



**Purchase Order  
No. 2011-00020628**

**DATE 09/22/2011**

**Ph. (970) 244-1513**

**Fax (970) 256-4022**

**Ship To**  
City of Grand Junction  
333 West Ave  
Building C  
GRAND JUNCTION, CO 81501

**Bill To**  
City of Grand Junction  
333 West Ave  
Building C  
GRAND JUNCTION, CO 81501

**Vendor**

**VENDOR NO. 4939**  
Smeal Fire Apparatus Company  
PO Box 8  
610 West 4th Street  
Snyder, NE 68664  
Phone: (402) 568-2224 Fax: (402) 568-2346

**PAGE 1 of 1**  
**SHIP VIA** Vendor Delivery  
**DELIVER BY** 09/15/2012  
**FREIGHT TERMS** FOB Destination  
**Buyer Name:** Susan Jill Hyatt  
**Buyer Email:** susanh@gjcity.org

Award RFP-3312-11-SH. City Council approval received 9/21/11.

QUANTITY	UNIT	DESCRIPTION	UNIT COST	TOTAL COST
1.0000	Each	VEHICLES/EQUIPMENT - 2012 Smeal Freedom Custom Pumper/Spartan MetroStar (\$368,791.00) Unit shall be supplied with Waterous Eclipse CAFS (\$38,500). 402-250.8100_04 - Capital Equip_Vehicles/Machinery 407,291.00 B0001	407,291.0000	\$407,291.00
<b>PURCHASE ORDER TOTAL</b>				<b>\$407,291.00</b>

**Special Instructions:** PURCHASE ORDER No. MUST APPEAR ON ALL INVOICES, SHIPPERS, PACKAGES, CORRESPONDENCE  
**Tax Exempt No. 98-03544**  
This Purchase Order along with all other solicitation documents comprise the entire contract.

By: Susan J. Hyatt

**SECTION 11: RESPONSE FORM**

The City of Grand Junction will receive sealed Proposals, on this form, in the office of the City Clerk, 250 North 5<sup>th</sup> Street, Grand Junction, Colorado 81501. This price is to furnish materials, supplies, equipment and/or services, as shown below and/or attached hereto: **FOB DESTINATION delivered at Grand Junction, Colorado. TRANSPORTATION CHARGES PREPAID.** All in accordance with the Proposal conditions, special provisions, and specifications attached or as indicated below.

Purchasing representative: Susan Hyatt (970)-244-1513 [susanh@gicity.org](mailto:susanh@gicity.org)

**One (1) each, Fire Engine Pumper Truck, as per the attached minimum specifications**

Net price for *one each* Fire Engine Pumper Truck NEW \$ 368,791.00

Written: Three Hundred Sixty Eight Thousand Seven Hundred Ninety One Dollars.

Year/Model No. 2012 Smeal Freedom custom pumper/Spartan MetroStar

Manufacturer Name: Smeal Fire Apparatus Co.

If quoting a demonstrator indicate the mileage (Quoting as option - approximately 5,000 miles)  
\*Demo #3917 option: Four Hundred Forty Seven Thousand Five Hundred Thirty Seven Dollars

Optional net price for CNG engine w/60 DGE tank: \$ No Bid

Written: \_\_\_\_\_ Dollars.

Manufacture/Year/Model No. \_\_\_\_\_

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Optional net price for Compressed Air Foam System (CAFS): \$ \$38,500.00

(See Attachment A for specifications)

Written: Thirty Eight Thousand Five Hundred Dollars.

Manufacture/Year/Model No. Waterous Eclipse

Other foam options provided in comment section of Item #261.

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Additional Information required from Specification Form:

Item 7 on Specification Form:

**Overall Height:** Specify overall height of vehicle measuring with tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus. **Measurements are:** 119" ( 9 ' 11 ")

Item 8 on Specification Form:

**Overall Length:** The overall length of the vehicle shall be approx. 362" ( 30 ' 2 ").

Item 9 on Specification Form:

**Vehicle Top Speed:** The vehicle's top speed shall be 65 mph.

Item 150 on Specification Form:

**10 (Ten) Inch Extended Cab and In Cab Roll Up Storage Cabinets:** The cab shall be extended by 10 inches and there shall be two (2) roll up compartments in the crew area of the cab located to the outside of the forward facing seats. One (1) will be located on each side of the forward facing seats. The cabinets will be as large as space allows but the dimensions will be approximately 22"x50"x15".

**Price for the option:** \$ 10,000.00

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**Optional Trade:** Unit 1124, Fire Engine Pumper Truck, 1993 KME Renegade, Serial Number 1K9AF4282PN058824, L-10 Cummins Engine, Allison Automatic, 6,652 engine hours, 500 gallon combo tank, 1250 GPM Pump.

\$ \_\_\_\_\_ No Bid \_\_\_\_\_ Trade Offered

Written \_\_\_\_\_ Dollars

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**Delivery** in 240 -370 days.

**Addenda:** Offeror hereby acknowledges receipt of Addenda Numbers: 1, 2, , , ,.

Submittal Check list	Yes	No
One Original and One Electronic Copy of response are included	X	
Verification & Certification Form and Specification Form are included (Sections 9 and 10)	X	
ISO 9001 Certificate of Compliance included		X
Manufacturer's Warranty of the chassis is included	X	
Manufacturer's Warranty of the electrical, lights, <del>ambulance box</del> Engine, cab, brakes and transmission and all other warranties that apply to the vehicle is included	X	
Written guarantee enclosed for 1 year replacement of defective components at no cost to the City <u>Specs require 90 days</u>		X
Manufacturer's brochure(s) included	X	
Addenda acknowledged above (if applicable)	X	
Manufacturer's Statement of Origin included (Section 3.16)	X	
Bidder's maintenance policies and associated costs. (Section 4.4)	X	
References have been provided. (Section 4.6)	X	
Exceptions to Specifications included, if needed (Section 10)	X	

DATE June 10, 2011

- Prompt payment discount of One (1) percent of the net dollar amount will be offered to the City if the invoice is paid within ten (10) days after the receipt of the invoice.
- The undersigned certifies and agrees that this Proposal is submitted in accordance with all applicable Federal, State, County, and City laws.
- The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.

Smeal Fire Apparatus Co.  
 (Company Name of Vendor - Typed or Printed)

(888) 637-3374  
 (Phone Number of Vendor)

410 West 4th Street  
 (Address of Supplier)

Mile-Hi Fire Apparatus, Inc.  
 (Authorized Dealer Agent - Typed or Printed)

Snyder, NE 68664  
 (City, State, and Zip Code)

  
 (Authorized Agent Signature)

(303) 289-9969  
 (Fax Number of Supplier)

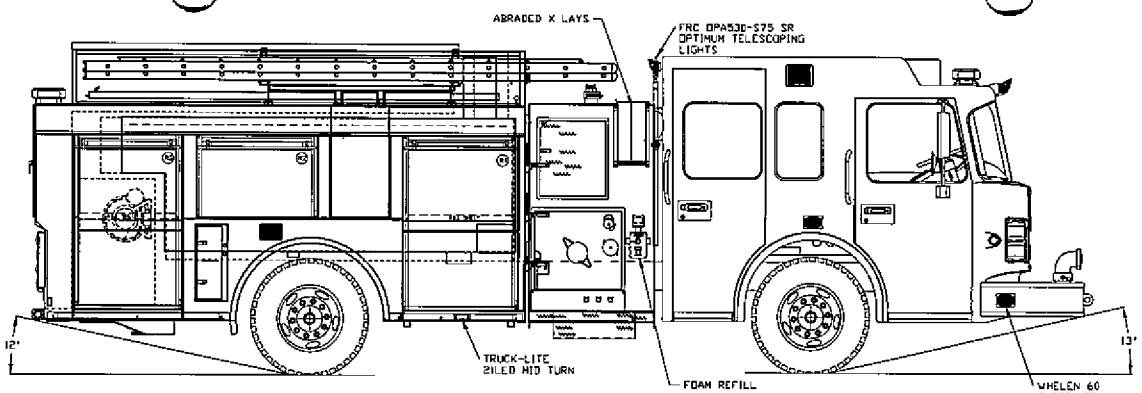
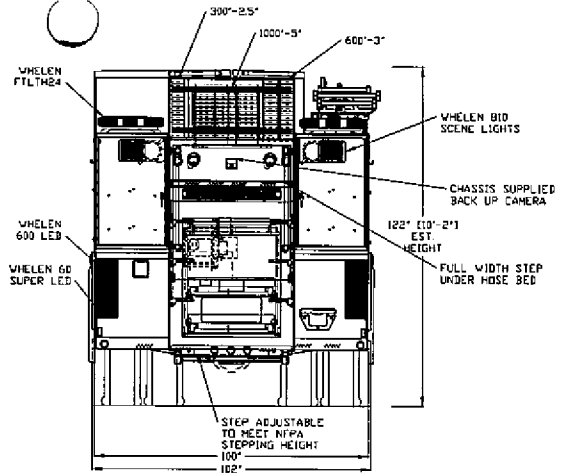
Sharon.Sells@MileHiFire.com  
 (E-mail Address)



We are proposing Demo #3917 as an option.

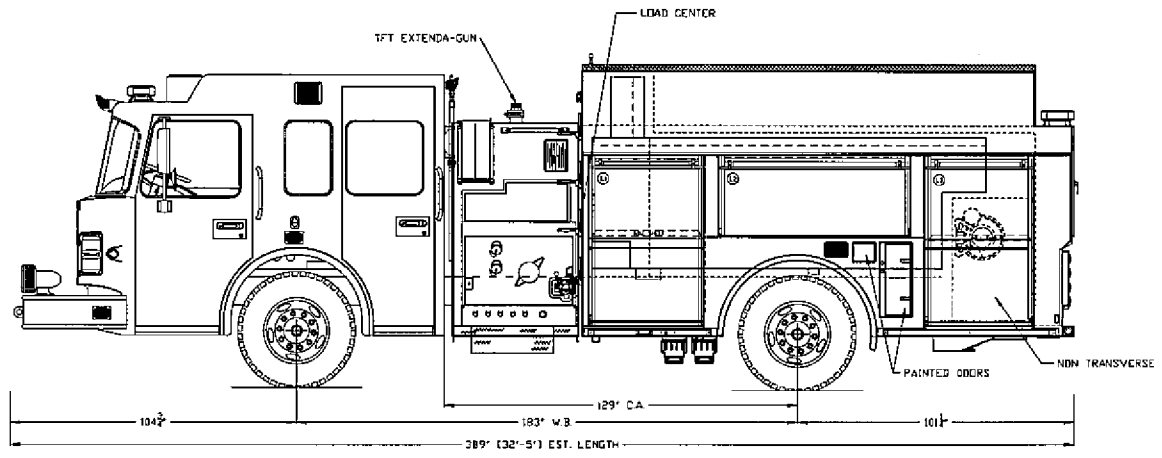
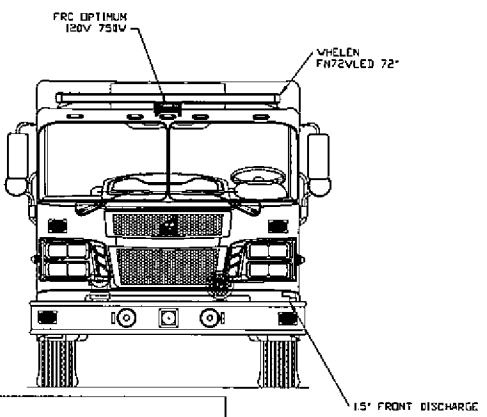
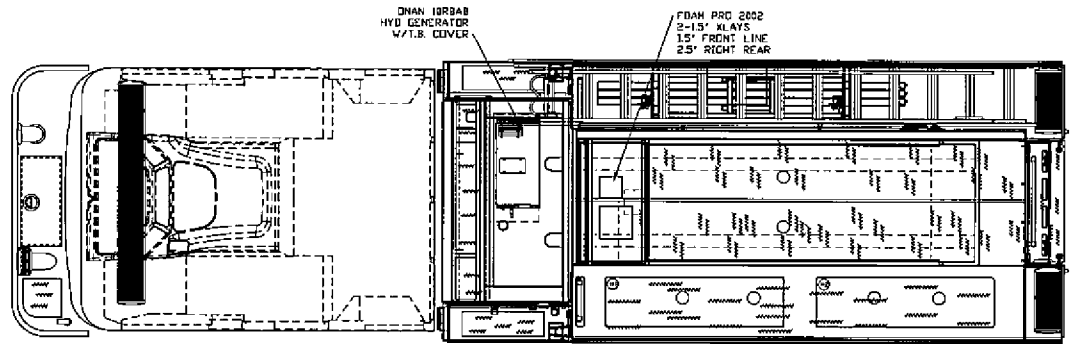
For complete specifications, please refer to the electronic copy.

OPTION



GROUND LADDERS & PIKE POLES		
ITEM/LADDER LENGTH	MODEL	QTY
A 28' 2 SEC	1200A	1
B 14' ROOF	775A	1
C 10' ATTIC	585A	1
D NUPLA	SPD B	1
E NUPLA	SPD 12	1
F		
G		
H		
I		

COMPT.	OPENING	DEPTH	DEPTH	DEPTH
L1	39W X 55.5H	25.75	25.75	
L2	67W X 24H	25.75	N/A	
L3	37W X 55.5H	25.75	TRANS	
R1	39W X 55.5H	15.25	25.75	
R2	41W X 24H	15.25	N/A	
R3	37W X 55.5H	15.25	TRANS	
T1	33W X 35H	28	28	
H1 H2	18W X 60L	20		
INTERMEDIATE DIVIDE HEIGHT				
		R1/R2	26.5	



**NOTE:**  
UNSPECIFIED DECKGUNS WILL NOT BE INCLUDED IN THE OVERALL HEIGHT OF THE VEHICLE. THE ADDITION OF A DECKGUN MAY INCREASE THE OVERALL HEIGHT OF THE VEHICLE.

**NOTE:**  
DIMENSIONS SHOWN ARE APPROXIMATE AND ARE SUBJECT TO CHANGE AS MAY BE FOUND NECESSARY DURING CONSTRUCTION. MINOR DETAILS MAY NOT BE SHOWN.  
  
THE DRAWING IS FOR REFERENCE PURPOSES ONLY. SOME ITEMS MAY OR MAY NOT APPEAR ON THE DRAWING THAT MAY OR MAY NOT BE INCLUDED IN THE SPECIFICATIONS. SPECIFICATIONS SHALL BE THE FINAL AUTHORITY TO BE DETERMINED WHAT IS SUPPLIED ON THE APPARATUS.

PUMP: WATEROUS 1500 GPM  
TANK: POLY 1000 GAL 1/4" OVERFLOW  
FOAM: 20 GAL CELL  
BODY: ALUMINUM  
HOSE BED: 76 CUBIC FEET  
COMPARTMENTS: 252 CUBIC FEET  
CHASSIS: SMEAL MFD SIRIUS

**FINAL APPROVAL**

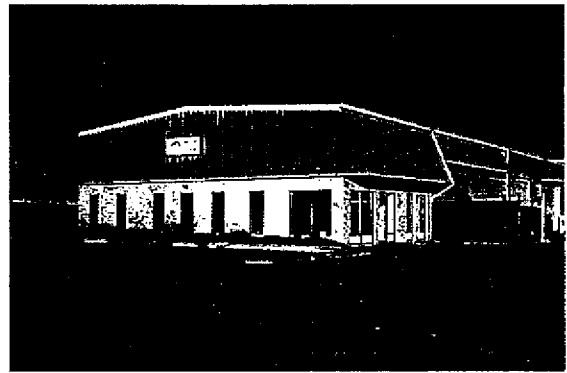
Date	Approval Signatures	Revisions
	DEALER	
	FIRE CHIEF	
	SALES AD	
	PRODUCTION	
	ENGINEERING	



Revisions	Revisions	Material
000 09-02-10	SMEAL FIRE APPARATUS SNYDER, NE 68664	
KSF 09-20-10	KEPLINGER DEMO WINCHESTER, VA.	
Drawn by: JAW	Scale: 3/8"=1'	Material:
Checked: SD	Date: 6/7/10	Drawing No: 3917
18 x 24	SD	



7270 Dahlia Street - Commerce City, CO 80022  
(303) 289-9909 – (888) 637-3374  
www.MileHiFire.com



Our facility is located on 2.5 acres. The building is over 17,000 sq. ft. and includes a fenced yard. The facility consists of six bays total. We are capable and equipped to perform some field repairs or service if required. Our hours of operation are 6:00 a.m. to 9:00 p.m. Monday through Friday. We also provide our customers with 24-hour emergency service.

- Mile-Hi Fire Apparatus, Inc. is licensed as a Colorado Motor Vehicle Dealer

Mile-Hi Fire Apparatus, Inc. is an authorized service center for the following manufacturers:

- Smeal Fire Apparatus Company
- Spartan Chassis, Inc.
- Waterous Company
- W.S. Darley & Company

We have the capability and training to perform repairs on the following:

- Smeal fire apparatus including aerial devices
- Spartan Motors cab and chassis
- Waterous pumps, valves, etc.
- Akron valves, nozzles, monitors, etc.
- Annual pump testing
- Tank repair and replacement
- Preventative Maintenance Programs
- In frame engine over haul
- Air conditioning service

We are Heavy Duty Truck ASE and/or EVT certified in the following categories:

- Design & Performance Standards and Preventative Maintenance
- Pumps
- Electrical
- Air Systems
- Brakes
- ABS Brakes
- Cooling Systems
- Steering/Suspension
- Drivelines

Mile-Hi Fire Apparatus, Inc. belongs to the following organizations:

- Colorado Fire Mechanics Association
- Colorado State Fire Chiefs Association
- Colorado Firefighters Association
- Metro Denver Fire Chiefs Association
- Pikes Peak Firefighters Association



610 WEST 4TH ST. - P.O. BOX 8  
SNYDER, NEBRASKA 68664

**smeal.com**  
(402) 568-2224

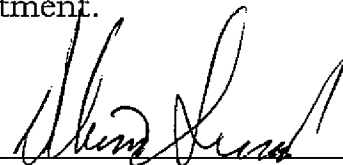
**WE BUILD RESPECT.**

Smeal Fire Apparatus Co. is located in Snyder, Nebraska where we have been manufacturing Smeal Fire Apparatus for over 50 years. Smeal Fire Apparatus and Aerial Ladders are manufactured using the most innovative construction methods and materials available, creating the standards for the highest quality and most efficient fire apparatus on the market today.

We have an unlimited time availability on parts and service, however, our enclosed apparatus warranty more accurately details our Smeal Warranty Plan.

Jeannie Fullerton with Mile-Hi Fire Apparatus, Inc. located at 7270 Dahlia Street, Commerce City, CO is our Smeal Fire Apparatus Dealer Representative in your area. They have an authorized factory service center staffed with trained service technicians available for on location service if necessary.

We at Smeal Fire Apparatus Co. welcome the opportunity to submit our proposal for Smeal Fire Apparatus and look forward to working with you in obtaining these new vehicles for your department.

  
\_\_\_\_\_  
Delwin Smeal, President

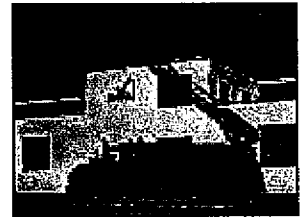


## CORPORATE HISTORY

2005 marks 50 years of success for the company Donald Smeal founded in 1955. At that time, a business opportunity arose for Don to purchase a small welding shop in his home town of Snyder. His plan was modest – design a product that he could market beyond the local level but not in competition with large businesses. After all, his was a one-man shop in a village in Nebraska.

Don was known around the area for his creative mind and mechanical skills. He didn't have to search too hard for a product because people came to him with their needs. His first successful product was agriculturally oriented. He designed and built a better feed hauling system, and then entered the ground water industry designing a water well service rig, which has culminated in sales throughout the U.S. and in 35 foreign countries.

In 1963, the local fire board asked Don to repair a water tank leak in town's fire truck. Rather than fix a leak in something old, Don suggested that the board purchase a new chassis and he would build the town a new fire truck. It was not Don's style to copy anybody's anything, so he started to think outside the box and he put it all into one package for his fellow firefighters. He built a truck that had a water tank, a pump, a fully enclosed crew cab behind the chassis cab, and a 42' two-section, hydraulic aerial ladder. All these features on one truck was revolutionary in 1963. It didn't take long before other departments were requesting a Smeal fire truck, and thus began Smeal Fire Apparatus Co.



Throughout the years, Smeal Fire Apparatus Co., designed many features that are standard equipment on today's aerial ladders. Some of the Smeal first's include the, Creeper controls, LoadMinder, Ergonomic Hose Load (EHL), Electric Pinnable Waterway, Blue Rung Lighting, Hot-Dip Galvannized Outriggers, Auto-Leveling Platform basket, Chrome-Plated Steel Waterway, Crossmount Pumpers, and many more features.

Fire apparatus are built today for large communities, such as: St. Louis, MO; Charlotte, NC; Riverside County, CA; and Toronto, Canada all the way through small towns, such as: Prauge, NE, Mariaville, ME, Troublesome Creek, KY and many more. Smeal Fire Apparatus Co. is a "Custom" builder of Pumpers, Aerials and Platforms, designed to meet the needs of today's firefighters from the simplest Volunteer pumpers to the most complex 100' Midmount Platform.

Today, Smeal Fire Apparatus Co. offers:

- Over 16 models of Pumpers ranging from Volunteers, Urbans, Freedom, Stainless Steel, Top Mount, Side Mount, Crossmount, Wildland, Pumpers, Tankers, Pumper-Tankers, Rescue-Pumpers and Custom models.
- 14 models of Aerial Ladders, ranging from the HD55', HD75', HD105', HD 125', SHD 100', 100' UT, 100' MM, available in Quint or Ladder company configuration.
- 4 models of Aerial Platforms, ranging from 85' and 100' in both Rearmount and Midmount Configurations.

