light switch in the cab.

## **LIGHTS - NON-WARNING**

### **Spot Light [Qty: 4]**

One (1) Rigid-Dually D2 LED spotlight model 50131 shall mounted on the roof turret for night operation. Each light shall provide 2,600 lumens of light and 50,000 hours of lamp life. The light shall be switched from the cab. The light will follow turret nozzle (where possible) in both elevation and azimuth. Location: on bumper turret, on roof turret.

### **Engine Compartment Lights**

Six (6) LED engine compartment lights shall be provided. The lights shall be located three (3) each side of the engine access compartment door. The lights shall be TecNiq EON with polished

stainless steel housings. The work light switch in the cab shall activate the lights when the park brake is set.

## **CONTROLS / SWITCHES**

### **Master Pre-connect Switch**

Provide Master Pre-connect Activation Switch on cab dash with easy access to Driver. Rocker style switch(s). To include required labeling and programming.

**Note:** For Operator safety requires Pump-in-gear and Pre-connect Master power switch on before Pre-connect "Deadman switch(s)" can be actuated for auto pressurization.

### **Door Ajar Alarm**

An audible alarm shall be mounted in the cab interior and wired into the door ajar or indicator.

### **Foot Switch**

A heavy-duty metal floor mounted foot switch shall be installed to operate the air horns. It shall be located driver's side, officer's side.

### **Foot Switch**

A heavy-duty metal floor mounted foot switch shall be installed to operate the electronic siren. It shall be located driver's side, officer's side.

## **CAMERAS / INTERCOM**

### **Intercom 4 Cab**

A FireCom intercom package shall be installed within the cab interior. One (1) model 5200D dual radio digital intercom with touch pad adjustable volume with advanced digital noise reduction circuitry. The intercom uses a durable membrane switch plate to control volume and change radios.

This intercom provides hearing loss protection that can occur from exposure to high noise levels.

The system contains:

- One (1) FireCom model 5200D dual radio monitor shall be provided in the cab (two (2) year limited warranty).

- Four (4) FireCom model HM-10 plug in modules shall be provided at each seated position.
- Four (4) NFPA compliant headset hooks, FireCom part number 108-0678-00 shall be provided at each seated position.

**Headsets shall be ordered separately and are not included as part of the Intercom package.**

### **TIC, 12 Monitor and Back-up Camera Package**

An Orlaco thermal imaging camera, a 12" Monitor, a back-up camera, and a two (2) camera switch box package.

The Orlaco Thermal Imaging Camera shall have a minimum **640 x 480** resolution and packaged in a weather resistant housing with shock and vibration resistance. The camera system shall have a minimum field of view of **24 degrees by 18 degrees**. It has an operating temperature range of -40 to 176 degrees F (-40 to 80 degrees C). It is operated by a joystick controller (Model 0506500) with a membrane switch interface panel that is located within easy reach of driver and officer. The interface panel functions (Model 0502620) include: power, dim, home, zoom, scene, B/W. The joystick includes a 1-meter cable (Model 1220900) to interface with the control box. The camera shall be securely mounted to the front exterior of the cab to provide clear vision and optimal operation of the pan, tilt and zoom functions. The camera shall include pan and tilt capability (Model 0507091), a 4-meter cable (Model 1210250), a control box (Model 0503500) and a cable with metallic waterproof threaded O-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

A 12" high resolution flat screen monitor (Model 0207910) with a minimum **640 x 480** resolution shall be installed in the cab within clear view of the driver. The monitor's mounted position within the cab shall be on the center console area, visible at night and in bright sunlight to the driver.

An FAMOS Back-Up Camera (Model 0171230) with 21-meter UNI cable (Model 0301940) shall be mounted up high at the rear of the vehicle to provide a wide-angle rear view. The backup camera shall be activated when the when shift lever has been put in reverse (unless otherwise specified).

A two (2) camera video switch box (Model 0404060) shall accompany this package. This video control box allows the monitor to display the video of choice from either of the two cameras.