Smeal Fire Apparatus Co. will build your apparatus on a number of chassis including, Spartan, HME, International, Freightliner, Mack, Peterbilt, Kenworth and two custom chassis model of their own, the Altair or the Sirius.

Employees come from a strong farm community with very strong work ethics. Smeal Fire Apparatus Co. strives to manufacture each and every truck with the same commitment and pride they had when building the very first one.

With the help of his family and loyal employees, Don's business continued to grow, just as his building did and just as his family did. The Smeal factory has 260,000 square feet under roof. There are more than 5000 Smeal fire trucks and over 1000 aerial ladders throughout North America. Don, and his wife Ardath, raised nine children, five of whom work in the business along with children-in-law, grandchildren and grandchildren-in-law, as well as many long term employees.



Always Evolving.....



**PUMPERS**

Boulder Fire Department  
Boulder, Colorado

Battalion Chief Dan Thomas  
(303) 441-3360

Cripple Creek Fire Department  
Cripple Creek, Colorado

Fire Chief Nick Lauria  
(719) 689-0240

Elk Creek Fire Protection District (3)  
Conifer, Colorado

Chief Tom Kennelly  
(303) 816-9385

Georgetown Fire Department  
Georgetown, Colorado

Fire Chief Kelly Babeon  
(303) 567-4342

Greater Brighton Fire Protection District (4)  
Brighton, Colorado

Division Chief John Schissler  
(303) 659-4101

Gunnison Fire Department  
Gunnison, Colorado

Fire Marshal Dennis Spritzer  
(970) 641-8000

Julesburg Volunteer Fire Department (2)  
Julesburg, Colorado

Toby Heath  
(970) 520-9936

Laramie County Fire Protection District #8  
Laramie, Wyoming

Captain Mike Phelps  
(307) 778-3049

Larkspur Fire Protection District (2)  
Larkspur, Colorado

Fire Chief Jim Baumgardner  
(303) 681-3284

Louviers Fire Department (2)  
Louviers, Colorado

Fire Chief Tim Stover  
(303) 791-1033

Loveland Rural Fire Protection District  
Loveland, Colorado

Battalion Chief Merlin Green  
(970) 962-2471

Lyons Fire Protection District (2)  
Lyons, Colorado

Fire Chief Tiffany Steakley  
(303) 823-6611

Montrose Fire Protection District  
Montrose, Colorado

Fire Chief Bob Pistor  
(970) 249-9181

Mountain View Fire Protection District (4)  
Longmont, Colorado

Fire Chief John Devlin  
(303) 772-0710

Northeast Teller County Fire Protection District  
Woodland Park, Colorado

Fire Chief Jim Heenan  
(719) 687-1866

North Metro Fire Rescue (9)  
Northglenn, Colorado

Battalion Chief Kevin Sweeney  
(303) 452-9910

**PUMPERS**

North Washington Fire District  
Denver, Colorado

Deputy Chief Jim Younger  
(303) 289-4683

Pagosa Fire Protection District (8)  
Pagosa Springs, Colorado

Fire Chief Ron Thompson  
(970) 731-4191

Prowers County Fire Protection District  
Lamar, Colorado

Fire Chief Marvin Rosencrans  
(719) 336-4841

Ryan Park Volunteer Fire Department  
Saratoga, Wyoming

Fire Chief Homer Beach  
(307) 326-8744

Sedgwick Rural Fire Protection District  
Sedgwick, Colorado

President Jack McClary  
(970) 463-5516

South Adams County Fire District (2)  
Commerce City, Colorado

Fire Marshal Ron LaPenna  
(303) 288-0835

Southeast Weld County Fire Protection District  
Keenesburg, Colorado

Fire Chief Mark Gray  
(303) 332-6165

Sterling Fire Department (2)  
Sterling, Colorado

Fire Chief Darrell Curtis  
(970) 522-3823

Thornton Fire Department (3)  
Thornton, Colorado

Deputy Chief Larry Coapland  
(720) 872-6112

Tri-Lakes Fire Protection District (3)  
Monument, CO

Fire Chief Rob Denboske  
(719) 481-2312

Trinidad Fire Department  
Trinidad, Colorado

Fire Chief Jim Bulson  
(719) 846-0596

Wheatland Fire Department  
Wheatland, Wyoming

Chief Scott Scheller  
(307) 322-3445

Windsor-Severance Fire Protection District  
Windsor, Colorado

Chairman Jeff Fagler  
(970) 667-4296

Wray Fire Department (3)  
Wray, Colorado

Fire Chief Jim Smith  
(970) 332-5923

Yuma County Fire Protection District (3)  
Wray, Colorado

James Bracelin  
(970) 332-4865

**AERIALS**

Canon City Area Fire Protection District  
Canon City, Colorado

Fire Chief Dan Brixey  
(719) 275-8666

Clear Creek Fire Authority (2)  
Clear Creek, Colorado

Fire Chief Kelly Babeon  
(303) 567-4342

Cimarron Hills Fire Department  
Colorado Springs, Colorado

Lieutenant Kevin Richmond  
(719) 591-0953

Denver Fire Department (4)  
Denver, Colorado

Master Mechanic Dan Freix  
(720) 865-3850

Federal Heights Fire Department  
Federal Heights, Colorado

Fire Chief Andrew Marsh  
(303) 428-3526 x 260

Greater Brighton Fire Protection District  
Brighton, Colorado

Division Chief John Schissler  
(303) 659-4101

Gypsum Fire Protection District  
Gypsum, Colorado

Fire Chief Dave Vroman  
(970) 524-7101

Loveland Fire Rescue  
Loveland, Colorado

Battalion Chief Merlin Green  
(970) 962-2471

North Metro Fire Rescue (3)  
Northglenn, Colorado

Battalion Chief Kevin Sweeney  
(303) 452-9910

Park County Fire Protection District #2  
Cody, Wyoming

Administrator Russ Wenke  
(307) 527-8551

Pleasant View Fire Department  
Golden, Colorado

Fire Chief Chris Malmgren  
(303) 279-5227

Sable Altura Fire Department  
Aurora, Colorado

Fire Chief Mark Campagnola  
(303) 364-7187

Thornton Fire Department  
Thornton, Colorado

Deputy Chief Larry Coapland  
(720) 872-6112

## SECTION 9: VERIFICATION & CERTIFICATION INFORMATION FORM

*Failure to submit this form filled out in its entirety could be grounds to find you non-responsive.*

	Verification and Certification Information	Comply	Does Not Comply	Comments
1	<p><b>ISO Compliance:</b> The manufacturer shall operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the "International Organization for Standardization (ISO)" specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance shall be included with the bid.</p>	X	X	Smeal utilizes the Made-To-Manage system
2	<p><b>NFPA 1901-2009:</b> The National Fire Protection Association "Standard for Automotive Fire Apparatus, 2009 edition, is hereby adopted and made a part of these specifications, the same as if it were written out in full detail, with the exception of the section dealing with "Equipment Recommended for Various Types of Apparatus". Offerors shall provide the equipment requested herein. It is the intent of the City to purchase an apparatus that meets 100% of the minimum standards defined and outlined in NFPA 1901, newest edition. There are to be no exceptions to this requirement</p>	X		
3	<p><b>NFPA 2009 Standards:</b> This unit shall comply with the NFPA standards effective January 1, 2009, except for fire department specifications that differ from NFPA specifications. These exceptions shall be set forth in the Statement of Exceptions.</p> <p>Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.</p> <p>A plate that is highly visible to the driver while seated shall be provided. This plate shall show the overall height, length, and gross vehicle weight rating.</p> <p>The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.</p> <p>An official of the company shall designate, in writing, who is qualified to witness and certify test results.</p>	X		
4	<p><b>NFPA Compliancy:</b> Apparatus proposed by the</p>	X		

	bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications shall be indicated in the proposal as "non-NFPA"	X		
5	<b>Total Vehicle Assessment Certification:</b> The apparatus shall be third party, independent, audit certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 standards. The certification includes all design, production, operational and performance testing of the apparatus. (no exception)	X		
6	<b>Generator Test:</b> If the unit has a generator, the generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to the Fire Department at the time of delivery.	X		
7	<b>Breathing Air Test:</b> If the unit has breathing air, Underwriters Laboratories shall draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, <i>Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection</i> .			N/A
8	<b>Inspection Trip(s):</b> The bidder shall provide on-line access to assess the production of the aerial truck and mutually agreed upon on-site inspection trips.	X		Access is available through the local dealer
9	<b>Approval Drawing:</b> A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.  A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.	X		
10	<b>Drawing, Preliminary Layout, Pump Operator's Panel:</b> A detailed drawing, to scale, of the pump operator's panel shall be provided for the purpose of illustrating the standard location(s) of controls and discharges on the pump operator's panel. The drawing shall not be meant as an approval, or final construction drawing, rather it shall be used as an illustration drawing of a standard panel layout. This drawing shall include all of the gauges and controls located on the pump	X		Provided at the pre-paint inspection

	operator's panel.			
11	<p><b>Warranty:</b> Each piece of new fire or rescue apparatus shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, as a part of their bid package, a copy of the warranty or warranties that they propose to provide, and in no case shall it be less than one (1) year on the entire apparatus.</p> <p>All other warranties, as outlined in these specifications shall be provided in writing as a part of the bid package.</p> <p>Failure to provide the warranties as outlined throughout these specifications shall be cause for rejection of the bid package.</p>	X		
12	<p><b>Crossmembers Warranty:</b> A Lifetime parts and labor warranty shall be provided on all chassis frame crossmembers</p>	X		
13	<p><b>Warranty 3-Year Custom Chassis:</b> Each new custom chassis shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, on company letterhead as part of their bid package, a copy of the detailed warranty or warranties that they propose to provide and in no case shall the custom chassis warranty be less than <b>three (3) years</b>. (Indicate the number of years the chassis warranty shall be in effect <u>three</u> ). It shall include as the minimum the A/C, defroster and heater systems, spring suspension components, independent suspension components, steering gears on the independent suspension, gauge instrumentation, seats, instrument consoles, and a \$10,000 collateral damage warranty on the transmission cooler. The electrical system, cab structural, engine, transmission, frame and crossmembers are to be covered under separate warranties throughout these specifications.</p>	X		
14	<p><b>Additional Trucks:</b> The City of Grand Junction includes a provision in its Purchasing Policy to extend a solicitation for an additional year if mutual agreement exists between the City and the vendor. The City anticipates purchasing another apparatus in 2012, however there is no guarantee with this statement. If the City does purchase an additional apparatus next year, will you (vendor) hold the price quoted on this solicitation? The City will not award this portion until January 2012.</p>			<p><b>Hold price for 2012?</b></p> <p><b>YES or NO</b></p> <p>No - provided very aggressive pricing that cannot carry over. Add three percent (3%) for 2012 pricing.</p>

## SECTION 10: SPECIFICATION FORM

*Failure to submit this form filled out in its entirety could be grounds to find you non-responsive.*

**SPECIFICATIONS:** One (1) Current Year or Demonstration Model Fire Engine Pumper Truck. Offeror must meet or exceed the following specifications or the proposal shall be considered non-responsive.

**EXCEPTIONS TO SPECIFICATIONS:** Proposer shall mark corresponding box below and list on a separate sheet of paper variations from, or exceptions to the conditions and specifications of this solicitation. This sheet shall be labeled "Exception(s) to Bid Conditions and Specifications" and shall be the last page attached to the bid.

	SPECIFICATION	Meets	Does Not Meet	Comments
1	<b>Body Structural Integrity Ten (10) Year Warranty:</b> The body shall be free of structural or design failure or workmanship for a period of ten (10) years or 100,000 miles starting thirty (30) days after the original invoice date.	X		
2	<b>Paint Limited Warranty:</b> The apparatus body and pump house shall be free of blistering, peeling and any other adhesion defect cause by defective manufacturing methods or paint material selection for exterior surfaces for a period of three (3) years starting thirty (30) days after the original invoice date. Paint on the undercarriage, body interior (line-x coating included) or aerial structure related paint, if applicable, is covered only under the Standard One Year Limited Warranty.	X		
3	<b>Corrosion Limited Warranty:</b> The body exterior paint shall be warranted against corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.	X		
4	<b>Stainless Steel Ten (10) Year Limited Plumbing Warranty:</b> The stainless steel plumbing shall be free from corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.	X		
5	<b>Basic Ninety (90) Day Limited Warranty on OEM Purchased Parts:</b> The apparatus shall be free of defects in material and workmanship for a period of ninety (90) days starting thirty (30) days after the original invoice date.	X		
6	<b>Standard One (1) Year Warranty:</b> The apparatus shall be free of defects in material and workmanship for a period of one (1) year starting thirty (30) days after the original invoice date.	X		
7	<b>Overall Height:</b> Specify overall height of vehicle	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	measuring with tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus. <b>Measurement shall be noted on Response Form</b>	X		119" (9' 11")
8	<b>Vehicle Top Speed:</b> The vehicle's top speed shall be <u>65</u> mph. <b>Speed shall be noted on Response Form.</b>	X		
9	<b>Overall Length:</b> The overall length of the vehicle shall be noted on <b>Response Form</b>	X		362" (30' 2")
10	<b>Miscellaneous Equipment, Pumps:</b> Miscellaneous equipment, as defined in the newest edition of NFPA 1901, Sections 5.8.2 and 5.8.3, shall be the responsibility of the City. The apparatus shall be designed and manufactured in such a manner as to provide ample enclosed space for which to store such equipment.	X		
11	<p><b>Cab Style:</b> The cab shall be custom, fully enclosed. <b>(An optional 10" extended cab will be quoted separately in #150 below).</b> The cab shall have a 10" raised roof over crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to six (6) seating positions.</p> <p>The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.</p> <p>The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.</p> <p>All interior and exterior seams shall be sealed for</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.</p> <p>The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 &amp; 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.</p> <p>The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.</p> <p>The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The cab shall also include a crew area with two (2) cab doors, also large enough for personnel in full firefighting gear.</p> <p>The cab shall incorporate a two (2) step configuration from the ground to the cab floor at each door opening (Or equivalent). The steps will allow personnel in full firefighting gear to enter and exit the cab easily and safely.</p>	X		
12	<b>Cab Undercoat:</b> There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.	X		
13	<b>Cab Side Drip Rail:</b> There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.	X		
14	<p><b>Cab Paint Exterior:</b> The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.</p> <p>All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.</p> <p>The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.</p> <p>The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.</p> <p>The cab shall be painted with PPG Industries paint.</p>	X		
15	<b>Cab Paint Warranty:</b> The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.	X		
16	<b>Cab Paint Interior:</b> The visible cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish, or equivalent.	X		
17	<b>Cab Engine Tunnel:</b> The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an in thick aluminum.	X		
18	<p><b>Cab Entry Doors:</b> The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The exterior skins shall be constructed of 0.13 inch aluminum plate.</p> <p>The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	weather tight fit.			
19	<b>Cab Entry Door Type:</b> All cab entry doors shall be full length in design to fully enclose the lower cab steps.	X		
20	<b>Cab Structural Warranty:</b> The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles, whichever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.	X		
21	<p><b>Cab Test Information:</b> The cab shall have successfully achieved survival of the International crash test ECE-R29, Addendum 28, Revision 1 standards as indicated below. It shall also meet SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks and SAE J2422 Cab Roof Strength Quasi-Static Roof Load test requirements.</p> <p>As part of testing, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward imparting 32,600 lbs/ft of force to the cab front face.</p> <p>The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse.</p> <p>The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.</p>	X		
22	<b>Electrical System:</b> The chassis shall include a single starting electrical system which shall include a 12 volt direct current Weldon brand of multiplexing system, suppressed per SAE J551 or equivalent. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and seal Deutsch connectors shall be waterproof.	X		
23	<b>Apparatus Wiring Provision:</b> An apparatus wiring panel shall be installed which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp three (3) 10 amp, and one (1) 15 amp circuit with relays and breakers with trigger wires which shall be routed to the rocker switch panel.	X		
24	<p><b>Data Recording System:</b> The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed or equivalent. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:</p> <ul style="list-style-type: none"> <li>• Vehicle speed</li> <li>• Acceleration</li> <li>• Deceleration</li> <li>• Engine speed</li> <li>• Engine throttle position</li> <li>• ABS Event</li> <li>• Seat Occupied Status</li> <li>• Seat Belt Status</li> <li>• Master Optical Warning Device Switch Position</li> <li>• Time</li> <li>• Date</li> </ul> <p>Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.</p>	X		
25	<b>Power &amp; Ground Stud:</b> The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud that shall be 0.38 inch diameter.	X		
26	<b>Power &amp; Ground Studs - Master Power:</b> Power and grounding studs shall be provided and installed behind the electrical center cover with a breaker. The studs shall be #10 and capable of	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	carrying up to a 40 amp load through the master power switch.			
27	<b>Additional Power &amp; Ground Stud:</b> An additional set of power and grounding studs shall be provided and installed behind the rocker switch panel. The power and ground stud shall be circuit protected with a 40 amp breaker. The studs shall be .375 inch diameter and capable of carrying up to a 40 amp ignition switched load.	X		
28	<b>Exterior Electrical Terminal Coating:</b> All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.	X		
29	<p><b>Engine:</b> The chassis engine shall be a Cummins ISM engine. <b>(NOTE: A CNG ENGINE WITH A 60 DGE TANK SHALL BE QUOTED AS AN OPTION ON THE RESPONSE FORM).</b> The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a minimum rating of 400 horse power.</p> <p>The ISM engine shall feature a VGT™ Turbo-charger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.</p> <p>The engine shall include an engine mounted combination full flow-by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.</p> <p>A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.</p>	X		No Bid on optional CNG engine
30	<b>Engine Programming High Idle Speed:</b> The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.	X		
31	<b>Engine High Idle Control:</b> The vehicle shall be	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the Vista screen for the high idle speed control.	X		
32	<b>Engine Programming Road Speed Governor:</b> The engine programming which governs the top speed of the vehicle shall not be disabled.	X		
33	<b>Auxiliary Engine Brake:</b> A compression brake, for the six (6) cylinder engine shall also be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.  The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.	X		
34	<b>Auxiliary Engine Brake Control:</b> An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all the following conditions are simultaneously detected: <ul style="list-style-type: none"> <li>• A valid gear ratio is detected.</li> <li>• The driver has requested or enabled engine compression brake operation.</li> <li>• The throttle is at a minimum engine speed position.</li> <li>• The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.</li> </ul> The compression brake shall be controlled via on off/low/medium/high button. The multiplex system shall remember and default to the last	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	engine brake control setting when the vehicle is shut off and re-started.			
35	<b>Fluid Fills:</b> The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible without the need for raising the cab.	X		
36	<b>Electronic Engine Oil Level Indicator:</b> The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.	X		
37	<b>Engine Warranty:</b> The engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.	X		
38	<b>Engine Programming Idle Speed:</b> The engine low idle speed will be programmed at 700 rpm.	X		
39	<b>Engine Fan Drive:</b> The engine cooling system fan shall be direct drive belt driven on the engine.	X		
40	<p><b>Engine Cooling System:</b> There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.</p> <p>The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.</p> <p>The radiator shall be a down-flow design constructed with aluminum cores plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>The cooling system shall include a one piece injected molded polymer eleven (11) blade fan with a fiberglass fan shroud.</p> <p>The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant to a separate tank.</p> <p>All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.</p> <p>The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast fans. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.</p>	X		
41	<p><b>Engine Cooling System Protection:</b> The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.</p>	X		
42	<p><b>Engine Coolant:</b> The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.</p> <p>Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.</p>	X		
43	<p><b>Engine coolant Filter:</b> An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The locations of the filter shall allow for easy maintenance.</p> <p>Proposals offering engines equipped with coolant</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	filters shall be supplied with standard non-chemical type particulate filters.			
44	<b>Electronic Coolant Level Indicator:</b> The instrument panel shall feature a low engine coolant indicator light which shall be located in the center for the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.	X		
45	<b>Engine Pump Heat Exchanger:</b> A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.	X		
46	<b>Coolant Hoses:</b> The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.	X		
47	<p><b>Engine Air Intake:</b> The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.</p> <p>The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab behind the right hand side. The dry type filter shall ensure dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.</p> <p>The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the right</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.	X		
48	<p><b>Engine Exhaust System:</b> The exhaust system shall include a diesel particulate filter (DPE), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.</p> <p>The system shall utilize 0.065 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.</p> <p>The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.</p> <p>The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF.</p>	X		
49	<p><b>Diesel Exhaust Fluid Tank:</b> The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.</p> <p>The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.</p> <p>The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.</p>	X		
50	<b>Engine Exhaust Accessories:</b> An exhaust			

	SPECIFICATION	Meets	Does Not Meet	Comments
	temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.	X		
51	<b>Engine Exhaust Wrap:</b> The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.	X		
52	<p><b>Transmission:</b> The drive train shall include and Allison Gen IV-E model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads, located on the converter housing.</p> <p>The transmission shall include two (2) internal oil filters and Castrol TransSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.</p> <p>The Gen IV-E transmission shall include prognostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.</p> <p>The transmission gear ratios shall be:</p> <ul style="list-style-type: none"> <li>• 1<sup>st</sup> 3.49:1</li> <li>• 2<sup>nd</sup> 1.86:1</li> <li>• 3<sup>rd</sup> 1.41:1</li> <li>• 4<sup>th</sup> 1.00:1</li> <li>• 5<sup>th</sup> 0.75:1</li> <li>• Rev 5.03:1</li> </ul>	X		
53	<b>Transmission Mode Programming:</b> The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.	X		
54	<b>Electronic Transmission Oil Level Indicator:</b> The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
55	<b>Transmission Shift Selector:</b> An Allison pressure sensitive range selector touch pad, or equivalent, shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall provide a prognostic indicator (wrench symbol) on the digital display between the selected and attained indicators. The prognostics monitor various operating parameters to determine and shall send an alert when a specific maintenance function is required.	X		
56	<b>Transmission Pre-Select With Auxiliary Brake:</b> When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.	X		
57	<b>Transmission Cooling System:</b> The transmission shall include a water-to-oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.	X		
58	<b>Transmission Warranty:</b> The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.	X		
59	<b>Driveline:</b> All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.	X		
60	<b>Fuel Filter/Water Separator:</b> The fuel system shall have a fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.  A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.  A secondary fuel filter shall be included as approved by the engine manufacturer.	X		
61	<b>Fuel Lines:</b> The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	fuel (or CNG, as required). The fuel lines shall be connected with brass fittings.			
62	<b>Fuel Tank:</b> The fuel tank shall have a capacity of fifty (50) gallons minimum.	X		
63	<b>Fuel Tank Fill Port:</b> The fuel tank fill ports shall be offset with the right fill port located in the middle position and the left fill port located in the rearward position on the fuel tank.	X		
64	<b>Front Axle:</b> The front axle shall be a Non drive front axle, model.	X		
65	<b>Front Axle Warranty:</b> The front axle shall be warranted two (2) years with unlimited miles under the general service application.	X		
66	<b>Front Wheel Bearing Lubrication:</b> The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.	X		
67	<b>Front Shock Absorbers:</b> Two (2) Bilstein inert, nitrogen gas filled shock absorbers, or equivalent, shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.  The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort.	X		
68	<b>Front Suspension:</b> The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54 inches long and 4 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with great fitting. The spring capacity shall be 21,500 pounds.	X		
69	<b>Steering Column/Wheel:</b> The cab shall include a Douglas Autotech steering column, or equivalent, which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18 inch, two (2) spoke wheel located at the driver's position. The steering wheel shall be covered with black	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	polyurethane foam padding. The steering column shall contain a horn button, self-cancelling turn signal switch, four-way hazard switch and headlamp dimmer switch.	X		
70	<b>Power Steering Pump:</b> The hydraulic power steering pump shall be a TRW PS, or equivalent, which shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.	X		
71	<b>Electronic Power Steering Fluid Level Indicator:</b> The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.	X		
72	<b>Front Axle Cramp Angle:</b> The chassis shall have a front axle cramp angle of 48 degrees to the left and 44 degrees to the right.	X		
73	<b>Power Steering Gear:</b> The power steering gear shall be a TRW model TAS 65 with an assist cylinder, or equivalent.	X		
74	<b>Rear Axle:</b> The rear axle shall be single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.	X	X	Based on the weight analysis performed, the proper rear axle capacity is 24,000 lbs.
75	<b>Rear Axle Differential Lubrication:</b> The rear axle differential shall be lubricated with oil.	X		
76	<b>Rear Axle Warranty:</b> The rear axle shall be warranted for two (2) years with unlimited miles under the general service application.	X		
77	<b>Rear Wheel Bearing Lubrication:</b> The rear axle wheel bearing shall be lubricated with oil.	X		
78	<b>Vehicle Top Speed:</b> The top speed of the vehicle shall be approximately 65 MPH +/- 2 MPH at governed engine RPM.	X		
79	<b>Rear Suspension:</b> The single rear axle shall feature a Reyco 79KB vari-rate, or equivalent, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.5 inch x 3 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided. The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.	X		
80	<b>Front Tire:</b> The front tires shall be Michelin 385/65R-22.5 18PR "J" tubeless radial XZY3 mixed service tread. The front tire US Fire Service Intermittent Usage load capacity shall be 20,000	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	pounds per axle with a speed rating of 65 MPH when properly inflated to 120 lb/sq in.			
81	<b>Rear Tire:</b> The rear tires shall be Michelin 315/80R-22.5 "L" tubeless radial XDY3 mixed service tread. The rear tire US Fire Service Intermittent Usage load capacity shall be 33,080 pounds per axle with a speed capacity of 65 MPH when properly inflated to 130 lb/sq in.	X		
82	<b>Tire Pressure Indicator:</b> There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front and rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire. The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the City.	X		
83	<b>Front Wheels:</b> The front wheels shall be Accuride hub piloted, or equivalent, 22.5 inch x 12.25 inch polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall be forged from a single piece of aluminum, designed to be corrosion resistant and are engineered for a long life.	X		
84	<b>Rear Wheels:</b> The rear wheels shall be Accuride hub piloted, or equivalent, heavy duty, 22.5 inch x 9 inch aluminum wheels. Each outer wheel shall have a polished aluminum finish on the exterior surface and each inner wheel shall have a machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.	X		
85	<b>Wheel Trim:</b> The front and rear wheels shall include stainless steel lug nut covers. The lug nut covers shall be Real Wheels® brand, or equivalent, constructed of 304L grade, non-corrosive stainless steel. Each wheel trim component shall meet D.O.T. certification.	X		
86	<b>Brake System:</b> A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inches of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss.  The rear axle spring brakes shall automatically	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.</p> <p>A four (4) sensor, four (4) modulator anti-lock braking system (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.</p> <p>Automatic traction control (ATC) shall be installed on the single rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels lose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.</p> <p>System shall include roll stability control which shall monitor the vehicle's rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABC and ATC systems.</p> <p>A switch shall be provided and properly labeled "mud/snow". When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.</p> <p>An electronic stability control unit (ESC) shall be a functional extension of the electronic braking system. It shall detect any skidding of the vehicle</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	on the vertical axis as well as any rollover tendency. The control unit shall have an angular-speed sensor that measures the vehicle's motion on the vertical axis. An acceleration sensor shall measure the vehicle's lateral acceleration. The system shall provide information on the lateral acceleration and steering angle to calculate a theoretical angular speed for the stable vehicle condition.	X		
87	<b>Front Brakes:</b> The front brakes shall be Disc Plus disc brakes, or equivalent, with 17 inch vented rotors.	X		
88	<b>Rear Brakes:</b> The rear brakes shall be disc type and shall include a cast iron shoe.	X		
89	<b>Park Brake:</b> Upon application of the push-pull valve in the cab, the rear brakes shall engage via mechanical spring force by dual chamber rear brakes to satisfy the FMVSS parking brake requirements.	X		
90	<b>Park Brake Control:</b> A Meritor-Wabco, or equivalent, manual hand control push-pull style valve shall operate the parking brake system. The parking brake actuation valve shall be mounted on the left hand dash to the right of the steering column within easy reach of the driver.	X		
91	<b>Rear Brake Slack Adjusters:</b> The rear brakes shall include Meritor, or equivalent, automatic slack adjusters installed on the axle designed to offer reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.	X		
92	<b>Air Dryer:</b> The brake system shall include a Wabco System Saver 1200, or equivalent, air dryer with an integral 100 watt heater with a Metri-Pack, or equivalent, sealed connector. The air dryer shall incorporate an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve shall allow purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.	X		
93	<b>Front Brake Chambers:</b> The front brakes shall be provided with MGM, or equivalent, type 24 long stroke brake chambers.	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
94	<b>Rear Brake Chambers:</b> The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE 30/36 brake chamber shall have a 36 inch effective area.	X		
95	<b>Air Compressor:</b> The air compressor shall be a Wabco SS318, or equivalent, single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Piston and bore finishing technology shall reduce oil consumption and increase the system component life.	X		
96	<b>Air Governor:</b> An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.	X		
97	<b>Moisture Ejectors:</b> An automatic moisture ejector with a manual drain provision shall be installed on the wet tank of the air supply system. Manual pet-cock type drain valves shall be installed on all remaining reservoirs of the air supply system.	X		
98	<b>Air Supply Lines:</b> A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) shall be blue. Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.	X		
99	<b>Air Inlet Connection:</b> An air connection for the shoreline air inlet shall be supplied and installed in the left hand side lower front step in the forward position. The air inlet connector shall be plumbed to the air system with a check valve to prevent air from escaping through the inlet connector. The air connector supplied shall be a	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	0.25 inch size Tru-Flate Interchange, or equivalent, style manual connection compatible with Milton 'T' style, Myers 0.25 inch Automotive style and Parker 0.25 inch 10 Series connectors.	X		
100	<b>Vehicle Towed Air Supply Package:</b> The chassis shall include a vehicle towing air supply package. The air service brake connection shall be accomplished via trailer glad hands located under the left side of the front bumper. The mating surface of the glad hand connections shall be rotated horizontal. The glad hand connections shall be located in the forward position and shall protrude beyond the face of the front bumper when connected. The glad hands shall allow a service tow truck to tie into the disabled vehicle's air system and unlock the rear brakes.	X		
101	<b>Rear Air Tank Mounting:</b> If a combination of wheel base, air tank quantity, or other requirements necessitate the location of the one or more air tanks to be mounted rear of the fuel tank, these tank(s) shall be mounted perpendicular to frame.	X		
102	<b>Frame Warranty:</b> The frame and cross members shall carry a limited lifetime warranty. The detailed warranty document shall be provided upon request.	X		
103	<b>Frame Paint:</b> The frame shall be powder coated black prior to any attachment of components. All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120 inches per pound at 2 mils.  Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.	X		
104	<b>Front Bumper:</b> The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be .38 thick ASTM A36 steel which shall measure	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	12 inches high with a 3.05 inch flange and shall be 104.5 inches wide with angled front corners.			
105	<b>Front Bumper Paint:</b> The front bumper shall be painted the same as the lower cab color.	X		
106	<b>Front Bumper Extension Length:</b> The front bumper shall be extended approximately 18 inches ahead of the cab.	X		
107	<b>Front Bumper Apron:</b> The 18 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.  The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.	X		
108	<b>Front Bumper Compartment Center:</b> The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well for 100 feet of 1 3/4" fire hose and 1 1/2" discharge. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall include a cover constructed of 0.19 inch thick bright embossed aluminum tread plate.	X		
109	<b>Front Bumper Compartment Cover Hardware:</b> The front bumper compartment cover shall include gas cylinder stays which shall hold the cover open. The cover shall be held in the closed position via a flush push button style latch.	X		
110	<b>Mechanical Siren:</b> The front bumper shall include an electro mechanical Federal Q2B™ siren, or equivalent, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10 feet.  LOCATION: The siren shall be bumper mounted in a hidden position. An angled sound deflector shall direct the sound from the siren through a stainless grille mounted to the face of the bumper.	X		
111	<b>Air Horns:</b> The front bumper shall include two (2) Hadley brand E-Tone air horns, or equivalent, which shall measure 21 inches long with 6 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.  The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	bumper in the inboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left hand frame rail.	X		
112	<b>Air Horn Reservoir:</b> One (1) air tank, with a 1200 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air brake system.	X		
113	<b>Electronic Siren Speaker:</b> The bumper shall include one (1) Whelen Engineering Inc. model SA122FMP, or equivalent, cast aluminum speaker with a polished aluminum grille recess mounted within the bumper fascia. The speaker shall feature 100 watts of power. The electronic siren speaker shall be located on the front bumper face.	X		
114	<b>Front Bumper Tow Hooks:</b> Two (2) heavy duty chrome plated tow hooks shall be installed in a rearward position out of the approach angle area, bolted directly to the outside of each chassis frame rail with grade 8 bolts.	X		
115	<b>Tow Fork Provision:</b> A tow bar provision shall be installed on the front of the chassis and attached to the frame rails which shall allow the vehicle to be picked up from the front and towed.	X		
116	<p><b>Cab Tilt System:</b> The entire cab shall be capable of tilting approximately 45 degrees to allow for easy maintenance of the engine and transmission.</p> <p>The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.</p> <p>It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.</p> <p>Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once hold down hooks are in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.</p> <p>Two (2) cab tilt cylinders shall be provided with</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>velocity fuses in each cylinder port. The cab tilt pivots shall be 1.9 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.</p> <p>A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.</p>	X		
117	<b>Cab Tilt Control Receptacle:</b> The cab tilt control cable shall include a receptacle. The tilt pump shall include 8 feet of cable with a six (6) pin Deutsch receptacle with a cap.	X		
118	<b>Cab Windshield:</b> The cab windshield shall have a surface area of at least 2825 square inches and be of a two (2) piece wraparound design for maximum visibility. The glass shall include standard automotive tint. The left and right windshield shall be fully interchangeable. Each windshield shall be installed using black self-locking window rubber.	X		
119	<p><b>Glass Front Doors:</b> The front cab doors shall include a window. These windows shall have the capability to roll down completely into the door housing with a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.</p> <p>The shall be an irregular shaped fixed window, more commonly known as "cozy glass" ahead of the front door roll down windows.</p> <p>The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.</p>	X		
120	<b>Glass Tint:</b> The windows located in the cab shall have a standard dark automotive tint.	X		
121	<p><b>Glass - Rear Doors:</b> The rear right hand side door shall include a window. This window shall roll up and down manually with a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.</p> <p>The rear left hand side door shall include a window. This window shall roll up and down manually with a crank style handle on the inside of the door. A reinforced window regulator assembly</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	shall be provided for severe duty use.			
122	<p><b>Glass – Side Mid:</b> The cab shall include a window on the officer’s side behind the front and ahead of the crew doors. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber.</p> <p>The cab shall include a window on the driver’s side behind the front door and ahead of the crew door and above the wheel well. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber.</p>	X		
123	<p><b>Climate Control:</b> The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster.</p> <p>The cab shall also include a combination heater air conditioning unit. This unit shall offer a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.</p> <p>The air conditioning system shall perform as follows:</p> <ul style="list-style-type: none"> <li>- In 100 degree F ambient temperature, with 50% relative humidity and at 1200 engine RPM, the crew area will cool down to 72 degree F within 30 minutes.</li> <li>- Roof mounted condenser with adequate BTU to meet the performance specification.</li> <li>- The evaporator units will have an adequate BTU rating to meet the performance specifications.</li> </ul> <p>All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.</p> <p>The air conditioner lines shall be a mixture of custom bend zinc coated steel fittings and Aero-quip GH 134 flexible hose, or equivalent, with Aero-quip EZ clip fittings, or equivalent.</p> <p>The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.</p> <p>The air conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.</p>	X		
124	<p><b>Front Underseat Heaters:</b> Two (2) 13,500 BTU heaters shall be provided and installed in the face of the seat riser storage area for the left and right front seats, one (1) each side. The fan controls shall be located on the Vista display and control screen(s).</p> <p>The auxiliary heater system hoses shall be silicone with stainless steel constant torque clamps approved for use with silicone hose. The auxiliary heater system shall include one (1) seasonal shut-off valve. The valve shall be supplied at the front of the right hand corner of the cab. The cab must be tilted to access the shut-off valve.</p>	X		
125	<p><b>Cab Insulation:</b> The cab ceiling and walls shall include 1 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.</p>	X		
126	<p><b>Under Cab Insulation:</b> The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments (or CNG, as needed). The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations.</p> <p>Then engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The insulation shall meet or exceed FMVSS 302 flammability test.</p> <p>The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	3 mils of acrylic pressure sensitive adhesive and aluminum pins			
127	<b>Interior Trim Floor:</b> The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish, or equivalent. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.	X		
128	<b>Sun Visors:</b> The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield.	X		
129	<b>Dash Trim:</b> The entire dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate with appropriate ventilation.	X		
130	<b>Engine Tunnel Trim:</b> The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish, or equivalent. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim.	X		
131	<b>Auxiliary Power Point Engine Tunnel:</b> The cab interior shall include two (2) 12 volt cigarette lighter type receptacles and shall be connected directly to the batteries.	X		
132	<b>Under Cab Access Door:</b> The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.	X		
133	<b>Interior Door Trim:</b> The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall then be painted to match.	X		
134	<b>Cab Door Reflective Trim:</b> The interior of each door shall include high visibility reflective tape. A white reflective tape that measures 1 inch in width shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes measuring 6 inches in height.	X		
135	<b>Interior Grab Handle "A" Pillar:</b> There shall be two (2) handles installed inside the cab, one on each "A" post at the left and right door openings.	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
136	<p><b>Interior Grab Handles:</b> Each front door shall include one (1) 9 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish.</p> <p>A black powder coated cast aluminum handle shall be installed on the inside of each rear crew door. A 30 inch long handle shall extend horizontally the width of the window just above the window sill.</p>	X		
137	<p><b>Interior Trim Color:</b> The cab interior vinyl trim surfaces shall be gray in color. The cab interior vacuum formed ABS composite trim surfaces shall be gray in color. The cab interior floor mat shall be gray in color.</p> <p>The following surfaces shall be painted with Zolatone #20-72 silver gray texture finish, or equivalent:</p> <ul style="list-style-type: none"> <li>• Inner door panel</li> <li>• Entire center dash</li> <li>• Any accessory pods attached to the dash</li> <li>• Left hand dash</li> <li>• Right hand dash</li> </ul>	X		
138	<p><b>Dash Panel Group:</b> The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.</p>	X		
139	<p><b>Center Panel:</b> The center dash panel shall include six (6) switch positions in the upper left portion of the panel. A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. All switch legends shall have backlighting provided.</p>	X		
140	<p><b>Left Panel:</b> The left dash panel shall include one (1) windshield wiper/washer control switch located in the left hand side of the panel. The switch shall have backlighting provided.</p>	X		
141	<p><b>Right Panel:</b> The right dash panel shall include rocker switches to control electric siren, mechanical siren and air horn.</p>	X		
142	<p><b>Seat Belt Warning:</b> A Weldon, or equivalent, seat belt warning system, integrated with the</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator and indicator light in the instrument panel, and an audible alarm.</p> <p>The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt is fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.</p>	X		
143	<b>Seat Material:</b> The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to protect from UV rays and block contaminated fluids.	X		
144	<b>Seat Color:</b> All seats shall be gray in color.	X		
145	<b>Seat Driver:</b> The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat, or equivalent. The seat shall be equipped with air ride and feature eight-way electric positioning.	X	X	Proposed an electric 8 way electric seat, not air ride.
146	<p><b>Seat Officer:</b> The officer's seat shall be an H.O. Bostrom Firefighter model seat, or equivalent. The seat shall be equipped with air ride and feature two-way manual adjustment and shall include a tapered and padded seat cushion.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. The testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seat shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The officer's seat shall feature a SecureAll™, or equivalent, SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA</p>	X	X	Specs call for manual adjustment and air ride. We did not bid air ride because it is not available with under seat heaters.