The system shall also include (1) (Model 8662) - MASCOT DC/DC converter - switch mode with electrical separation – unregulated, to power the 24-volt components of the system.

This FLIR system meets or exceeds the requirements as outlined in NFPA 414.



## **MISC ELECTRICAL**

### **Alternating Headlights**

The chassis high beam headlights shall alternately flash and shall be controlled by a switch inside the cab.

### **12 Volt DC Power Distribution Module**

A Blue Sea model 5032 12 place, split bus fuse block with ground, 12-volt DC power distribution module shall be provided. The module shall provide two isolated groups of six circuits and shall be wired through switched hot and battery hot, and include a battery ground.

Location: L2 high on forward wall.

## **GENERATOR**

### **Generator 10KW Hydraulic**

A Harrison 10,000-watt, model MCR hydraulic generator shall be provided.

The generator shall be installed body mounted generator position.

The Harrison 10KW hydraulic generator package shall include:

- Generator
- Hydraulic reservoir
- Hydraulic motor
- Heat exchanger
- Bypass solenoid to remotely turn the generator on/off with a 12vDC signal
- Gauge panel, voltage display, hour meter, frequency, amperage, and oil temp
- Self-sealing air intake with a dedicated intake duct for the alternator)
- Axial piston hydraulic pump

The generator and necessary hydraulic components shall be mounted in a rugged steel case.

Accessibility is gained through the top of the steel case/enclosure, where the oil filter element is located. The hydraulic motor is a bent axis piston motor. The generator package is modular to allow various mounting locations. The generator and all its components shall be permanently mounted in place.

The overall Harrison package is approximately 38" L x 14.2" W x 18.1" H.

The axial piston hydraulic pump shall be a chassis driven power take off (PTO).

A generator control switch shall be mounted on the cab instrument panel to start the generator.

#### **Ratings and Capacity**

- Ratings: 10,000 watts continuous
- Voltage: 120/240 VAC, single phase, 4 wire
- Frequency: 60 Hz
- Current: 84/42 Amps at 120/240 volts
- Weight: Approximately 266 pounds

#### **Testing:**

The generator shall be tested in accordance with current NFPA 1901 standards.

#### **Notes:**

- All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
- Extreme ambient temperatures could affect generator performance.

## **BREAKER BOXES**

### **Breaker Box**

A sixteen (16) place breaker box with up to sixteen (16) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output. The breaker box will be located in the specified compartment, not to exceed 12' run of wire.

Location: R2 up high rearward side wall.

## **LIGHTS - AREA**

### **Pioneer Flood Light [Qty: 2]**

Whelen Pioneer Plus, model KR-PFP1-I LED light fixture(s) shall be supplied. The rectangular extruded light fixture with die cast end caps shall measure 8-3/16" wide by 4-5/8" high by 3" deep and have a black powder coat finish. The light fixture shall have a single panel (2) clusters of LED lamps with molded vacuum metalized reflector that draws .625 amps at 120 VAC and produces 5,500 usable lumens. The lights shall be mounted with an locking swivel joint to allow

the lights to be manually tilted up/down and locked in position by the operator. Handle standard.

The light shall be mounted on a Whelen 3100 series through the body top adjustment pull-up pole. The wiring shall be routed from the light head. A length of 16/3 wire is supplied and secured with a strain relief.

A hand tightened locking knob shall be provided to allow for easy adjustment of the pole height.

Location: each side rear center body/rear body up high.

## **RECEPTACLES**

### **Receptacle [Qty: 2]**

A 15 amp, 110V duplex receptacle with one (1) 3-prong NEMA 5-15 and one (1) twist lock NEMA L5-15 and a weatherproof cover plate shall be installed as specified by the department.

Location: below R1 offset rearward, below L1 offset rearward.

## **ELECTRIC CORD REELS**

### **Electric Cord Reel**

Hannay electric cord reel(s) (ECR 1616-17-18) shall be installed and located L1.

The reel(s) shall include 200' of black 10-gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector.

### **Cord Connector**

A Daniel Woodhead 20-amp, 110-volt (NEMA L5-20) twist lock female cord connector model #27W47 shall be installed as specified.

Location: L1.

### **Cord Connector**

A mating connector for the junction box shall be installed as specified. Requires a separately added connector on the cord reel and a separately added junction box.

### **Electrical Junction Box**

A Circle-D model PF51G four outlet electrical junction box shall be provided and shall have an integral pilot light to indicate electrical current.

The unit shall be equipped with two (2) 120-volt 20-amp NEMA L5-20R twist-lock receptacles and two (2) 120-volt 15-amp NEMA 5-15R straight blade receptacles, each with a hinged weatherproof cover.

Located on cord for reel in or on L1.

### **Cord Reel Rewind Switch**

A heavy-duty rubber covered electric reel rewind button shall be installed on the roller assembly bracket.

Location: L1

## **ADAPTERS**

### **Adapter 5 Storz x 5 FNST**

This unit shall be supplied with one (1) 5" FNST x 5" Storz adapter with cap.

## **HOSE / NOZZLES**

### **Assault Pistol Grip Nozzle**

A 1-1/2" pistol grip Akron Assault combination fog and straight stream booster nozzle constructed of lightweight pyrolite with dual handle stops shall be supplied.

### **Double Jacket Hose [Qty: 4]**

A 50' length of 1.75" hose with 1.5" NST couplings shall be supplied.

NFPA Standard: The hose must meet all the requirements of NFPA 1961, Standard on Fire Hose (latest edition).

### **Nozzle**

This unit shall be supplied with a Williams Fire & Hazard Control dual agent hand line Hydro-Chem nozzle, 60 GPM @100 PSI K Factor of 6, 5PPS Dry Chemical, Pistol Grip. 1" NST Inlets, meets applicable NFPA 414, NFPA 412, FAA AC#150-5220-10A Standards.

### **Booster Hose**

A sheathed twin 100' section of 1" dual agent booster hose complete with couplings shall be provided. The hose shall be capable of discharging both foam solution and dry chemical agent simultaneously.

## **MISC LOOSE EQUIPMENT**

### **Spare Tire**

The tires shall be 24R21 radial mud and snow tread mounted on a 21" (533 mm) x 18" (457 mm) steel disc wheels.

### **Funnel Dry Chemical Fill CFR**

This unit shall be supplied with one (1) funnel for filling dry chemical vessel.

### **Purple K Dry Chemical [Qty: 10]**

A 50 lb. pail of Purple K dry chemical shall be supplied.

### **Nitrogen Bottle Shipped Loose**

A 400-cu. ft. nitrogen cylinder with sufficient capacity to discharge the agent and purge the system shall be provided.

A UL listed nitrogen cylinder valve shall be provided with the nitrogen cylinder. The relief pressure valve shall limit pressure to a maximum of 3360 psi.

### **Headset [Qty: 2]**

A Setcom radio transmit headset shall complement the intercom system selected. One (1) model CSB-900 "under the helmet" headset.

**The intercom shall be ordered separately and is not included as part of the headset(s).**

Controls include:

- Push to talk over radio.
- Always live intercom when button is not engaged.
- Adjustable boom.
- Volume control
- 15' coiled cord.

## **Headset [Qty: 2]**

A Setcom intercom only headset shall complement the intercom system selected.  
One (1) model CSB-901 "under the helmet" headset.

**The intercom shall be ordered separately and is not included as part of the headset(s).**

Controls include:

- Push to talk intercom.
- Adjustable boom.
- Volume control
- 15' coiled cord.

## **EXTERIOR PAINT**

### **Durabak Package.**

One or more components installed on this unit shall have Durabak coating. When used on walking surfaces, slip resistance shall meet or exceed NFPA 1901 test requirements.

Color shall be Black unless otherwise specified.