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths, without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.</p>	X		
147	<p><b>Rear Facing Outer Seats:</b> The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series, or equivalent. The seat shall feature a tapered and padded seat and cushion. The seat shall be mounted in a fixed position.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. <b>In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95<sup>th</sup> percentile hybrid III male weighing 225 pounds rather than the 50<sup>th</sup> percentile male dummy weighing 165 pounds as referenced in FMVSS 208.</b> The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The rear facing outboard seat shall feature a Bostrom SecureAll™, or equivalent, self-</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>contained breathing apparatus (SCBA) locking system which shall store all U.S. and International SCBA brands and bottle sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.</p> <p>The rear facing outer seats shall offer special mounting positions which shall be 2 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.</p> <p>The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.</p>	X		
148	<p><b>Forward Facing Center Seats:</b> The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall. The seats shall be a H.O. Bostrom Firefighter series, or equivalent. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. <b>In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95<sup>th</sup> percentile hybrid III male weighing 225 pounds rather than the 50<sup>th</sup> percentile male dummy weighing 165 pounds as referenced in FMVSS 208.</b> The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The forward facing center seat shall feature a SecureAll™, or equivalent, self-contained breathing apparatus (SCBA) locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.</p> <p>The forward facing center seats shall be installed facing the front of the cab.</p> <p>The forward facing center seating positions shall include an enclosed seat frame which is located</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	and installed on the rear wall. The seat frame shall be constructed of 5052-H32 Marine Grade 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.  There shall be one (1) access points to the seat frame storage area to the front. The access point shall be covered by a hinged door.	X		
149	<b>Cab Front Underseat Storage Access:</b> The left and right under seat storage areas shall have a vented aluminum hinged door with non-locking latch.	X		
150	<b><u>TO BE QUOTED AS AN OPTION AS REFERENCED IN #11 ABOVE:</u></b> <b>10 (Ten) Inch Extended Cab and In Cab Roll Up Storage Cabinets:</b> The cab shall be extended by 10 inches and there shall be two (2) roll up compartments in the crew area of the cab located to the outside of the forward facing seats. One (1) will be located on each side of the forward facing seats. The cabinets will be as large as space allows but the dimensions will be approximately 22"x50"x15".  <b>Price for adding this option shall be noted on the Response Form.</b>	X		Option to provide an LFD cab which is 13" longer with two compartments is \$10,000. This includes increasing the axles, if required.
151	<b>Seat Compartment Door Finish:</b> All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture, or equivalent.	X		
152	<b>Windshield Wiper System:</b> The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.	X		
153	<b>Electronic Windshield Fluid Level Indicator:</b> The windshield washer fluid level shall be monitored electronically. There shall be an indicator light or warning message when fluid level is low.	X		
154	<b>Cab Door Hardware:</b> The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. All cab entry doors shall include locks which are keyed	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	alike. The door locks shall be designed to prevent accidental lockout.			
155	<b>Door Locks:</b> Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab.	X		
156	<b>Grab Handles:</b> The cab shall include one (1) 18 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304 stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.	X		
157	<b>Rearview Mirrors:</b> Ramco model CRM-310-1750-CHCHR bus style mirrors, or equivalent, shall be provided. The mirror heads shall be injection molded chrome plated ABS plastic and shall measure 9.50 inches wide X 17.50 inches high. The mirrors shall be mounted one (1) on each the driver and officer doors of the cab with polished die-cast aluminum arms.  The mirrors shall feature an upper heated remote controlled flat glass and a lower heated manually adjustable convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting to reduce vibration. The mirrors shall be corrosion free under all weather conditions.  The heat for the rearview mirrors shall be controlled through a virtual button on the multiplex display.	X		
158	<b>Exterior Trim Rear Corner:</b> There shall be mirror finish stainless steel scuff plates on the outside corners at the back of the cab. The stainless steel plate shall be affixed to the cab using two sided adhesive tape.	X		
159	<b>Cab Fenders:</b> Full width wheel well liners shall be installed on the extruded cab. Each two-piece liner shall consist of an inner liner 16 inches wide made of vacuum formed ABS composite and an outer fenderette 3.5 inches wide made of 14 gauge 304 polished stainless steel.	X		
160	<b>Mud Flaps Front:</b> The front wheel wells shall have mud flaps installed on them.	X		
161	<b>Ignition:</b> A master battery system with a keyless tart ignition system shall be provided.	X		
162	<b>Battery:</b> The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541., The cables shall have encapsulated ends with heat shrink and sealant.	X		
163	<b>Battery Tray:</b> The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.  The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek, or equivalent, shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.	X		
164	<b>Battery Box Cover:</b> Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle.	X		
165	<b>Battery Cable:</b> The starting system shall include cables which shall be protected by 275 degree F minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.	X		
166	<b>Battery Jumper Stud:</b> The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.	X		
167	<b>Alternator:</b> The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.	X		
168	<b>Battery Conditioner:</b> A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab behind the driver's seat.	X		
169	<b>Battery Conditioner Display:</b> A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.	X		
170	<b>Electrical Inlet:</b> A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shall automatically eject the plug when the starter button is depressed.</p> <p>A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.</p> <p>An electrical inlet shall be installed on the left hand side of cab over the wheel well.</p> <p>The electrical inlet shall be connected to the battery conditioner.</p> <p>The Kussmaul electrical inlet connection shall include a red cover.</p>	X		
171	<b>Headlights:</b> The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.	X		
172	<b>Front Turn Signals:</b> The front fascia shall include two (2) Whelen model 600, or equivalent, 4 inch x 6 inch programmable LED amber turn signals which shall be installed in a polished aluminum housing above and outboard of the front warning and head lamps.	X		
173	<b>Headlight Location:</b> The headlights shall be located on the front fascia of the cab directly below the front warning lights.	X		
174	<b>Side Turn/Marker Lights:</b> The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.	X		
175	<b>Marker and ICC Lights:</b> In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.	X		
176	<b>Ground Lights:</b> Each door shall include LED NFPA compliant ground lights mounted to the underside of the cab step below each door. Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.	X		
177	<b>Step Lights:</b> The middle step located at each door shall include a recess mounted 4 inch round LED light which shall activate with the opening of the respective door.	X		
178	<b>Engine Compartment Light:</b> There shall be an LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.	X		
179	<b>Interior Overhead Lights:</b> The cab shall include a two-section Whelen, or equivalent, LED dome lamp with a red and clear lens located over each door.  An additional two-section Whelen, or equivalent, LED dome lamp with a red and clear lens shall be provided over the engine tunnel which can be activated by individual switches on the lamp.	X		
180	<b>Do Not Move Apparatus Light:</b> The front headliner of the cab shall include a red Whelen 500 Series, or equivalent, 5mm LED light located in the center for greatest visibility. The light shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.  The light and alarm shall be interlocked for activation when a cab door is not firmly closed, an apparatus cabinet door is not closed and the parking brake is released.	X		
181	<b>Master Warning Switch:</b> A master switch shall be included. The switch shall feature control over all devices wired through it. Any warning device switches left in "ON" position when the master switch is activated shall automatically power up.	X		
182	<b>Headlight Flasher:</b> An alternating high beam headlamp flashing system shall be installed into the high beam headlamp circuit which shall allow the high beams to flash alternately from left to right. Deliberate operator selection of high beams shall override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights shall also be disabled "On Scene" when the park brake is applied.	X		
183	<b>Light Bar:</b> There shall be one (1) 72 inch LED light bar mounted on the cab with opticom capabilities.	X		
184	<b>Inboard Front Warning Lights:</b> The cab front fascia shall include dual Whelen series 600 Super, or equivalent, LED warning lights which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	the inboard position. The front warning lights mounted on the fascia in the inboard positions shall be red.	X		
185	<b>Outboard Front Warning Lights:</b> The cab front fascia shall include dual Whelen series 600 Super, or equivalent, LED warning lights which shall offer 14 flash patterns plus a steady burn for solid colors and 20 flash patterns plus a steady burn for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the outboard position.  The front warning lights mounted on the fascia for the outboard position shall be red.	X		
186	<b>Front Warning Switch:</b> The front warning lights shall be controlled. This switch shall be clearly labeled for identification.	X		
187	<b>Intersection Warning Lights:</b> The chassis shall include two (2) Whelen series 600 Super, or equivalent, LED 4 inch x 6 inch intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.  The intersection lights shall be red and mounted in the rear position on the side of the bumper.	X		
188	<b>Side Warning Lights:</b> The cab sides shall include a Whelen series 600 Super, or equivalent, LED 4 inch x 6 inch warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.  The warning lights located on the side of the cab shall be red and mounted over the front wheel directly over the center of the front axle.	X		
189	<b>Cab Mounted Search Lights:</b> There shall be two (2) Golight model 2020, or equivalent, permanent mount search lights installed on the front corners of the apparatus cab. The light shall provide 400,000 candle power of light output from a weather resistant halogen bulb. The Golight, or equivalent, shall be capable of 370 degree rotation and 120 degree tilt. Each light shall be equipped with two hard wired remote controls located in the chassis cab.	X		
190	<b>Cab Mounted Command Light:</b> There shall be a Command Light model KL450 mounted on the roof of the cab.	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
191	<b>Siren Control Head:</b> A code 3 Micro Com, or equivalent, 200 watt remote dual amplifier control head shall be provided and mounted on the dash in the switch panel in a location specific to the City's needs. Location to be determined after award.	X		
192	<b>Air Horn Activation:</b> The air horn activation shall be accomplished by one (1) Linemaster model SP491-S81, or equivalent, foot switch on the driver's side and one (1) rocker switch on the right side dash panel accessible to the officer.	X		
193	<b>Mechanical Siren Activation:</b> The mechanical siren shall be actuated by one (1) rocker switch on the right side dash panel for use by the officer. One (1) momentary siren brake rocker switch shall be provided in the right side dash panel.	X		
194	<b>Back-up Alarm:</b> A Preco-Matic model 1059, or equivalent, dual function, dual sound back-up alarm shall be installed at the rear of the chassis with an auto-adjusting output level of 87 dB to 112 dBa. The alarm shall automatically activate without delay when the transmission is placed in reverse.	X		
195	<p><b>Instrumentation:</b> An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine and transmission information over the J1939 data bus to reduce redundant sensors and wiring.</p> <p>The instrument panel shall contain the following gauges:</p> <ul style="list-style-type: none"> <li>• One (1) electronic speedometer</li> <li>• One (1) electronic tachometer. The scale on the tachometer shall read from 0 to 3000 RPM.</li> <li>• One (1) two-movement gauge displaying primary system and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degree Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.</li> </ul>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<ul style="list-style-type: none"> <li>• One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included.</li> </ul> <p>The instrument panel shall include a light bar that will contain the flowing LED indicator lights:</p> <p><b>A. Red Lamps:</b></p> <ul style="list-style-type: none"> <li>• Low primary Air Pressure, located in gauge</li> <li>• Low Secondary Air Pressure, located in gauge</li> <li>• Stop Engine, indicates critical engine fault</li> <li>• Air Filter Restricted, indicates excessive engine air intake restriction</li> <li>• Park Brake, indicates parking brake set</li> <li>• Seat Belt Indicator, indicates when a seat is occupied and corresponding seat belt remains unfastened</li> <li>• Volts, indicates high or low system voltage, located in gauge</li> <li>• Low Oil Pressure, indicates low engine oil pressure, located in gauge</li> <li>• High Coolant Temperature, indicates excessive engine coolant temperature, located in gauge</li> <li>• DEF level Bar, DEF level is critically low, located in gauge</li> </ul> <p><b>B. Amber Lamps:</b></p> <ul style="list-style-type: none"> <li>• MIL, indicates an engine emission control system fault</li> <li>• Check Engine, indicates engine fault</li> <li>• Check Trans, indicates transmission fault</li> <li>• High Transmission Temperature, indicates excessive transmission oil temperature</li> <li>• ABS, indicated anti-lock brake system fault</li> <li>• Wait to Start, indicates active engine air preheat cycle</li> <li>• HEST, indicates a high exhaust system temperature</li> <li>• Water in Fuel, indicates presence of water in fuel filter</li> <li>• DPF, indicates a restriction of the diesel particulate filter</li> <li>• Regen Inhibit, indicates regeneration has been postponed due to user interaction</li> <li>• Range Inhibit, indicates a transmission</li> </ul>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>operation is prevented and requested shift request may not occur</p> <ul style="list-style-type: none"> <li>• Low Fuel, located in gauge</li> <li>• DEF, indicates low DEF fluid, located in gauge</li> <li>• DEF Level Bar, DEF level is low, located in gauge</li> </ul> <p><b>C. Green Lamps:</b></p> <ul style="list-style-type: none"> <li>• Left and Right turn signal indicators</li> <li>• ATC, indicates low wheel traction for automatic traction control, also indicates mud/snow mode is active for ATC system</li> <li>• High Idle, indicates high idle is active</li> <li>• Cruise Control, indicates cruise control is active</li> <li>• OK to Pump, indicates the pump engage conditions have been met</li> <li>• Pump Engaged, indicates pump is in use</li> <li>• Auxiliary Brake, indicates secondary braking device is active</li> <li>• DEF Level Bar, indicates usable levels of DEF: 25%, 50%, 75%, 100%, located in gauge</li> </ul> <p><b>D. Blue Lamps:</b></p> <ul style="list-style-type: none"> <li>• High Beam indicator</li> </ul>	X		
196	<p><b>Constant Audible Alarms From Gauge Package:</b></p> <ul style="list-style-type: none"> <li>• High Trans Temp</li> <li>• High or Low Voltage</li> <li>• Seatbelt</li> <li>• Check Engine</li> <li>• Check Transmission</li> <li>• Stop Engine</li> <li>• Low Air Pressure</li> <li>• Fuel Low</li> <li>• Water in Fuel</li> <li>• ESC</li> <li>• High Coolant Temperature</li> <li>• Low Engine Oil Pressure</li> <li>• Low Coolant Level</li> </ul>	X		
197	<p><b>Oscillating Audible Alarms From Gauge Package:</b></p> <ul style="list-style-type: none"> <li>• Air Filter</li> <li>• Extended Left &amp; Right Turn remaining on</li> <li>• Cab Ajar</li> <li>• Door Ajar</li> </ul>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	• Low Oil Level			
198	<b>Backlighting Color:</b> The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting	X		
199	<b>Communication Antenna:</b> An antenna base, for use with an NMO type antenna, shall be mounted on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment. The antenna base shall be an Antenex model MABVT8, or equivalent, made for either a 0.38 inch or 0.75 inch receiving hole in the antenna and shall include 17 feet of RG58 A/U cable with no connector at the radio end of the cable. The antenna base shall be provided by manufacturer.  The antenna cable shall be routed from the antenna base mounted on the roof to the area underneath the right hand front seat.	X	X	This is duplicated by Item #351.
200	<b>Cab Exterior Protection:</b> The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.	X		
201	<b>Fire Extinguisher:</b> A 2.5 pound D.O.T. approved fire extinguisher with BC rating shall be shipped loose with the cab.	X		
202	<b>Road Safety Kit:</b> The cab and chassis shall include one (1) emergency road side triangle kit.	X		
203	<b>Door Keys:</b> The cab and chassis shall include a total of four (4) door keys for the manual door locks.	X		
204	<b>Operation Manuals:</b> There shall be two (2) complete sets of chassis operation manuals provided with the chassis. One (1) set shall be a printed hard copy and one (1) set shall be an electronic copy on CD or flash drive. Each manual shall include a parts list specific to the chassis model.	X		
205	<b>Engine and Transmission Operation Manuals:</b> There shall be two (2) printed hard copy sets of the engine operation manual and two (2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.	X		
206	<b>Engine Service Manuals:</b> There shall be one (1) printed hard copy set of Cummins ISC/ISL (or CNG as required) engine service reference manuals which shall be provided with the chassis.	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
207	<b>Transmission Service Manuals:</b> There shall be one (1) printed hard copy set of Allison 3000 transmission service manuals included with the chassis.	X		
208	<b>As Built Wiring Diagrams:</b> The cab and chassis shall include two (2) complete sets of wiring schematics and option wiring diagrams. One (1) set shall be a printed hard copy, one (1) set shall be and electronic copy on CD or flash drive.	X		
209	<b>Fire Pump Mounting:</b> The fire pump shall be mounted within a separate body module that is not directly connected to the apparatus body. The pump shall be frame mounted to minimize the likelihood of the pump casing cracking should the apparatus be involved in a collision. The pump module shall be mounted to the frame in four (4) locations and shall be reinforced appropriately in order to carry the expected load for the life of the apparatus.			
210	<b>Midship Mount Fire Pump:</b> The fire pump shall be a Waterous CSC20, 1250 GPM midship mount pump, or equivalent.	X		
211	<b>Single Stage Fire Pump:</b> The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for fire service.	X		
212	<p><b>Independent Third Party Pump Certification:</b> The fire pump shall be tested and certified by Underwriter's Labs, a nationally recognized independent third party testing company. Tests shall be conducted so that the pump performs as listed below:</p> <ul style="list-style-type: none"> <li>• 100% of rated capacity at 150 pounds net pressure</li> <li>• 70% of rated capacity at 200 pounds net pressure</li> <li>• 50% of rated capacity at 250 pounds net pressure</li> <li>• 100% of rated capacity at 165 pounds net pressure</li> </ul> <p>The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA pamphlet number 1901. The pump shall be free from objectionable pulsation and vibration.</p>	X		
213	<b>Pump Anodes:</b> There shall be two (2) Waterous, or equivalent, zinc anodes provided with the fire	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>pump. The anodes shall aid in preventing galvanic corrosion within the water pump. The anodes shall be installed in the left and right steamer inlets and shall be easily replaceable.</p> <p>There shall be two (2) Waterous, or equivalent, zinc anodes installed in the discharge manifold of the pump and shall be easily replaceable.</p>	X		
214	<p><b>Impellers:</b> The pump impellers shall be bronze, specifically designed for fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection. The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.</p>	X		
215	<p><b>Mechanical Seals:</b> The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.</p>	X		
216	<p><b>Impeller Wear Rings:</b> The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.</p>	X		
217	<p><b>Pump Casing:</b> The pump casing shall be cast as two (2) horizontally split pieces. The casing shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.</p>	X		
218	<p><b>Pump Transmission:</b> The pump shall have a Waterous model C20 series transmission, or equivalent. The housing of the transmission shall be constructed of high strength, three piece, horizontally split aluminum. The drive line shafts shall be made from alloy steel forgings, hardened and ground to a size 2.350 inch 46 tooth involute spline.</p> <p>The drive and driven sprockets shall be made of</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>steel and shall be hardened and have ground bores. The drive chain shall be a Morse HV™, or equivalent, high strength involute form chain.</p> <p>Bearings shall be deep groove, anti-friction ball bearings and shall give support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seal.</p> <p>An internal lubrication system shall deliver lubricant directly to the drive chain and shall eliminate the need for an external lubrication pump and auxiliary cooling.</p> <p>The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission.</p> <p>All drive line components shall have a torque rating equal to or greater than the final net engine torque.</p>	X		
219	<p><b>Air Operated Pump Shift:</b> The pump shift actuating mechanism shall be air operated from a valve in the cab identified as "PUMP SHIFT". Full instructions for shifting the pump shall be inscribed on the valve plate.</p>	X		
220	<p><b>Pump Shift Indicating Lights:</b> There shall be two (2) pump system shift indicator lights in the chassis cab. The first light shall become energized when the chassis parking brake has been set and the pump has completed its shift into pump gear and shall be labeled "Pump Engaged". The second light shall become energized and when the pump and the chassis transmissions have been shifted completely into the correct gears for pumping, this light shall be labeled "OK To Pump".</p> <p>There shall be one (1) pump system shift indicator light located on the operator's panel. This light shall only become engaged when the chassis parking brake has been set, and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled "Throttle Ready".</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
221	<p><b>Primer:</b> The priming pump, model VPO/VPOS, or equivalent, shall be included in the pump assembly. The priming pump shall be an electrically driven rotary vane pump mounted firmly within the pump area. The pump shall be controlled from the pump operator's panel. An indicator light on the pump panel shall show when the primer motor is engaged. The pump shall be capable of creating suction and discharging water from a lift of 10 feet through 20 feet of suction hose of the appropriate size, in not more than 30 seconds starting with the pump dry. It shall be capable of developing a vacuum of 22 inches at an altitude of up to 1000 feet.</p>	X		
222	<p><b>Priming Valve:</b> There shall be a Waterous model VPA, or equivalent, vacuum activated priming valve supplied with the pump. The valve shall open automatically when the priming system is activated. The valve shall be installed on the pump or mounted remotely.</p>	X		
223	<p><b>Pressure Governor/Monitory Display:</b> A Fire Research Pump Boss, or equivalent, pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 ¾ inches high by 4 5/8 inches wide by 1 ½ inches deep. The control knob shall be 2 inches in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 ¾ inches from the front of the control module. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring. Inputs to the control module from the pump discharge and intake pressure sensors shall be electrical.</p> <p>The following continuous displays shall be provided:</p> <ul style="list-style-type: none"> <li>· Engine RPM; shown with four daylight bright LED digits more than ½ inch high</li> <li>· Check engine and stop engine warning LEDs</li> <li>· Oil pressure; shown on a dual color (green/red) LED bar graph display</li> </ul>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<ul style="list-style-type: none"> <li>· Engine coolant temperature; shown on a dual color (green/red) LED bar graph display</li> <li>· Transmission Temperature: shown on a dual color (green/red) LED bar graph display</li> <li>· Battery voltage; shown on a dual color (green/red) LED bar graph display</li> <li>· Pressure and RPM operating mode LEDs</li> <li>· Pressure / RPM setting; shown on a dot matrix message display</li> <li>· Throttle ready LED</li> </ul> <p>The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.</p> <p>The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:</p> <ul style="list-style-type: none"> <li>· High Battery Voltage</li> <li>· Low Battery Voltage (Engine Off)</li> <li>· Low Battery Voltage (Engine Running)</li> <li>· High Transmission Temperature</li> <li>· Low Engine Oil Pressure</li> <li>· High Engine Coolant Temperature</li> <li>· Out of Water (visual alarm only)</li> <li>· No Engine Response (visual alarm only)</li> </ul> <p>The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.</p> <p>The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.  The pressure governor and monitoring pressure display shall be programmed to interface with the specific engine installed.	X		
224	<b>Intake Relief Valve:</b> There shall be an Elkhart 40-41, or equivalent, intake relief valve installed on the suction side of the pump. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2 inches male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".	X		
225	<b>Pump Drain Valve:</b> A Trident, or equivalent, manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by turning a single control. The valve assembly shall consist of a stainless steel plate and shaft in a bronze body with multiple ports. The drain valve control shall be mounted on the left side pump panel and identified as "Master Drain".	X		
226	<b>Pump Lubrication System:</b> An internal lubrication system shall deliver lubricant directly to the drive chain and shall eliminate the need for an external lubrication pump and auxiliary cooling. Oil shall be supplied with the lubrication system.	X		
227	<b>Pump Cooler Line:</b> There shall be a 1/2 inch line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during longer periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on operator's panel, and shall be clearly labeled "Pump Cooler".	X		
228	<b>Pump Cooler Check Valve:</b> There shall be a check valve installed in the pump cooler line to	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	prevent tank water from back flowing into the pump when it is not in use.	X		
229	<b>Pump Manuals:</b> Two (2) Pump Operation & Maintenance manuals in CD format shall be supplied at the time of delivery.	X		
230	<b>Pump Operation Video:</b> There shall be one (1) pump operation and maintenance video(s) supplied at the time of delivery.	X		
231	<b>Five Year Pump Warranty:</b> The fire pump shall be warranted for a period of five (5) years from the date of delivery to Grand Junction Fire Department of five and one-half (5-1/2) years from the shipment date.	X		
232	<b>Tank To Pump Check Valve:</b> There shall be check valve between the pump suction and booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.	X		
233	<b>Tank to Pump Valve:</b> There shall be one (1) 3 inch full flow ball valve connected with a flexible hose from the tank to the suction side of the pump.	X		
234	<b>Tank Fill Valve:</b> There shall be one (1) Akron 2 inch full-flow tank fill valve plumbed with 2 inch plumbing from the pump to the tank. Installation shall be completed with 2 inch Class 1 rubber hose and stainless steel hose couplings. The tank fill valve shall be controlled from the operator's control panel.	X		
235	<b>Direct Tank Fill:</b> There shall be one (1) 2 ½ inch direct tank fill valve located on the right side panel. It shall be furnished with a 2 ½ inch valve and 2 ½ inch plumbing. The intake shall terminate with a 2 ½ inch NST female chrome swivel.	X		
236	<b>Pump Paint:</b> The pump body shall be painted with PPG polyurethane enamel paint. The pump enclosure shall be painted the same color as the apparatus body.	X		
237	<b>Paint Steamer and Inlet Valves:</b> The steamer and partially recessed inlet valves shall be painted with PPG polyurethane enamel paint. The paint color shall be the same as the apparatus body.	X		
238	<b>Intake Drains:</b> Each gated intake shall be equipped with a Trident Emergency, or equivalent, ¾ inch quarter turn bleeder valve. The bleeder valve shall be equipped with a chrome plated rectangular handle to provide a positive grip while personnel are wearing gloves.	X		
239	<b>Intake Trim Plates:</b> Each gated intake shall have a chrome plated die cast zinc trim plate around the	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	intake valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.	X		
240	<b>Slow Close Mechanisms:</b> Gates intakes that are 3 inches or larger shall be equipped with a mechanism to prevent changing the position of the valve from full open to full close, or vice versa, in less than 3 seconds.	X		
241	<b>Intake Strainers:</b> Removable strainers shall be provided with each gated intake.	X		
242	<p><b>Gate Intake:</b> There shall be one (1) 2 ½ inch gated intake provided on the left side of the pump compartment. The intake shall be furnished with a 2 ½ inch valve and 2 ½ inch plumbing. The intake shall terminate with a 2 ½ inch NST female chrome swivel.</p> <p>The suction valve(s) shall be an Akron 8800 series brass quarter-turn, full flow, and swing-out type. The valve shall be designed in such a manner that the action of water against the regulating element shall not affect its position.</p> <p>Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum. The valves located in the pump compartment area shall be partially recessed behind the panel in order to keep the valve protected from the elements.</p> <p>There shall be a South Park model HPC3008AC, or equivalent, 2½ inch NST plug with chain supplied. The plug shall be manufactured from high quality brass and shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>	X		
243	<b>Inlets, Steamer:</b> There shall be one 6 inch steamer inlet supplied on the left side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion. To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the left side of the apparatus. There shall be one (1) 6 inch NST thread, South Park LHC26P14AC long handle cap, or equivalent, provided. The cap shall be	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one 6 inch steamer inlet located on the right side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion. To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the right side of the apparatus. There shall be one (1) 6" NST thread, South Park LHC26P14AC long handle cap, or equivalent, provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>	X		
244	<p><b>Crosslays:</b> There shall be two (2) 1½ inch and one (1) 3 inch crosslays above the side mount control panel. Two (2) crosslay shall be plumbed with a full-flow 2 inch Akron style 8820 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 1½ inch male swivel elbow. One (1) crosslay shall be plumbed with a full-flow 3 inch Akron style 8820 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 3 inch male swivel elbow. The swivel for each crosslay hose bed shall be located outboard for ease of making connections while changing hose.</p> <p>The floor of the crosslay shall be covered with Dura-Dek, or equivalent, fiber reinforced material with adjustable dividers. Two (2) crosslay hose bed shall have a capacity of 200 feet of 1¾ inch double jacket fire hose. One (1) crossslay hose bed will have a capacity of 200 feet of 2½ inch double jacket fire hose.</p> <p>There shall be two (2) Thuemfing, or equivalent, individual pressure gauge(s) installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation.</p> <p>Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided</p>	X	X	<p>We proposed a 2-1/2" valve and piping for the 2-1/2" crosslay. If we provide a 3", a slow close valve will be required. If you still require 3" for the 2-1/2" crosslay, add \$625.00 which includes a hand wheel control.</p>