### **Undercoating**

Undercoating shall consist of a heavy coating of CRC SP400 soft seal film sprayed on the undercarriage of the entire vehicle to repel water and road elements.

### **Paint Custom Cab**

The apparatus cab shall be painted Sikkens standard color as specified. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

### **Paint Cab Two-Tone Color**

The upper section of the cab shall be painted Sikkens standard (non-metallic) color as specified.

The paint process of the secondary cab color shall be the same as the primary color.

### **Paint Body Small**

The apparatus body shall be painted Sikkens standard (non-metallic) color as specified. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on body, door jambs and door edges.



Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

### **Paint Body Two Tone Color**

The two-tone body shall be Akzo-Nobel lead-free, chromate-free high solid LV acrylic urethane paint color applied to the body. The paint break line shall be as specified by the customer.

### **Painted Water Tank**

The vertical exterior surfaces of the tank that shall be visible when the water tank is mounted shall be painted Sikkens standard color as specified. The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The water tank exterior shall have no mounted components mounted during the painting process to assure full coverage of exterior surfaces of the tank.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where a mounting surface on the tank is penetrated, after painting, for the purpose of mounting steps, handrails, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

## **INTERIOR PAINT**

### **Zolatone [Qty: 8]**

Interior compartment walls and ceiling shall have a Zolatone finish.

Zolatone is a durable coating that resists wear from abrasion, scratching, and chipping in normal everyday use.

## **LETTERING**

### **Scotchlite Letter [Qty: 60]**

Scotchlite letters up to 12" tall shall be applied.

The exact size, color and location of the letters shall be as specified by the customer.

### **Scotchlite Letter [Qty: 3]**

Scotchlite letters taller than 12" shall be applied.

The exact size, color and location of the letters shall be as specified by the customer.

## **STRIPING**

### **Cab and Body Stripe**

A single straight Scotchlite stripe, up to 10 inches in width shall be installed on the cab and body.

The stripe shall be NFPA compliant and the size, color and location shall be as specified by the customer.

### **Chevron Striping Rear of Body / Engine Cover**

Chevron "A" style 6" diamond grade striping shall be provided on the rear of the body/engine cover of the apparatus. The stripes shall consist of 6" equivalent or equal to 3M part number 983-17 (red) and 6" equivalent or equal to 3M part number 983-23 (yellow/green) alternating stripes in an "A" pattern.

Colors to be Red/Fluorescent Yellow Green.

### **Chevron Striping Front Approach Panel**

Chevron "A" style 6" diamond grade striping shall be provided on the front approach panel of the apparatus. The stripes shall consist of 6" equivalent or equal to 3M part number 983-17 (red) and 6" equivalent or equal to 3M part number 983-23 (yellow/green) alternating stripes in an "A" pattern.

Colors to be Red/Fluorescent Yellow Green.

## **GRAPHICS**

### **Logo [Qty: 2]**

Customer logo supplied to E-ONE's Graphics department in a digital format to assist with design. Logo to be installed reference graphics layout drawing.

### **Graphics Drawing**

A graphics drawing shall be provided for the apparatus. The drawing shall include striping, lettering and logos meeting NFPA guidelines. The drawing shall be presented for review and approval by the end user prior to application of the graphics.

## **SUPPORT, DELIVERY, INSPECTIONS AND MANUALS**

### **Approval Drawings**

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

Vehicles requiring pump controls shall include a general arrangement view of the pump operator's position, scaled the same as the elevation views.

### **Electronic Manuals**

Two (2) copies of all operator, service, and parts manuals **MUST** be supplied at the time of delivery in digital format -NO EXCEPTIONS! The electronic manuals shall include the following information:

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

The electronic document shall incorporate a navigation page with electronic links to the operator's manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The electronic document must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer's location.

**NOTE:** Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

### **Fire Apparatus Safety Guide**

Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the E-ONE's fire apparatus operator and maintenance manuals or commercial chassis manufacturer's operator and maintenance manuals.