	SPECIFICATION	Meets	Does Not Meet	Comments
	with each gauge.			
245	<b>Crosslay Cover:</b> The crosslays shall have a treadplate coated cover installed. There shall be a webbing restraint located on each end of the pre-connected crosslay/speedlay. The webbing shall be easily opened in the center with Velcro closures.	X		
246	<b>Crosslay Rollers:</b> Stainless steel rollers shall be provided at each end of the crosslay hose bed to facilitate deployment of hose. Vertical rollers shall be installed on each side of the hose bed opening, and a horizontal roller shall be installed under the opening.	X		
247	<b>Discharge Valves:</b> All discharge valves shall be quarter-turn, full flow, swing-out type. The flow regulating element of each valve shall not change its position under any condition of operation involving discharge pressures to the maximum pressure of the pump. The means to prevent a change in position shall be incorporated in the operating mechanism and shall be permitted to be manually controlled.	X		
248	<b>Location of Discharge Outlets:</b> No discharge outlets larger than 2½ inches shall be located on the pump operator's panel.	X		
249	<b>Stainless Steel Plumbing:</b> Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum and high pressure hose shall be used in as many places as practical.	X		
250	<b>Drain Valves:</b> Each discharge 2½ inches or larger, with the exception of the crosslays and hard to access plumbing, shall be equipped with a ¾ inch quarter turn Trident Emergency, or equivalent, drain between the valve and the discharge. There shall be a chrome plated rectangular handle provided on each drain valve to facilitate use with a gloved hand.  Drain valves shall be located in a row just above the running board and below the pump panel on each side of the apparatus pump compartment to reduce clutter in the pump panel area. Each drain valve shall have a color coded bezel to match the appropriate line it is connected to. The drain valves shall be connected to the individual valves with flexible hose that is routed in such a manner as to assure complete drainage. Discharge from	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	the drain valves shall be routed to below the apparatus.	X		
251	<b>Automatic Drains:</b> A Class 1 model 34AD, or equivalent, automatic drain shall be installed on all crosslay, deluge gun and discharge plumbing that flows in low routed areas that are located below the ¼ turn manual drain. The drains shall be located in areas where there is a possibility of back flow. These drains will open whenever pressure in the line drops below 6 PSI.	X		
252	<b>Discharge Elbows:</b> All discharges that are 2 inches or larger and are 42 inches or more above grade shall be equipped with a downward pointing elbow of 30 degrees or more.	X		
253	<b>Discharge Caps:</b> All discharges, except for those designated as preconnects, shall have a chrome cap. Caps for discharges 3½ inches and smaller shall be secured to the apparatus with suitable chains or cables.	X		
254	<b>Discharge Trim Plates:</b> Each gated discharge shall have a chrome plated die cast zinc trim plate around the discharge valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.	X		
255	<b>Slow Close Mechanisms:</b> Discharges that are 3 inches or larger shall be equipped with a valve mechanism to prevent changing the position of the valve from full open to full close, or vice versa, in less than 3 seconds as required by NFPA.	X		
256	<b>Front Bumper 1½ Inch Discharge:</b> There shall be one (1) 1½ inch NST discharge installed in the bottom center of the hose tray located in the front bumper. The discharge shall be plumbed with a 2 inch Akron valve and 2 inch plumbing. Class 1 high pressure flex hose with stainless steel couplings shall be used in the plumbing of this discharge.  There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation.  Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.	X		
257	<b>Left Side Discharges:</b> There shall be two (2) 2½			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>inch NST discharges on the left side of the pump compartment. The discharges shall be plumbed with 2½ inch Akron valves and 2½ inch plumbing.</p> <p>The 2 ½ inch valves shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkages and universal yokes. Control rods shall be hard coated anodized aluminum ¾ inch rod and polished chrome plated zinc handles.</p> <p>There shall be two (2) Thuemling, or equivalent, individual pressure gauges installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be two (2) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapters provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be two (2) 2 ½ inch NST South Park HCC2808AC, or equivalent, caps with chains provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>	X		
258	<p><b>Right Side Discharge:</b> There shall be one (1) 2½ inch NST discharge on the right side of the pump compartment. The discharge shall be plumbed with a 2½ inch Akron valve and 2½ inch plumbing.</p> <p>The 2½ inch valve shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum ¾ inch rod with a polished chrome plated zinc handle.</p> <p>The centerline of the valve control shall be no</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>more than 72 inches vertically above the platform that serves as the pump operator's position.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapter provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one (1) 2½ inch NST South Park HCC2808AC, or equivalent, cap(s) with chain(s) provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>	X		
259	<p><b>Rear Discharge:</b> There shall be one (1) 2½ inch NST discharge on the left side rear under the hosebed. The discharge shall be plumbed with a 2½ inch Akron valve and 2½ inch plumbing.</p> <p>The 2 ½ inch valve shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum ¾ inch rod with a polished chrome plated zinc handle.</p> <p>The centerline of the valve control shall be no more than 72 inches vertically above the platform that serves as the pump operator's position.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapter provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one (1) 2 ½ inch NST South Park HCC2808AC, or equivalent, cap(s) with chain(s) provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>	X		
260	<p><b>Large Diameter Discharge:</b> There shall be one (1) 4 inch NST discharge located on the right side pump panel. The discharge shall be plumbed with a 3½ inch Akron valve and 4 inch plumbing. The 4 inch discharge shall be controlled by an Akron handwheel. The handwheel worm gear shall be connected to the remote mounted valve via a rod assembly. The handwheel shall turn a gear sector mounted on the valve for smoother and easier operations under pressure.</p> <p>A position indicator shall show the position of the ball valve as per NFPA 1901. Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge(s) installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) Snap-Tite model AS50T40NER, or equivalent, 4 inch NST female rocker lug x 5 inch Storz, or equivalent, 30 degree elbow adapter(s) shall be supplied with the apparatus. There shall be one (1) Snap-Tite model BS50, or equivalent, 5 inch Storz, or equivalent, blind cap(s) with chain supplied with the</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	apparatus			
261	<p><b>Foam Pro 2001 Single Foam System:</b> The apparatus shall be equipped with a Hypro FoamPro 2001 electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates and most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. The system shall be capable of delivering accuracy to within 3% of calibrated settings. The system shall be equipped with a digital electronic control display, suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flow meter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.</p> <p><b>(NOTE: AN OPTIONAL COMPRESSED AIR FOAM SYSTEM [CAFS] SHALL BE QUOTED ON THE RESPONSE FORM. See Attachment A for specifications.)</b></p>	X		<p>The 2001 model foam system is not capable of supplying all discharges.</p> <p><b>OPTIONS:</b>  ~FoamPro 3012 series system that compares to a Husky system, add \$18,500.  ~Overboard pick up for off board foam, add \$1,500.  ~Waterous Eclipse CAFS system,</p>
262	<p><b>Foam Proportioning System Testing:</b> The foam proportioning system shall be tested and certified after final installation as per NFPA 1901, newest edition.</p>	X		
263	<p><b>Deluge Monitor Riser:</b> There shall be one (1) 3 inch riser for a deluge monitor installed above the pump on the apparatus. The riser pipe shall be installed with a 3 inch valve, controlled fro the pump operator's panel.</p> <p>The discharge valve shall be controlled by an Elkhart RC-10, or equivalent, slow-closing remote linear output screw-type actuator. The actuator housing and push-rod shall be constructed of light weight extruded aluminum. A precision needle thrust bearing and hardened thrust washers shall assure smooth, efficient operation and accurate flow and pressure control capability. A 5 inch cast aluminum handwheel shall allow for compact through-the-panel installation.</p> <p>The valve status indicator module shall provide the pump operator with the status of the valve at a</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>glance. Red shall mean fully closed; Green shall mean fully opened; Yellow shall indicate a gated position. Incandescent lamps shall provide a reliable signal with a wide viewing angle even in bright sun light. Reliable solid state valve position sensors shall be water and lubricant resistant. The integrated circuit board and lamp sockets shall be completely encased in epoxy for total protection from the elements.</p> <p>The riser for the deck gun shall terminate 3 inch NPT.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p>	X		
264	<p><b>Polypropylene Foam Cell:</b> There shall be one (1) 30 gallon polypropylene foam cell incorporated into the polypropylene water tank.</p> <p>There shall be one (1) pressure/vacuum vent installed on the foam tank.</p> <p>There shall be one (1) drain hose connected to the foam cell. The drain shall have a ¼ turn valve installed inside the pump house and it shall drain below the frame rail of the chassis.</p>	X		
265	<p><b>Water Tank:</b> The water tank shall have a capacity of 500 U.S. gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the City of Grand Junction upon delivery of the apparatus.</p>	X		
266	<p><b>UPF Poly Tank Construction:</b> The UPF Poly-Tank® IIE, or equivalent, shall be constructed of 12 inch thick PT2E™ polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermoplastic, black in color, and U.V. stabilized for maximum protection.</p>	X		
267	<p><b>Booster Tank:</b> The booster tank shall be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	3 to 1 safety factor to facilitate easy removal.			
268	<b>Tank Baffles:</b> The transverse swash partitions shall be manufactured of 3/8 inch PT2E™ polypropylene (natural in color) and extend from approximately 4 inches off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8 inch PT2E™ polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.	X		
269	<b>Tank Sump:</b> There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of 1/2 inch polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4 inch schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2 inches above the sump to prevent air from being entrained in the water while pumping.	X		
270	<b>Tank Fill Connection:</b> All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.	X		
271	<b>Tank Lid:</b> The tank lid shall be constructed of 1/2 inch thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8 inches from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2 inch polypropylene dowels spaced a maximum of 30 inches apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped 1/2 inch x 13 inches to	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	accommodate the lifting eyes.			
272	<p><b>Tank Mounting:</b> The UPF Poly-Tank IIE shall rest on the body cross members in conjunction with such additional cross members, as required by the tank manufacturer.</p> <p>The tank shall be isolated from the cross members through the use of hard rubber strips with, a minimum Rockwell Hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation.</p> <p>Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restraints to minimize movement during vehicle operation.</p> <p>The tank shall be completely removable without disturbing or dismantling the apparatus structure.</p>	X		
273	<b>Lifetime Tank Warranty:</b> The tank shall have a lifetime warranty from UPF.	X		
274	<b>Water Tank Fill Tower:</b> The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of ½ inch PT2E polypropylene and shall be a minimum dimension of 8 inches x 8 inches at the outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have a ¼ uinch thick removable polypropylene screen and a PT2E polypropylene hinged-type cover.	X		
275	<b>UPF Tank Overflow:</b> The tank shall be equipped with a minimum of a 4 inch schedule 40 polypropylene overflow/air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.	X		Direct fill option requires a 6" overflow which exceeds your requirements.
276	<b>Tank Drain Valve:</b> One (1) 1½ inch tank drain valve shall be provided under the tank sump. The valve shall have a locking lever to prevent accidental draining of the tank.	X		
277	<p><b>Water Tank Level Gauge:</b> The apparatus shall be equipped with one (1) Class 1 "Intelli-Tank", or equivalent, level gauge on the pump operator's control panel. The tank level gauge shall indicate the water level on an easy to read LED display and show increments of 1/8 of a tank. The tank level gauge system shall include:</p> <p>1) A pressure transducer that is mounted on</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>the outside of the tank in an easily accessible area.</p> <p>2) A super bright LED 4-light display with a visual indication at nine accurate levels.</p> <p>3) A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.</p>	X		
278	<p><b>Control Panel:</b> The left side of the pump enclosure shall be divided into two sections. The lower section shall be where all valve controls, the primer control, the discharge relief valve controls (pilot valve), and other mechanical controls are located. This surface shall be referred to as the "control panel".</p> <p>All valve controls shall be the self-locking type, activated by either direct control or with a direct linkage utilizing friction locking bell cranks and universal ball swivels. The primary valve handles shall have color coded tags installed in a recessed area to clearly denote the purpose of each control.</p>	X		
279	<p><b>Instrument Panel:</b> The surface above the control panel shall contain all instruments, gauges, test fittings, and optional controls. This surface shall be referred to as the "instrument panel". The instrument panel shall be independent and hinged and latched so that it may be opened. All instruments, gauges, and other equipment shall be installed with sufficient slack in any cabling, tubing, or plumbing to allow the panel to swivel to the fully open position.</p> <p>The instrument and gauge panel shall be vertically hinged "swing out" to provide access for service.</p>	X		
280	<p><b>Color Coded Labels:</b> To improve identification of discharges and intakes, color coded tags shall be provided. The tags shall utilize an etching process to provide easy visibility and improved field service life. Tags shall be affixed using an industrial grade adhesive backing, eliminating the need for pop rivets or screws into the panel or control handle.</p>	X		
281	<p><b>Right Side Pump Panel:</b> A single panel shall be installed on the right side of the pump enclosure. This shall be the area where any right side discharges, inlets, steamers, and other pump associated equipment are located. This panel shall be easily removable and held in place with quick release push latches. It shall be fully removable</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	for pump and plumbing access without the need to use hand tools. Any electrical equipment that may be installed shall be equipped with connectors so they may be easily separated from the opening created when the below described front access panel is removed.	X		
282	<b>Pump Panel Lights:</b> The pump operator's control panel and the right side pump panel shall each be illuminated by an On Scene, or equivalent, LED night stick lighting.  The pump panel lights shall become energized upon setting the parking brake so the gauge information provided may be consulted at any time the apparatus is parked.  A shield shall be installed over the pump panel lights to further protect them from the elements and to act as a reflector for additional illumination.	X		
283	<b>Panel Surfaces:</b> The control panel, instrument panel, and right side pump panel shall be coated with a thermoplastic material for maximum resistance to abrasion and to minimize glare. The material shall be capable of withstanding the effects of extreme temperatures and weather.	X		
284	<b>Pressure/Vacuum Test Ports:</b> Class 1 model 115100, or equivalent, pressure and vacuum test ports shall be provided on the pump panel.	X		
285	<b>Pump Cooler Valve:</b> Class 1 model 38BV, or equivalent, pump cooling control valve shall be provided on the pump panel.	X		
286	<b>Engine Cooler Valve:</b> Class 1 model 38BV, or equivalent, pump cooling control valve shall be provided on the pump panel.	X		
287	<b>White Face/Black Numeral Gauge Display:</b> The master pump gauges and individual pressure gauges shall have a white face with black numbers and lettering providing a high contrast to allow the gauges to be easily read by the operator.	X		
288	<b>Master Pump Gauges:</b> The pump vacuum and pressure gauges shall be supplied by Thuemling, or equivalent. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operation to minus 40 degrees and to reduce lens condensation. The gauge shall read -30-0-400 PSI and shall be a minimum of 4½ inches in diameter.	X		
289	<b>Dunnage Compartment:</b> There shall be a dunnage compartment above the pump	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	compartment. The dunnage compartment shall be constructed of Tread Brite.			
290	<b>Independent Pump Compartment:</b> The main body and the pump compartment shall be fabricated as individual units. Both the body and pump compartment shall be fabricated using precision holding fixtures to ensure proper dimensions. All attachment points shall be heavily reinforced.	X		
291	<p><b>Aluminum Body Construction:</b> The apparatus body shall be fabricated from 1/8 inch thick 5052-H32, smooth aluminum sheet. The complete apparatus body shall be fabricated utilizing the break and bend techniques in order to form a strong, yet flexible, uni-body structure. The body shall be constructed with holding fixtures to ensure proper dimensioning. The apparatus body shall be designed to meet the unique requirements as specified.</p> <p>The main body compartments on each side, as well as the rear center compartment if applicable, shall contain a sweep out floor design. Each compartment shall be made to the most practical dimensions in order to provide maximum storage capacity. The door opening threshold will be positioned lower than the compartment floor permitting easy cleaning of the compartments.</p> <p>Continuous, solid welded seams shall be located at the upper front and upper rear corners of the apparatus body. The flooring of all lower, main body compartmentation shall also have solid weld seams. All door jams, on both the top and the bottom, shall be solid welded. Each main door jam shall consist of a double jam design, comparable to a double struck frame design, which provides superior strength and durability. All double door jams are to be welded together utilizing the plug weld technique. All remaining compartment walls shall be stitch welding.</p> <p>The compartment floors, specifically L1 and R1 (found in item 295 and 296 below), shall have a minimum of two (2) 1 inch x 2 inch rectangular tubes welded to the entire width of the compartment floor. The two (2) rear side compartments as well as the rear center compartment, if applicable, shall be welded to the rear deck support structure. This rear deck</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>support structure is specially designed for the galvanized apparatus body substructure. A minimum of two (2) squares tubes, which are ¼ inch x 3 inches x 3 inches, shall run the entire width of the body from sidewall to sidewall. Each lower, rear compartment will be adequately stitch welded to the cross tubes providing strength and durability to the entire apparatus body.</p> <p>The body design shall include a "false wall" design in the lower portion of each lower, rear compartment. This is required in order to allow for easy accessibility to the rear electrical components found in the rear taillight cluster area.</p> <p>The upper area of the apparatus body directly above the side compartment door openings, shall have a header fabricated from smooth, aluminum sheet. This area shall be free from any body seams and shall be painted the same color as the apparatus body. The height of the header may vary depending on the following factors: apparatus design, lettering requirements, scene lights and warning light requirements as well as various other options.</p>	X		
292	<p><b>Body Sub Frame:</b> To assure proper body alignment and clearance, the body sub frame shall be constructed in a jig and fitted directly to the chassis.</p> <p>The chassis frame rails shall be fitted with fiber reinforced rubber to isolate the body frame members from direct contact with chassis frame rails.</p> <p>The main body sub frame shall be constructed from steel tubing. The sub frame shall run the full length of the body and shall be spaced the same width as the chassis frame rails. The main sub frame shall also be the integral support for the water tank. Vertical drop tubes shall be welded to the sub frame. From these vertical drop tubes shall extend cross members constructed of steel angle. These cross members shall extend out to support the compartments. Cross members shall be located at the front and rear of the body and in front and rear of the wheel well opening.</p> <p>The compartment area behind the rear axle shall be supported by a drop frame fabricated of steel tube and steel angles. The rear drop frame shall be constructed using vertical drop tubes, welded</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>to the main sub frame. All drop frame structures shall be welded directly to the body sub frame to allow the body to be a completely separate structure from the chassis.</p> <p>After fabrication the sub frame shall be hot dip galvanized for maximum protection against corrosion.</p>	X		
293	<p><b>Body Mounting:</b> The body sub frame shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece bracket. The two (2) brackets shall be fabricated of steel plates. The plates shall be painted to prevent any corrosion. Each mounting assembly shall utilize two (2) plated bolts and two (2) heavy duty springs. The assembly design shall allow the body and sub frame to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall limit stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strain due to load and chassis movement. Body mountings that do not allow relief from chassis movement shall not be acceptable.</p>	X		
294	<p><b>Tank Mounting:</b> The water tank shall rest on the sub frame cross members which are spaced as required by the tank manufacturer.</p> <p>The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum Rockwell hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operations.</p> <p>Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restrains to minimize movement during vehicle operations. The tank shall be completely removable without disturbing or dismantling the apparatus structure.</p>	X		
295	<p><b>Left Side Compartments:</b> COMPARTMENT L1</p> <p>There shall be a full height compartment located ahead of the rear wheel on the left side of the apparatus body. This compartment shall be</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>designated as L1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a double, vertically hinged swing-out door.</p> <p>COMPARTMENT L2 A compartment shall be located above the rear wheel on the left side of the apparatus body. This compartment shall be designated as L2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.</p> <p>COMPARTMENT L3 There shall be a full height compartment located behind the rear wheel on the left side of the apparatus body. This compartment shall be designated as L3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.</p>	X	X	A double door is not required. Proposed a single door.
296	<p><b>Right Side Compartments:</b></p> <p>COMPARTMENT R1 There shall be a full height compartment located ahead of the rear wheel on the right side of the apparatus body. This compartment shall be designated as R1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a double, vertically hinged swing-out door.</p> <p>COMPARTMENT R2 A compartment shall be located above the rear wheel on the right side of the apparatus body. This compartment shall be designated as R2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.</p> <p>COMPARTMENT R3 There shall be a full height compartment located behind the rear wheel on the right side of the apparatus body. This compartment shall be designated as R3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.</p>	X	X	A double door is not required. Proposed a single door.
297	<p><b>Transverse Rear Compartments:</b> The rear lower compartment shall be transverse from the left side</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	of the body to the right side of the body.			
298	<p><b>Rear Compartments:</b>  <b>COMPARTMENT T1</b>  There shall be a single compartment located at the rear of the apparatus. This compartment shall be designated T1 within these specifications and any ensuing paperwork or drawings after contract execution. The compartment shall be equipped with a roll-up door.</p> <p><b>COMPARTMENT T2</b>  There shall be a compartment located in the hose bed area designed for storage of two (2) ten foot sections of 5 inch hard suction hose, two (2) EMS backboards and one (1) 6 foot rubbish hook with D handle.</p>	X		
299	<p><b>Compartment Lighting:</b> All compartments shall be furnished with an LED compartment light mounted on the front corner of the compartment.</p> <p>All compartments that are equipped with a lap style door with an opening 42 inches or wider shall have a light installed on the front corner and rear corner of the compartment.</p> <p>The lights shall be rated at 100,000 hours of service with 74 lumens per 18 inch light. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8 inch polycarbonate tube. Multi clip attachments shall allow for installation into any roll up, or standard door configuration.</p> <p>An automatic door switch shall activate all compartment lights.</p>	X		
300	<p><b>Compartment Scuff Plates:</b> Anodized aluminum angle scuff plates shall be installed in the bottom sill area of all major equipment carrying compartments to reduce paint damage from equipment. The scuff plates shall be attached using a permanent bonding double sided tape.</p>	X		
301	<p><b>Compartment Door Construction:</b>  Compartment doors shall be of double panel construction. The outer panel shall be fabricated of .190, 5052-H32 aluminum and the inner panel of .125, 3003-H14 aluminum. There shall be a heavy duty automotive type extruded rubber molding installed on the overlap area of the doors to insure a weatherproof seal and prevent water from collecting in the door sills. All of the compartment doors shall have a polished stainless</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	steel continuous hinge connected to both the body and the door with stainless steel bolts and nuts. The hinge pin shall be stainless steel with a minimum diameter of ¼ inch.	X		
302	<b>Compartment Non-Locking Door Handles, Double Pan Doors:</b> Compartment door handles shall be non-locking stainless steel recessed "D" ring type handles. There shall be a safety latch with striker plate included with the door handle assembly.	X		
303	<b>Compartment Door Holders:</b> Cleveland style spring loaded door holders shall be furnished on all vertically hinged, swing-open compartment doors to hold the doors in either fully open or partially closed position. The spring-loaded door holder shall close the door automatically when it is positioned past center or return the door to the fully open position if the center point is not reached and the door is released. On compartments having double doors, the secondary door shall have a latch mechanism to secure the door when the primary door is opened. The door strut attachment tabs will be designed in such a way to prevent them from cracking or breaking due to stress.  Pressurized gas filled cylinders shall be furnished on all horizontally hinged, lift-up compartment doors to hold the door in the open position and assist in raising it. The gas filled cylinders shall assist in closing the door automatically when the door is positioned over center.	X		
304	<b>NFPA Step Requirements/Folding Steps:</b> All steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of at least 500 pounds. Steps shall be adequately lighted.  Each folding step shall have two large open slots to prevent buildup of ice or mud and to provide a handhold when necessary.  Steps shall be provided for the following locations: <ul style="list-style-type: none"> <li>• Three (3) folding steps on the left front compartment</li> <li>• Three (3) folding steps on the right front compartment</li> </ul>	X		
305	<b>Right Side Pump Access Door:</b> There shall be a Tread Brite door above the right hand side pump	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	panel to allow access to the pump compartment. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing a push button latch. A gas strut shall be provided on the door. This door shall be wired into the door ajar warning light circuit. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint fro chipping and scratching.	X		
306	<b>Front Pump Access Door:</b> There shall be a Tread Brite access door panel provided on the front of the pump compartment. The panel shall b of the single pan design and shall be positively latched in the closed position utilizing a push button latch. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. The area shall be accessible when the cab is tilted.	X		
307	<b>Compartment Venting:</b> Each body compartment shall be properly vented in a manner that will reduce the amount of dirt and water that may enter the compartment. Venting shall be directly to the atmosphere rather than into another compartment. The vent opening, which is located in the lower corner of the compartment, shall have filter which is easily removable to allow cleaning. Each compartment shall be equipped with drain holes to allow standing water to exit.	X		
308	<b>Heat Deflector Shield, Exhaust:</b> A deflector shield shall be provided to aid in dissipating exhaust heat from adversely affecting anything stored in the body.	X		
309	<b>Left Side Modular Running Board:</b> A modular running board shall be installed on the left side of the pump compartment module. The running board shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.  All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.	X		
310	<b>Right Side Modular Running Board:</b> A modular running board shall be installed on the right side of the pump compartment module. The running board shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>to maintain a uniform appearance.</p> <p>All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.</p>	X		
311	<p><b>Modular Rear Deck:</b> A modular bolt-on deck shall be installed on the rear of the apparatus to form a full width step area. The rear deck shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.</p> <p>All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.</p>	X		
312	<p><b>Stainless Steel Screws:</b> Stainless steel screws shall be provided throughout the body in locations such as overlays, pump panels, and other numerous hardware mounting locations. Screws shall be type 410 stainless steel containing 2% molybdenum, or equivalent.</p>	X		
313	<p><b>Stepping, Standing, Walking Surfaces:</b> All exterior surfaces designated by the manufacturer as stepping, standing or walking areas shall be constructed of grip strut or textured Tread Brite and shall provide a highly slip resistant surface, even when the surface is wet. All interior surfaces designated by the manufacturer as stepping, standing or waling areas shall be slip resistant when the surface is dry.</p> <p>The degree of slip resistance shall be in compliance with the intent of NFPA 1901 newest edition.</p> <p>The apparatus should utilize aluminum tread plate as an overlay of the main apparatus body structure. Aluminum tread plate may also be utilized in the construction of enclosure doors, lids and covers, where applicable. Aluminum tread plate is not to be utilized as a main structural member of the apparatus body or pump enclosure.</p>	X		
314	<p><b>Tread Brite Overlays:</b> There shall be aluminum Tread Brite overlays installed on the apparatus in those areas designated as walking areas or where additional scuff protection of the apparatus finish is desired.</p> <p>The top Tread Brite overlay shall be mounted flush with the outer edges of the apparatus body.</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>A "J" channel shall be incorporated into the body design in order to provide a rain gutter to further assist in preventing excessive moisture from getting into the compartments.</p> <p>Overlays shall be totally insulated from the apparatus with nylon shoulder washers that extend into the hole that is drilled into the body. Stainless steel cap nuts shall be employed where bolts may damage equipment or cause injury. After painting and final construction overlays shall be additionally sealed at the edges with a caulking compound. In addition the following areas shall also be sealed with caulking compound:</p> <ul style="list-style-type: none"> <li>·Front compartment vertical areas on both sides.</li> <li>·Above the forward section of the water tank.</li> </ul>	X		
315	<p><b>Rear Wheel Wells:</b> The fenders shall be integral with the body side and compartments with a seamless appearance. The fenders shall be fitted with bolt-in removable full circular inner lines in the wheel well area for ease of cleaning and maintenance. There shall be sufficient clearance provided in the wheel well to allow the use of tire chains when the apparatus is fully loaded.</p>	X		
316	<p><b>Rear Fenderettes:</b> Two (2) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, one on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce build-up of road grime. The stainless steel fenderettes shall be polished to a high quality finish.</p>	X		
317	<p><b>Road Rub Rails:</b> Rub rails shall be installed beneath the compartment doors to protect them from damage should the body be brushed or rubbed against another object. The rub rails shall be 3/16 inch aluminum channel, 2½ inch x 1 inch. The rub rails shall be highly polished and then bright dip anodized. Rub rails shall be installed on the body utilizing non-corrosive nylon spacers and secured with stainless steel bolts. The outside edge of the rub rails shall be even with the fenderettes and bolt-on steps to prevent snagging.</p>	X		
318	<p><b>Rear Tow Hook:</b> One (1) rear tow hook shall be installed directly below the rear of the chassis frame rails. The tow hook shall be capable of a 15,000 lb straight pull rating.</p>	X		
319	<p><b>Handrails:</b> All handrails, unless otherwise stated,</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shall be constructed of knurled aluminum of not less than 1 ¼ inch diameter. All railing shields and brackets shall be chrome plated, and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.</p> <p>Location of handrails:</p> <ul style="list-style-type: none"> <li>·Horizontal rear hand rail above the rear center compartment.</li> <li>·Grab handle on top of catwalk on the left side of the apparatus in front of the tank fill tower.</li> <li>·Grab handle on top of catwalk on the right side of the apparatus.</li> <li>·Left rear vertical hand rail from top of body to just above the rear step.</li> </ul>	X		
320	<p><b>Hydraulic Ladder Rack with Pike Pole Storage:</b> The ladders shall be mounted above the high compartments on the right side of the apparatus on a pivoting ladder rack. The pivoting ladder rack shall be operated hydraulically, lowering the ladders firmly to shoulder height for easy removal and reloading.</p> <p>The hydraulic ladder rack shall be painted the same color as the apparatus and shall have space available for two (2) pike poles to be stored directly on the ladder rack. The control switch shall be located on the right side of the body to allow viewing the ladder rack when operating the mechanism. The control shall be wired to the parking brake and shall only be operable when the parking brake is applied.</p> <p>When in the up position the ladder rack lifting mechanism shall be fully retracted into the apparatus body and shall be flush with the side of the apparatus. Pilot operated check valves shall be installed in the hydraulic system to lock the rack in the stored position by maintaining pressure on the hydraulic cylinder.</p> <p>There shall be a master shut off switch and a flashing indicator light on the chassis dash to warn the driver when the ladder rack is in the down position or in motion when the chassis parking brake is disengaged. The warning light shall be operative regardless of the position of the master switch. Reflective striping shall be applied to the ladder rack assembly in a manner that will readily</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>indicate a hazard or obstruction to personnel.</p> <p>In addition to the reflective striping, Whelen TIR3 series, or equivalent, LED lights shall be affixed to the front and rear of the ladder rack. These lights shall automatically become energized any time the ladder rack is not fully bedded.</p>	X		
321	<p><b>Ground Ladder Brackets:</b> The ground ladder brackets shall provide a quick method of removing and reloading the ladders. A quick release shall allow personnel to loosen and unhook the strap in order to remove the ladder and a ratchet style mechanism shall securely and easily fasten the ladders back into place.</p> <p>In addition to the brackets, the following shall also be provided:</p> <ul style="list-style-type: none"> <li>·One (1) 10' folding attic ladder, Duo Safety 585A with one (1) set of Zico model FLB mounting brackets</li> <li>·One (1) 14' roof ladder, Duo Safety 775A</li> <li>·One (1) 24' Two section extension ladder, Duo Safety 900A</li> <li>·One (1) 8' Fiberglass Pike Pole, Duo Safety FP8</li> <li>·One (1) 10' Fiberglass Pike Pole, Duo Safety FP10</li> </ul>	X		
322	<p><b>Adjustable Shelving/Shelves:</b> In each compartment there shall be two (2) strut channels, one (1) per side, installed in compartments to all for maximum adjustability of shelves.</p> <p>There shall be one (1) adjustable shelf in each compartment constructed of 3/16 inch aluminum sheet with 2 inch lips. The shelves shall be coated with Line-X™, or equivalent, thermoplastic polyurethane coating. The shelves shall be fabricated in such a manner that liquids readily drain when spilled.</p>	X		
323	<p><b>Roll Out Equipment Tray:</b> There shall be one (1) roll out tray installed on the apparatus. The tray shall be provided with a SlideMaster™ model SM2-MP roller type assembly, or equivalent. The roller assembly shall have a rated capacity of 600 pound distributed load and shall have 70% extension capabilities. A mechanical lock assembly shall be provided to lock the tray in the extended position and the retracted position. The tray shall be constructed of 3/16 inch aluminum sheet with 3 inch lips. The tray shall be coated</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>with Line-X™, or equivalent, thermoplastic polyurethane coating.</p> <p>The tray roller assembly shall have a powder coated finish for added corrosion protection.</p>	X		
324	<p><b>Roll Out Drawers:</b> Compartment R1 shall contain three (3) roll out drawers built into the compartment suitable for storage of various small hand tools.</p>	X		
325	<p><b>Air Bottle Compartments:</b> There shall be a minimum of four (4) single cylinder air bottle compartments installed in the rear wheel well area. The tubes shall be constructed from injection molded plastic to assist in preventing damage to the air cylinders. There shall be drain hole in the rear of the compartment.</p> <p>The single air bottle compartment shall have Cast Products, or equivalent, hinged door. All hinges and mounting hardware shall be concealed. A Southco lever latch, or equivalent, shall be utilized for opening and securely closing the door. A gasket shall be provided to keep the inside of the compartment dry.</p>	X		
326	<p><b>Hose Bed Capacity:</b> The hose bed shall have the capacity for 600 feet of 5 inch LDH fire hose, 600 feet of 2 ½ inch double jacketed fire hose and two (2) bed of 200 feet of 1¾ inch double jacketed fire hose. Each hose bed shall be divided by adjustable dividers.</p>	X		
327	<p><b>Hose Bed Flooring:</b> The floor of the hose bed compartment shall be constructed of Dura-Dek, or equivalent, fiber reinforced plastic material. The flooring shall be fabricated of "T" beam pultrusions in parallel connected with cross slats that are first mechanically bonded and then epoxied, forming a large sheet.</p> <p>The top portion of each "T" cross section shall measure 1¼ inches wide and 3/16 inch thick with beaded ends. The vertical portion shall be 3/8 inch thick, beading out at the bottom to a thickness of ½ inch and tall enough to result in an overall height of 1 inch. The "T" sections shall be spaced ¾ inch apart to allow for drainage and ventilation.</p> <p>Each "T" beam shall be constructed utilizing a core of 250,000 continuous glass fiber strands that are high in resistance to tension, compression and bending. An outer sheath consisting of a</p>	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>continuous strand mat to prevent lineal splitting and slipping shall surround the core. The sheath shall also serve to draw the protective resin to the bar surface. Both reinforcements shall be pulled through an isophthalic polyester resin, treated with antimony trioxide for fire resistance, to form a solid length.</p> <p>The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. The bright white coating shall be baked on.</p>	X		
328	<p><b>Aluminum Hose Bed Partitions:</b> Hose bed partitions shall be installed in the hose bed. The partitions shall be fabricated from ¼ inch smooth aluminum plate and an aluminum extrusion.</p> <p>The partitions shall be mounted on hot-dipped galvanized slide rails at the front and rear of the hose bed.</p> <p>Where no obstruction such as a fill tower is present, the slide rails shall allow full movement of the partition along the width of the hose bed. Each hose bed partition shall have an oval shaped hand hold slot to assist in moving the partition. This shall provide the capability for variable hose load configurations and capacities.</p>	X		
329	<p><b>Vinyl Hose Bed Cover:</b> There shall be a heavy duty vinyl coated nylon hose bed cover installed don the apparatus. The front edge of the cover shall be retained in a "C" channel to prevent wind from lifting it. In addition, the end flap shall be secured with a positive means to prevent unintentional deployment of the hose.</p>	X		
330	<p><b>Wiring Harnesses:</b> Wiring harnesses shall be the automotive type, engineered specifically for the builder's apparatus, and shall meet the following criteria. Under no circumstances shall diodes, resistors, or fusible links be located within the wiring harness. All such components shall be located in an easy to access wiring junction box or the main circuit breaker area. All wire shall meet white book, baseline advanced design transit coach specification and Society of Automotive Engineers recommended practices. It shall be stranded copper wire core with cross linked polyethylene insulation complying with SAE specification J1128. Each wire shall be hot stamp function coded every three inches starting one inch from the end and continuing throughout the</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>entire harness. In addition to function coding, each wire shall be number and color coded.</p> <p>All terminals on the ends of the wiring harness shall be soldered unless a crimping tool or machine is used that gives an even and precise pressure for the terminal being used. All terminals shall be pull tested to insure their integrity.</p>	X		
331	<p><b>Outputs:</b> The outputs shall perform all the following items without added modules to perform any of the tasks.</p> <p>1. <u>Load Shedding:</u> The System shall have the capability to Load Shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like Load Shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>2. <u>Load Sequencing:</u> The System shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>3. <u>Output Device:</u> The System shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than 100 times that of a relay. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>4. <u>Flashing Outputs:</u> The System shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, or 160 FPM. This means any light can be specified with</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>5. <u>PWM</u>: The modules shall have the ability to PWM at some outputs so that a Headlight PWM module is not needed. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>6. <u>Diagnostics</u>: An output shall be able to detect either a short or open circuit. The System shall be able report in "real time" a text based message that points the maintenance person to a specific output.</p>	X		
332	<p><b>Inputs:</b></p> <p>1. The inputs shall have the ability to switch by a ground or battery signal.</p> <p>2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.</p>	X		
333	<p><b>Automatic Climate Control:</b> The Multiplex system shall have the capability to provide automatic climate control which shall occur by the use of PWM outputs and a digital readout that combines other vehicle functions. The Climate control shall be an integral part of the Multiplex system. No add-on modules shall be acceptable, the module with the outputs must perform this function.</p>	X		
334	<p><b>Auto-Throttle:</b> The Multiplex system shall be able to perform automatic high idle via a network gateway or by using an existing output on a module to provide the proper signals to an OEM Engine ECU. This task shall be handled with existing inputs and outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p>	X		
335	<p><b>Displays:</b> Displays shall be able to provide real time information regarding Load Shedding and System Status, such as network traffic/errors or shorts and open circuits.</p>	X		
336	<p><b>System Network:</b> The Multiplex system shall contain a Peer-to-Peer network. A Master Slave type network is not suitable for the Fire/Rescue industry. A Peer-to-Peer network means that all</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	the modules are equal on the network; a Master is not needed to tell other nodes when to talk.			
337	<b>System Reliability:</b> The Multiplex system shall be able to perform in extreme temperature conditions, from 40 degrees to +85 degrees C (-40 degrees to +185 degrees F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.	X		
338	<b>Weatherproof Door Switches:</b> Due the harsh environment and susceptibility to moisture on the fire ground, the fire apparatus compartment doors shall utilize weatherproof switches. Two different types of switches shall be used. Weatherproof proximity switches shall be utilized where space permits. In tight locations, mechanical weatherproof switches shall be used. <b>No Exceptions.</b>  The switches shall be used for activation of the compartment lights and shall provide a signal to the door open circuit in the cab.	X		
339	<b>12 Volt System Schematic:</b> A complete electrical schematic for the apparatus shall be provided. This schematic shall be specifically prepared for this individual unit rather than a generic schematic designed to accommodate all apparatus.	X		
340	<b>12 Volt System Test:</b> After completion of the unit, the 12 volt electrical system shall undergo a battery of tests as listed in the latest addition of NFPA Pamphlet 1901. These tests shall include, but not be limited to: a reserve capacity test, alternator performance test at idle, alternator performance test at full load, and a low voltage alarm test. Certification of the results shall be supplied with the apparatus at the time of delivery.	X		
341	<b>Rear Work Light Switch:</b> A switch shall be installed above the tail light bezel on the left side. The switch shall be wired to the backup lights to provide additional work lighting. The rear work light circuit shall be deactivated when the park brake is disengaged. In addition to the lights being activated by the above switch, the lights shall also come on when the transmission is placed in reverse.	X		
342	<b>Midship Turn Signals:</b> There shall be one (1)	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	Truck-Lite model 21, or equivalent, LED midship auxiliary/turn signal lights installed in the rub rail, on each side of the body.	X		
343	<b>Clearance Lights:</b> Grote model 65282, or equivalent, red LED clearance lights shall be installed on the rear of the body as necessary to be in full compliance with applicable ICC and DOT codes and regulations.	X		
344	<b>Ground Lighting:</b> Truck-Lite model 40, or equivalent, lights shall be installed beneath the apparatus in areas where personnel may be expected to climb on and off the apparatus. The lights shall illuminate the ground within 30 inches of the apparatus to provide visibility of an obstructions or hazards. These areas shall include, but not be limited to, side running boards and the rear step area.	X		
345	<b>Walkway Lights:</b> Lights shall be mounted in a manner that illuminates all walkways and steps for safe operation of the apparatus. These lights shall become illuminated when the parking brake is engaged.	X		
346	<p><b>Firecom 3010 Intercom:</b> There shall be a Firecom 3010 intercom system provided on the apparatus. The system shall include six (6) positions in the cab, and one (1) at the pump panel. Each position in the system shall have intercom capabilities.</p> <p>The following positions shall have radio interface capabilities: Driver, Officer, and Pump Panel.</p> <p>There shall be two (2) Firecom model UH-10, part number 105-0192-00 under the helmet, radio transmit headsets included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a red push to talk button.</p> <p>There shall be four (4) Firecom model UH-20, part number 105-0193-00 under the helmet, intercom only headset(s) included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a momentary push and hold to talk button.</p> <p>There shall be one (1) Firecom model HE-150, part number 108-0675-15, 15 foot coiled</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>extension cable(s) supplied. The cable shall be compatible with any single plug Firecom headset.</p> <p>There shall be six (6) Firecom HM-10, headset plug-in modules, part number 107-0407-00 installed. The modules are designed for interior mounting and shall accommodate a Firecom single plug headset.</p> <p>There shall be one (1) Firecom model PP-20, part number 107-0413-00, waterproof headset module installed. The module shall have a snap tight spring hinged lid to protect against moisture and allow for exterior mounting. The module shall be designed to accommodate Firecom single plug headsets.</p>	X		
347	<b>Mobile Radio Interface Cable, Firecom:</b> There shall be a Firecom mobile interface cable provided with the intercom system. The cable is radio specific and will allow the Firecom intercom system to interface with the mobile radio system. The mobile radios being used are Motorola XTL-2500.	X		
348	<b>Pump Compartment Lights:</b> There shall be two (2) LED lights installed in the pump compartment. The lights shall be activated by an automatic switch in the right side pump compartment access door and shall be located in a manner that will provide maximum lighting.	X		
349	<b>Tail Lights:</b> There shall be a Whelen 600 series, or equivalent, LED tail light assembly installed on each side of the rear of the apparatus. Each assembly shall include one (1) red LED stop/tail light model number 60R00BRR, one (1) amber LED model 60A00TAR turn light with arrow and one (1) clear halogen backup light model 60F000CR. The lights shall be mounted in a chrome plated composite housing.	X		
350	<b>Streamlight Rechargeable Lights:</b> There shall be two (2) Streamlight model 45102 20 watt spot, rechargeable LiteBoxes supplied and installed on the apparatus. The lights shall be wired direct to the chassis batteries	X		
351	<b>Customer Supplied Radio and Antenna:</b> There shall be one (1) City supplied radio and one (1) City supplied antenna shipped to the apparatus manufacturer for installation.	X		
352	<b>Onan Hydraulic Generator Set:</b> An Onan model 8RBAB hydraulic driven generator set shall be installed on the apparatus. The generator shall be rated at 8,000 watts at 120/240 volts. Current	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>frequency shall be stable at 60 hertz. The power generating unit shall be modular unit, housed in stainless steel with an acoustical material added for maximum sound dampening. The module shall consist of the hydraulic motor, generator, blower, cooler, and all other necessary components.</p> <p>For ease of maintenance, the only part of the system that shall require accessibility shall be the oil reservoir which shall be located so as to facilitate periodic checks and the adding of hydraulic fluids.</p>	X		
353	<p><b>Warranty Period:</b> Onan shall warrant that the 8RBAB series hydraulic generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery.</p> <p>A ninety (90) day adjustment policy shall be free of charge. This policy provides that Cummins Inc. will make minor adjustments to the generator set during the first three (3) months of ownership.</p> <p>In addition to the five (5) year or one thousand (1,000) hour warranty, a travel time repair allowance of 2-1/2 hours and mileage cost up to one hundred (100) miles shall be included for the first two (2) years</p>	X		
354	<p><b>Generator Hot Shift PTO Connection:</b> The hydraulic pump for the generator system shall be connected to the chassis transmission through a "Hot Shift", electrically engaged power-take-off system. The control to engage and disengage the power-take-off system shall be installed in the chassis cab.</p>	X		
355	<p><b>Generator Display Meter:</b> There shall be an LED generator display meter provided with the generator. The display meter shall automatically sense a generator signal and begin displaying information. The digital meter display shall constantly monitor and display voltage, frequency and amps. The display shall be capable of displaying total accumulated run time hours when the MODE button is pressed once. When the MODE button is pressed twice the display shall show the temperature of the oil returning to the oil reservoir.</p> <p>The frog display shall be located on the pump panel.</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
356	<b>Load Center:</b> The entire 120/240 volt electrical system shall be installed in strict compliance with NFPA Pamphlet 1901 newest edition. This shall include all testing, labeling, wiring methodology, and dimensional requirements. Certification of compliance shall accompany the apparatus at the time of delivery. There shall be a 120/240 volt load center incorporated into the 120/240 volt wiring system. The load center shall include adequate circuit breakers to protect the loads specified on this apparatus. All 120/240 volt A.C. wiring shall be done in accordance with NFPA Pamphlet 1901 as well as nationally accepted electrical codes.	X		
357	<b>Branch Circuit Over Current Protection:</b> Over current protection devices shall be provided for circuits in accordance with NFPA 1901 newest version. The load center shall be equipped with a non-GFI two pole main breaker when the six (6) or more individual branch circuits are present. Over current protection devices shall be marked with labels to identify the function of the circuit they protect.	X		
358	<b>Protective Covers and Enclosures for Electrical Terminals:</b> All ungrounded electrical terminals shall have a protective cove or be in an enclosure.	X		
359	<b>120 Volt Twist Lock Receptacles:</b> There shall be two (2) NEMA L5-20 120 volt 20 ampere rating twist lock type receptacles wired to the generator. The receptacles shall have spring loaded weather resistant covers.	X		
360	<b>Rear Cab Wall Telescoping Light Mounts:</b> The following 240 volt telescoping lights shall be mounted to the rear of the cab: <b>Telescoping 240 Volt Lights:</b> There shall be Two (2) Fire Research NightMaster model LTA510-M12 telescopic lights installed. The light poles shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position.  The lamphead shall have one (1) quartz halogen 1000 watt 240 volt bulb. The bulb shall draw 4.2 amps and generate 22,000 lumens. The bulb shall be accessible through the front. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a star shaped locking knob. The lamphead shall be no more than 5 3/8 inches deep by 10 1/2 inches	X		



	SPECIFICATION	Meets	Does Not Meet	Comments
	high by 16 ½ inches wide. Lamphead and mounting arm shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.  The above 240 volt light shall be controlled with the circuit breaker.	X		
361	<b>Mounted Portable Halogen Work Lights:</b> There shall be two (2) halogen work lights mounted to the top of the apparatus at the rear (one each side). The lights shall be equipped so they can be activated from inside the cab for scene lighting and can also be unplugged and removed for use with the cord reel or other electrical receptacles.	X		Proposed two additional receptacles for these lights which exceeds your requirements.
362	<b>Electric Cord Reel:</b> There shall be one (1) 120 volt electric rewind cord reel installed on the apparatus with a rewind button installed for 12 volt rewinding of the cord reel. The reels shall be equipped with 20 feet of cord installed with a cable stop to prevent damage to cable. Rollers shall be supplied to prevent damage to electrical cable if pulled in any direction.  The cord reel shall be located as determined at the pre-construction meeting.	X		
363	<b>Cord Reel Junction Box:</b> There shall be one (1) electrical junction box equipped with four (4) electrical receptacles mounted to the cord reel. Each receptacle shall be twist lock type and equipped with a spring loaded snap cover. The cord reel shall be prewired to the junction box to supply power to the four receptacles. Each side of the junction box shall be fitted with faceplates which are back lighted so that plug orientation to the receptacles is quick and easy to align.  Junction box mounting shall be located as determined at the pre-construction meeting	X		
364	<b>Deutsch Plugs on Warning Lights:</b> All warning lights shall be supplied with Deutsch plugs connectors.	X		
365	<b>Upper Zone A Visual Warning:</b> There shall be one (1) custom length 82 inch light bar installed on the chassis cab roof with Whelen Engineering model FN72VLED, or equivalent, and part number 9LLTH82, or equivalent, added to make the total length 82 inches. The light bar shall be equipped with two (2) forward facing linear "Red" LED's, two (2) forward facing linear "White" LED's, two (2) corner forward facing	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>"Red" LED's, and two (2) corner rear facing "Red" LED's.</p> <p>The light bars shall be equipped with clear lenses. All clear LEDs in the light bar shall be deactivated in the Blocking Right of Way mode.</p>	X		
366	<p><b>Opticom Emitter:</b> There shall be one (1) low profile LED Opticom emitter located in the light bar. The emitter shall be have a performance range of up to 2,500 feet to provide preemption of all intersections equipped with the Opticom infrared system.</p> <p>The emitter shall be wired in such a manner as to be disabled when the park brake is set. A switch in the main switch panel shall control the unit in conjunction with the park brake circuit.</p>	X		
367	<p><b>Upper Zone C Visual Warning:</b> There shall be two (2) Whelen Engineering model MCFLED2R Micro Edge, or equivalent, LED lights installed high at the rear of the apparatus. The lights shall have red lenses.</p>	X		
368	<p><b>Lower Zone B Visual Warning:</b> There shall be one (1) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>	X		
369	<p><b>Lower Zone C Visual Warning:</b> There shall be two (2) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>	X		
370	<p><b>Lower Zone D Visual Warning:</b> There shall be one (1) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>	X		
371	<p><b>Thermoplastic Coating:</b> In the designated areas (found in item 372 below) Line-X™, or an equivalent two component spray-in-place thermoplastic polyurethane system, shall be used for maximum protection of the body and equipment. The system shall utilize flexible 100% solids applied with high pressure impingement-mix polyurethane dispensing equipment.</p> <p>The coating shall be a fast cure, textured surface, multi-purpose material designed for commercial and industrial applications. It shall exhibit excellent adhesion to the body and serve as a protective, abrasion resistant liner where applied.</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	The density of the material shall be a minimum of 70 PCF as measured using ASTM test method D-1622. The taber abrasion resistance shall be a minimum of 0.03% per 1000 cycles as measured utilizing ASTM test method D-4060. The minimum tensile strength as measured using ASTM D-2370 shall be 1540 pounds per square inch	X		
372	<b>Body Compartmentation Coating:</b> The interior of the body compartments shall be coated with a gray thermo-plastic polyurethane coating. The coating shall be durable enough to withstand every day abuse of equipment removal and shifting.	X		
373	<b>Body Paint Preparation:</b> After the body and components have been fabricated and assembled they shall then be disassembled prior to painting so when the apparatus is completed there shall be finish paint beneath the removable components. The body shall be totally removed from the chassis during the painting process to insure the entire unit is covered. The apparatus body and components shall be metal finished as follows to provide a superior substrate for painting.  All aluminum sections of the body shall undergo a thorough cleaning process starting with a phosphoric acid solution to begin the etching process followed by a complete rinse. A chemical conversion coating shall be applied to seal the metal substrate and become part of the aluminum surface for greater film adhesion.  After the cleaning process the body and its components shall be primed with a High Solids primer and the seams shall be caulked.  All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be heavily chrome plated. Iron fittings shall be copper underplated prior to chrome plating.	X		
374	<b>Paint Process:</b> The paint process shall follow the strict standards as set forth by PPG Fleet Finish Guidelines.  The body shall go through a three-stage paint process: primer coat, base coat (color), and clear coat. In the first stage of the paint process the body shall be coated with PPG F3980 Low VOC / High Solids primer to achieve a total thickness of	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>2-4 mills. In the second stage of the paint process the body shall be painted with PPG FBCH Delfleef™ High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve hiding. In the final stage of the paint process the body shall be painted with PPG DCU-2002 Clear Coat. A minimum of two to three coats shall be applied to achieve a total dry film thickness of 2-3 mills.</p> <p>As part of the curing process the painted body shall go through a Force Dry / Bake Cycle process. The painted components shall be baked at 185 degrees for 3 hours to achieve a complete coating cure on the finished product.</p>	X		
375	<p><b>Hand Polished:</b> After the force dry / bake cycle and ample cool down time, the coated surface shall be sanded using 3M 1000, 1200, and or 1500 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed with 3M super duty compound to add extra shine to coated surface. No more than .5 mil of clear shall be removed in this process.</p>	X		
376	<p><b>Apparatus Body Color:</b> The apparatus shall be painted with PPG High Solids Polyurethane Base Coat. The apparatus shall be painted (RED) PPG #FBCH - 71096-ALT.</p>	X		
377	<p><b>Touch Up Paint:</b> One (1) two ounce bottle of acrylic enamel touch up paint or two (2) touch up paint pens, if color is available, shall be supplied.</p>	X		
378	<p><b>NFPA Compliant Reflective Striping:</b> Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with the National Fire Protection Associate Pamphlet 1901, latest edition. It shall consist of a straight, 6 inch wide stripe along the front of the chassis and along the sides, staying below the tops of the wheel well areas. The reflective striping shall be white in color</p>	X		
379	<p><b>Chevron Reflective Striping:</b> In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The reflective striping shall cover at least 50% of the rear facing vertical surface, per NFPA 1901 newest edition. The striping shall consist of alternating red and yellow, fluorescent yellow or fluorescent yellow-green reflective stripes. Each stripe shall be a minimum of inches wide and shall be applied to</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	the apparatus at 45 degree angle. The chevron striping shall consist of 3M part numbers 1172 EC, red and 3983, fluorescent yellow-green.	X		
380	<b>Rub Rail Reflective Striping:</b> There shall be 2 inch reflective striping installed in the rub rail channel. The reflective striping shall be diamond grade quality material for increase visibility. The reflective shall be silver in color.	X		
381	<b>Undercoating:</b> The apparatus shall undergo a two (2) step undercoating process. The first step shall be a rubberized polyurethane base compound that is applied after the body has been primed. The materials used shall incorporate unused paint products to reduce the amount of waste released into the environment. This coat shall be applied to all hidden pockets and surfaces that shall not be visible after completion. As a final step, the entire underside of the body shall be coated with a bituminous based automotive type undercoating when the apparatus is completed. During this application, special care shall be taken to avoid spraying the product on air lines, cables, or other items that would cause normal maintenance to be hindered.	X		
382	<b>Mud Flaps (4):</b> There shall be two (2) mud flaps at the front of the chassis and two (2) at the rear of the unit. The mud flaps shall be a minimum of 3/8 inch thick to prevent "sailing".	X		
383	<b>Wheel Chocks and Mounting:</b> There shall be one (1) pair of Cast Products Inc., or equivalent, wheel chocks provided with the apparatus. The chocks shall be mounted in brackets that are easily accessible under the left side body.	X		
384	<b>Additional Hardware:</b> There shall be one (1) bag of stainless steel nuts, bolts, and washers supplied with the apparatus for mounting of equipment.	X		
385	<b>Helmet Brackets, OEM Supplied:</b> The apparatus manufacturer shall supply brackets for mounting helmets in the chassis cab. These brackets shall comply with NFPA 1901, newest edition, and shall meet the 9G requirements. The Zico model UHH-1 brackets shall hold both traditional and contemporary style helmets without any adjustments necessary. Storing and removing a helmet that is on the bracket shall be quick and easy.	X		
386	<b>Fuel Fill:</b> The fuel fill pocket shall be located in	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	the left rear wheel well area. The fuel fill shall have a Cast Products, or equivalent, aluminum door with bezel installed.	X		
387	<b>Fuel Tank Gauge Access Panel:</b> There shall be a removable panel provided in the rear compartment to allow for access to the fuel tank gauge without removing the fuel tank.	X		
388	<p><b>Manufacturing Labels:</b> A permanent plate shall be mounted in the driver's compartment specifying the quantity and type of the following fluids that may be used in the apparatus for normal maintenance. Where a fluid is not applicable to the unit, the plate shall be marked N/A to inform the service technician who may not be familiar with the apparatus.</p> <ul style="list-style-type: none"> <li>•Engine oil</li> <li>•Engine coolant</li> <li>•Transmission fluid</li> <li>•Pump transmission fluid</li> <li>•Pump primer fluid</li> <li>•Drive axle fluid</li> <li>•Air conditioning refrigerant</li> <li>•Power steering fluid</li> <li>•Cab tilt mechanism fluid</li> <li>•Transfer case fluid</li> <li>•Equipment rack fluid</li> <li>•Air compressor system lubricant</li> <li>•Generator system lubricant</li> <li>•Front tires air pressure</li> <li>•Rear tires air pressure</li> </ul> <p>A permanent plate shall be affixed in the driver's area that states the maximum number of personnel allowed to ride on the apparatus at any time.</p> <p>A sign shall be affixed in the chassis cab, in plain sight of the driver that states the overall travel height, overall length, and gross GVWR of the apparatus.</p> <p>On any gated inlet on the apparatus, a permanent label shall be provided that states:</p> <p style="padding-left: 40px;">“WARNING: Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharges hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.”</p>	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	All other appropriate labels to ensure safe operation of the apparatus shall be permanently affixed in conspicuous locations.	X		
389	<p><b>Pre-Construction Meeting:</b> There shall be a pre-construction meeting held at the factory. The pre-construction meeting is the most important meeting during the after-award process. The purpose of this meeting is to finalize all aspects of the specifications, discuss and clarify all design details and to share or provide all information so all parties are in agreement on the apparatus being constructed. The ultimate goal of the pre-construction meeting is for the City and the dealer representative to discuss and clarify all aspects of the proposed apparatus and to provide all necessary information to the apparatus manufacturer that shall ensure the apparatus is built to the satisfaction of all parties involved.</p> <p>The apparatus manufacturer shall create and forward to the dealer a "Pre-construction" binder containing the following items:</p> <ul style="list-style-type: none"> <li>•Complete Specifications including the Body, Chassis and Aerial (if applicable).</li> <li>•Detailed Amp Draw Report</li> <li>•A listing of clarifications or questions from the manufacturer that require attention, such as shelf locations, lettering details, etc.</li> <li>•Full Size "C" Drawings, minimum of five (5)</li> <li>•11" x 17" Drawing</li> <li>•Paint Sample Plates for color matching of existing apparatus</li> <li>•Paint Confirmation form</li> </ul> <p>During this pre-construction meeting, any changes or clarifications must be documented on a manufacturer issued change order. The change order shall be signed by the City and Dealership and ultimately by the apparatus manufacturer. The change order officially becomes an extension of the contract upon official signatures of all three parties. All change order items resulting from the pre-construction meeting shall be implemented into the official shop order document.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>	X		
390	<b>Pre-Paint Inspection:</b> There shall be an inspection of the apparatus in the pre-paint stage	X		

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>of production by the City. The City shall be given the opportunity to visually inspect the chassis, pump panel, plumbing, and all other body options so that any discrepancies may be addressed prior to the painting process. A factory representative shall be present at the inspection to answer all questions. The manufacturer shall give adequate notice to the dealer as to when the apparatus shall be available for inspection.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>	X		
391	<p><b>Final Inspection:</b> There shall be an inspection of the apparatus in the final stage of production. The City shall be given the opportunity to visually inspect the completed apparatus including the chassis, pump panel, plumbing and all other body options so that any discrepancies may be addressed prior to the apparatus leaving the factory. A factory representative shall be present at the inspection to answer all questions. The manufacturer shall give adequate and accurate notice to the dealer as to the date the apparatus shall be completed. If any discrepancies are found during the final inspection, they shall be addressed immediately. At that point the manufacturer shall provide a firm delivery date.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>	X		
392	<p><b>Delivery and Demonstration:</b> Delivery of the completed apparatus to Grand Junction, CO shall be provided. On initial delivery of the fire apparatus, a qualified representative shall demonstrate the apparatus and provide initial instruction to representatives of the City regarding the operation, care and maintenance of the apparatus and equipment supplied at the City's location. The delivery and instruction schedule shall be determined by the delivery engineer/representative and the City.</p>	X		Delivery time will be 240 - 300 days after acceptance of order.



## **PREREQUISITE BIDDING REQUIREMENTS**

The manufacturer submitting a proposal meets the following conditions:

- The manufacturer of the apparatus herein specified; shall be wholly owned (100%) and managed by a Company, Corporation, and/or Parent Company that is wholly based, and permanently resides in the United States of America.
- The Company, Corporation, and/or Parent Company, and all assets belonging to such; shall be wholly owned and managed (100%) by the entities specified above.
- Any proposal, bid, or response to these specifications by any foreign based, owned, or managed (in part or in whole) Company, Corporation, and/or Parent Company; shall be cause for immediate rejection.
- Any proposal, bid, or response to these specifications by any Company, Corporation, and/or Parent Company, that is owned, operated, managed, or held in contract; in part or wholly by a partnership or other agreement; shall be cause for immediate rejection.

## **NFPA 1901-2009**

The National Fire Protection Association "Standard for Automotive Fire Apparatus, 2009 edition, is hereby adopted and made a part of these specifications, the same as if it were written out in full detail, with the exception of the section dealing with "Equipment Recommended for Various Types of Apparatus". Bidders shall provide the equipment requested herein and the buyer shall supply the rest before the apparatus is put into service. It is the intent of the purchaser to purchase an apparatus that meets 100% of the minimum standards defined and outlined in NFPA 1901-2009 edition.

## **STATEMENT OF EXCEPTIONS**

The proposed apparatus as described in this specification document and all related material with the bid package shall meet or exceed all applicable sections for the category of apparatus as defined by NFPA 1901 newest edition, unless specifically noted within this specification or other official documents associated with this bid.

Should any area, section or portion of the apparatus not meet the intent and applicable requirements, a clearly defined listing or explanation of what and why compliance was not achieved shall be provided to the purchaser at the time of delivery.

## **VEHICLE STABILITY**

The apparatus shall comply with the requirements of NFPA 1901, newest edition, as it applies to vehicle stability. The particular apparatus as described in the specification provided within the bid package shall be classified into the following categories:

- The apparatus shall be equipped with rollover stability control systems as defined in section 4.13.1.2 of NFPA 1901, newest edition.

## **INTENT OF SPECIFICATIONS**

It is the intent of these specifications to cover the furnishing and delivery to the purchaser of a complete apparatus equipped as herein specified. With a view to obtaining the best results and the most acceptable apparatus for service in the fire department, these specifications cover the general requirements as to the type of construction, together with certain details as to finish, equipment, and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 50 years.

Each bidder shall furnish satisfactory evidence of his ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. The bidder shall also show that they are in a position to render prompt service and furnish replacement parts for said apparatus.

## **CONTRACTOR'S SPECIFICATIONS**

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform.

These specifications shall indicate size, type, model, and make of all component parts and equipment.

## **DRAWINGS**

All bid drawings will be stamped PRELIMINARY DRAFT.

- A total of four (4) "C" size drawings will be supplied
- All drawings will be drawn and printed in a 3/8 to 1 scale
- Compartment door opening dimensions will be shown on table on the drawing which will refer to each compartment number, such as L1, R1, T1
- Drawings will be five (5) view. (left, right, front, rear, top) with the exception of chassis that are not always available as AutoCAD drawings
- Rear plumbing, such as 2-1/2" discharges, rear steamers, and direct tank fills, will be shown
- Ladders will be labeled with a letter designation referring to the table for an explanation of the ladder type
- OAL (overall length) in feet & inches - Estimated length will be rounded up to the nearest inch
- OAH (overall height) in feet & inches - Estimated height will be rounded up to the nearest inch
- Body dimensions shown - pump house width & front of the body to centerline of the rear axle
- Wheelbase in inches
- Estimated in-service weight
- Turning clearance radius
- Front and rear overhang in inches
- No pump panel or instrument panel controls, discharges or inlets. To be blank and labeled "Pump Panel"

- Water tank outline
- Foam tank(s) fill towers
- Exterior mounted hard suction hose
- Warning lights
- D.O.T. lights
- Generator outline
- No front bumper layout
- Rollup doors will be shown in open position. Lap doors will be shown in the closed position
- Compartment depth break over measurement. The measurement where the compartment switches from full depth to shallow depth
- Angle of approach and departure
- Top view of chassis

#### Text Block Items

- Chassis model
- Water tank capacity
- Foam tank capacity
- Hose bed capacity in cubic feet
- Total compartment cubic feet
- Drawing box is to read "BID" and utilize the bid number
- Drawings will be printed on white paper with black ink; blue line drawings will not be acceptable.

## **SAFETY REQUIREMENTS**

It is required that the bidder shall meet all State and Federal safety standards and laws that are in effect on the date of the bid for the item(s) that are being specified and the particular use for which they are meant.

## **QUALITY AND WORKMANSHIP**

The design of the apparatus shall embody the latest approved automotive engineering practices. Experimental designs and methods shall not be acceptable.

The workmanship shall be of the highest quality in its respective field. Special consideration shall be given to the following points: accessibility of the various units that require periodic maintenance, ease of operation (including both pumping and driving), and symmetrical proportions.

Construction shall be rugged and ample safety factors shall be provided to carry loads as specified.

## **GENERAL CONSTRUCTION**

The complete apparatus, assemblies, subassemblies, component parts, and so on, shall be designed and constructed with due consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is to be subjected when placed in service.

All parts of the apparatus shall be strong enough to withstand the general service under full load. The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

The apparatus shall be designed and constructed, and the equipment so mounted, with due consideration to distribution of the load between the front and rear axles, and side to side loading that all specified equipment, including a full complement of specified ground ladders, full water tank, loose equipment, and firefighters; shall be carried without overloading or injuring the apparatus as per requirements defined in NFPA. 1901.

The main apparatus body structure shall have an approximate width of 100" in order to maximize the enclosed compartment space of the apparatus. The 100" wide measurement represents the main body structure measured from the bottom, outermost rear corners of the apparatus body structure. Components affixed or fastened to the apparatus will increase the body width proportionately.

## **ROADABILITY**

The apparatus, when fully equipped and loaded, shall be capable of the following performance while on dry paved roads that are in good condition:

- From a standing start, the apparatus shall be able to attain a speed of 35 mph within 25 seconds on a level road.
- The apparatus shall be able to attain a minimum top speed of 50 mph on a level road.
- The apparatus shall be able to maintain a speed of at least 20 mph on any grade up to and including 6 percent.

## **CONSTRUCTION DOCUMENTATION**

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

1. The manufacturers record of apparatus construction details, including the following information:
  - a. Owner's name and address
  - b. Apparatus manufacturer, model, and serial number
  - c. Chassis make, model, and serial number
  - d. GAWR of front and rear axles
  - e. Front tire size and total rated capacity in pounds
  - f. Rear tire size and total rated capacity in pounds
  - g. Chassis weight distribution in pounds with water and manufacturer mounted equipment (front and rear)
  - h. Engine make, model, serial number, rated horsepower and related speed, and governed speed
  - i. Type of fuel and fuel tank capacity
  - j. Electrical system voltage and alternator output in amps
  - k. Battery make, model, and capacity in cold cranking amps (CCA)
  - l. Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio

- m. Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - n. Pump transmission make, model, serial number, and gear ratio
  - o. Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - p. Water tank certified capacity in gallons or liters
  - q. Aerial device type, rated vertical height in feet, rated horizontal reach in feet, and rated capacity in pounds
  - r. Paint manufacturer and paint number(s)
  - s. Company name and signature of responsible company representative
2. Certification of slip resistance of all stepping, standing, and walking surfaces
  3. If the apparatus has a fire pump, a copy of the following shall be provided: pump manufacturers certification of suction capability, apparatus manufacturer's approval for stationary pumping applications, engine manufacturers certified brake horsepower curve showing the maximum governed speed, pump manufacturer's certification of the hydrostatic test, and the certification of inspection and test for the fire pump
  4. If the apparatus has an aerial device, the certification of inspection and test for the aerial device, and all the technical information required for inspections to comply with NFPA 1914, Standard for Testing Fire Department Aerial Devices
  5. If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source
  6. If the apparatus is equipped with an air system, test results of the air quality, the SCBA fill station, and the air system installation
  7. Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
  8. Written load analysis and results of the electrical system performance tests
  9. When the apparatus is equipped with a water tank, the certification of water tank capacity

## **OPERATION AND SERVICE DOCUMENTATION**

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

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

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

1. Manufacturer's name and address

2. Country of manufacture
3. Source of service and technical information
4. Parts and replacement information
5. Descriptions, specifications, and ratings of the chassis, pump, and aerial device
6. Wiring diagrams for low voltage and line voltage systems to include the following information: representations of circuit logic for all electrical components and wiring, circuit identification, connector pin identification, zone location of electrical components, safety interlocks, alternator-battery power distribution circuits, and input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
7. Lubrication charts
8. Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
9. Precautions related to multiple configurations of aerial devices, if applicable
10. Instructions regarding the frequency and procedure for recommended maintenance
11. Overall apparatus operating instructions
12. Safety considerations
13. Limitations of use
14. Inspection procedures
15. Recommended service procedures
16. Troubleshooting guide
17. Apparatus body, chassis, and other component manufacturers warranties
18. Special data required by this standard
19. Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
20. A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

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

### **NFPA REQUIRED MANUALS**

The construction, operation, and service documentation shall be provided on a CD-ROM. These manuals shall be written in a "step by step" format for ease of reference. There shall be two (2) copies of the CD provided with the apparatus as standard.

### **BODY STRUCTURAL INTEGRITY WARRANTY**

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

### **PAINT LIMITED WARRANTY**

The apparatus body and pump house shall be free of blistering, peeling and any other adhesion defect caused by defective manufacturing methods or paint material selection for exterior surfaces for a period of three (3) years starting thirty (30) days after the original invoice date.

Paint on the undercarriage, body interior (line-x coating included) or aerial structure related paint, if

applicable, is covered only under the Standard One Year Limited Warranty.

### **CORROSION LIMITED WARRANTY**

The body exterior paint shall be warranted against corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.

### **STAINLESS STEEL PLUMBING WARRANTY**

The stainless steel plumbing shall be free from corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.

### **BASIC LIMITED WARRANTY ON OEM PURCHASED PARTS**

The apparatus shall be free of defects in material and workmanship for a period of ninety (90) days starting thirty (30) days after the original invoice date.

### **STANDARD WARRANTY**

The apparatus shall be free of defects in material and workmanship for a period of one (1) year starting thirty (30) days after the original invoice date.

### **OVERALL HEIGHT**

The overall height of the vehicle shall be approximately 119" from the ground. This measurement shall be taken with the tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus.

### **OVERALL LENGTH**

The overall length of the vehicle shall be approximately 362" (30' 2").

### **MISCELLANEOUS EQUIPMENT, PUMPERS**

Miscellaneous equipment, as defined in the newest edition of NFPA 1901, sections 5.8.2 and 5.8.3, shall be the responsibility of the purchaser. The apparatus shall be designed and manufactured in such a manner as to provide ample enclosed space for which to store such equipment.

### **FIRE PUMP MOUNTING**

The fire pump shall be mounted within a separate body module that is not directly connected to the apparatus body.

The pump shall be frame mounted; therefore minimizing the likelihood of the pump casing cracking should the apparatus be involved in a collision.

The pump module shall be mounted to the frame in four (4) locations and shall be reinforced appropriately

in order to carry the expected load for the life of the apparatus.

### **MIDSHIP MOUNT FIRE PUMP**

The fire pump shall be a Waterous CSC20, 1250 GPM midship mount pump.

### **SINGLE STAGE FIRE PUMP**

The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for the fire service.

### **INDEPENDENT THIRD PARTY PUMP CERTIFICATION**

The fire pump shall be tested and certified by Underwriter's Laboratories, a nationally recognized independent third party testing company. Tests shall be conducted so that the pump performs as listed below:

- 100% of rated capacity at 150 pounds net pressure
- 70% of rated capacity at 200 pounds net pressure
- 50% of rated capacity at 250 pounds net pressure
- 100% of rated capacity at 165 pounds net pressure

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA pamphlet number 1901. The pump shall be free from objectionable pulsation and vibration.

### **WATEROUS PUMP ANODES**

There shall be two (2) Waterous zinc anodes provided with the fire pump. The anodes shall aid in preventing galvanic corrosion within the water pump. The anodes shall be installed in the left and right steamer inlets and shall be easily replaceable.

There shall be two (2) Waterous zinc anodes provided with the fire pump. The anodes shall aid in preventing galvanic corrosion within the water pump. The anodes shall be installed in the discharge manifold of the pump and shall be easily replaceable.

### **IMPELLERS**

The pump impellers shall be bronze, specifically designed for the fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection.

The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.



## **MECHANICAL SEALS**

The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

## **IMPELLER WEAR RINGS**

The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.

## **PUMP CASING**

The pump casing shall be cast as two (2) horizontally split pieces. The casing shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.

## **PUMP TRANSMISSION**

The pump shall have a Waterous model C20 series transmission. The housing of the transmission shall be constructed of high strength, three piece, horizontally split aluminum. The drive line shafts shall be made from alloy steel forgings, hardened and ground to a size 2.350 inch 46 tooth involute spline.

The drive and driven sprockets shall be made of steel and shall be hardened and have ground bores. The drive chain shall be a Morse HV™ high strength involute form chain.

Bearings shall be deep groove, anti-friction ball bearings and shall give support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seal.

An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design eliminates the need for an external lubrication pump and auxiliary cooling.

The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission, to keep down time to a minimum.

All drive line components shall have a torque rating equal to or greater than the final net engine torque.

## **AIR OPERATED PUMP SHIFT**

The pump shift actuating mechanism shall be air operated from a valve in the cab identified as "PUMP SHIFT". Full instructions for shifting the pump shall be inscribed on the valve plate.

## **PUMP SHIFT INDICATING LIGHTS**

There shall be two (2) green pump system shift indicator lights in the chassis cab. The first light shall

become energized when the chassis parking brake has been set and the pump has completed its shift into pump gear and shall be labeled "Pump Engaged". The second light shall become energized and when the pump and the chassis transmissions have been shifted completely into the correct gears for pumping, this light shall be labeled "OK To Pump".

There shall be one (1) green pump system shift indicator light located on the operator's panel. This light shall only become engaged when the chassis parking brake has been set, and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled "Throttle Ready".

## **WATEROUS OIL LESS PRIMER**

The priming pump, model VPO/VPOS shall be included in the pump assembly. The priming pump shall be an electrically driven rotary vane pump mounted firmly within the pump area. The pump shall be controlled from the pump operator's panel. An indicator light on the pump panel shall show when the primer motor is engaged. The pump shall be capable of creating suction and discharging water from a lift of 10 feet through 20 feet of suction hose of the appropriate size, in not more than 30 seconds starting with the pump dry. It shall be capable of developing a vacuum of 22 inches at an altitude of up to 1000 feet.

## **PRIMING VALVE**

There shall be a Waterous model VPA vacuum activated priming valve supplied with the pump. The valve shall open automatically when the priming system is activated. The valve shall be installed on the pump or mounted remotely.

## **PRESSURE GOVERNOR / MONITORING DISPLAY**

Fire Research PumpBoss pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8" wide by 1 1/2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring. Inputs to the control module from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on a dot matrix message display
- Throttle ready LED

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only)

The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor and monitoring pressure display shall be programmed to interface with a specific engine.

## **INTAKE RELIEF VALVE**

There shall be an Elkhart 40-41 intake relief valve installed on the suction side of the pump. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".

## **PUMP DRAIN VALVE**

A Trident manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by turning a single control. The valve assembly shall consist of a stainless steel plate and shaft in a bronze body with multiple ports. The drain valve control shall be mounted on the left side pump panel and identified as "Master Drain".

## **LUBRICATION**

An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design shall eliminate the need for an external lubrication pump and auxiliary cooling. Oil shall be supplied with the lubrication system.

### **PUMP COOLER LINE**

There shall be a ½" line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on operator's panel, and shall be clearly labeled "Pump Cooler".

### **PUMP COOLER CHECK VALVE**

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

### **PUMP MANUALS**

Two (2) Pump Operation & Maintenance manuals in CD format shall be supplied at the time of delivery.

### **PUMP OPERATION VIDEO**

There shall be one (1) Waterous pump operation and maintenance video(s) supplied at the time of delivery.

### **FIVE YEAR PUMP WARRANTY**

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the fire department or five and one-half (5-1/2) years from the shipment date by Waterous.

### **TANK TO PUMP CHECK VALVE**

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

### **TANK TO PUMP VALVE**

There shall be one (1) 3" full flow ball valve connected with a flexible hose from the tank to the suction side of the pump.

### **TANK FILL VALVE**

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

### **PUMP PAINT**

The pump body shall be painted with PPG polyurethane enamel paint. The paint color shall be a neutral gray. The pump enclosure shall be painted the same color as the apparatus body.

### **STEAMER AND INLET VALVES PAINT**

The steamer and partially recessed inlet valves shall be painted with PPG polyurethane enamel paint. The paint color shall be the same as the apparatus body.

### **DIRECT TANK FILL VALVE**

There shall be one (1) 2-1/2" direct tank fill on the right side panel of the apparatus. The tank fill shall be plumbed with a 2-1/2" Akron valve and 2-1/2" plumbing. The direct tank fill valve shall be controlled utilizing a chrome plated handle located directly on the valve. The handle shall have a round ball at the end and shall be easily actuated with a gloved hand.

There shall be a South Park model HPC3008AC, 2-1/2" NST plug with chain supplied. The plug shall be manufactured from high quality brass and shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **INTAKE DRAINS**

Each gated intake shall be equipped with a Trident Emergency 3/4" quarter turn bleeder valve. The bleeder valve shall be equipped with a chrome plated rectangular handle to provide a positive grip while personnel are wearing gloves.

### **INTAKE TRIM PLATES**

Each gated intake shall have a chrome plated die cast zinc trim plate around the intake valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.

### **SLOW CLOSE MECHANISMS**

Gated intakes that are 3" or larger shall be equipped with a mechanism to prevent changing the position of the valve from full open to full close, or vice-versa, in less than 3 seconds.

### **INTAKE STRAINERS**

Removable strainers shall be provided with each gated intake.

### **LEFT SIDE GATED INTAKE**

There shall be one (1) 2-1/2" gated intake provided on the left side of the pump compartment. The intake shall be furnished with a 2-1/2" valve and 2-1/2" plumbing. The intake shall terminate with a 2-1/2" NST female chrome swivel.

The suction valve shall be an Akron 8800 series brass, quarter-turn, full flow, and swing-out type. The valve shall be designed in such a manner that the action of water against the regulating element shall not affect

its position.

Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum.

The valve located in the pump compartment area shall be partially recessed behind the panel in order to keep the valve protected from the elements.

There shall be a South Park model HPC3008AC, 2-1/2" NST plug with chain supplied. The plug shall be manufactured from high quality brass and shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **STEAMER INLET – LEFT SIDE**

There shall be one 6" steamer inlet supplied on the left side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion.

To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the left side of the apparatus.

There shall be one (1) 6" NST thread, South Park LHC26P14AC long handle cap provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **STEAMER INLET - RIGHT SIDE**

There shall be one 6" steamer inlet located on the right side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion

To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the right side of the apparatus.

There shall be one (1) 6" NST thread, South Park LHC26P14AC long handle cap provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **DISCHARGE VALVES**

All discharge valves, unless otherwise noted in the specifications, shall be quarter-turn, full flow, swing-out type. The flow regulating element of each valve shall not change its position under any condition of operation involving discharge pressures to the maximum pressure of the pump. The means to prevent a change in position shall be incorporated in the operating mechanism and shall be permitted to be manually controlled.

### **STAINLESS STEEL PLUMBING**

Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The

plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum. The use of high pressure hose will be used in as many places as practical.

## **DRAIN VALVES**

Each discharge 2-1/2" or larger, with the exception of the crosslays and hard to access plumbing, shall be equipped with a 3/4" quarter turn Trident Emergency drain between the valve and the discharge. There shall be a chrome plated rectangular handle provided on each drain valve to facilitate use with a gloved hand.

Drain valves shall be located in a row just above the running board and below the pump panel on each side of the apparatus pump compartment to reduce clutter in the pump panel area. Each drain valve shall have a color coded bezel to match the appropriate line it is connected to. The drain valves shall be connected to the individual valves with flexible hose that is routed in such a manner as to assure complete drainage. Discharge from the drain valves shall be routed to below the apparatus.

## **AUTOMATIC DRAINS**

A Class 1 model 34AD automatic drain shall be installed on all crosslay, deluge gun and discharge plumbing that flows in low routed areas that are located below the 1/4 turn manual drain. The drains shall be located in areas where there is a possibility of back flow.

These drains will open whenever pressure in the line drops below 6 PSI.

## **DISCHARGE ELBOWS**

All discharges that are 2" or larger and are 42" or more above grade shall be equipped with a downward pointing elbow of 30 degrees or more.

## **DISCHARGE CAPS**

All discharges, except for those designated as preconnects, shall have a chrome cap. Caps for discharges 3-1/2" and smaller shall be secured to the apparatus with suitable chains or cables.

## **DISCHARGE TRIM PLATES**

Each gated discharge shall have a chrome plated die cast zinc trim plate around the discharge valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.

## **SLOW CLOSE MECHANISMS**

Discharges that are 3" or larger shall be equipped with a valve mechanism to prevent changing the position of the valve from full open to full close, or vice-versa, in less than 3 seconds as required by NFPA.

## **LEFT SIDE 2-1/2" DISCHARGES**

There shall be two (2) 2-1/2" NST discharges on the left side of the pump compartment. The discharges shall be plumbed with 2-1/2" Akron valves and 2-1/2" plumbing.

The 2-1/2" valves shall be controlled by a Trident quarter turn locking type push/pull control with direct linkages and universal yokes. Control rods shall be hard coated anodized aluminum 3/4" rod and polished chrome plated zinc handles.

The centerline of any valve control shall be no more than 72" vertically above the platform that serves as the pump operator's position.

There shall be two (2) Thuemling individual pressure gauges installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

There shall be two (2) South Park model SE394505AC, 2-1/2" NST swivel female x 2-1/2" NST male 45° adapters provided. The adapters shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

There shall be two (2) 2 1/2" NST South Park HCC2808AC caps with chains provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **RIGHT SIDE 2-1/2" DISCHARGE**

There shall be one (1) 2-1/2" NST discharge on the right side of the pump compartment. The discharge shall be plumbed with a 2-1/2" Akron valve and 2-1/2" plumbing.

The 2-1/2" valve shall be controlled by a Trident quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum 3/4" rod with a polished chrome plated zinc handle.

The centerline of the valve control shall be no more than 72" vertically above the platform that serves as the pump operator's position.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

There shall be one (1) South Park model SE394505AC, 2-1/2" NST swivel female x 2-1/2" NST male 45° adapter provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

There shall be one (1) 2 1/2" NST South Park HCC2808AC cap with chain provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.



## **RIGHT SIDE 4" LARGE DIAMETER DISCHARGE**

There shall be one (1) 4" NST discharge located on the right side pump panel. The discharge shall be plumbed with a 3-1/2" Akron valve and 4" plumbing. The 4" discharge shall be controlled by an Akron handwheel. The handwheel worm gear shall be connected to the remote mounted valve via a rod assembly. The handwheel shall turn a gear sector mounted on the valve for smoother and easier operations under pressure.

A position indicator shall show the position of the ball valve as per NFPA 1901. Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

There shall be one (1) Snap-Tite model AS50T40NER, 4" NST female rocker lug x 5" Storz 30-degree elbow adapter supplied with the apparatus.

There shall be one (1) Snap-Tite model BS50 5" Storz blind cap with chain supplied.

## **FOAM PRO 2001 SINGLE FOAM SYSTEM**

The apparatus shall be equipped with a Hypro FoamPro 2001 electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates and most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. The system shall be capable of delivering accuracy to within 3% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a digital electronic control display, suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flow meter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.

Paddlewheel type flow meter shall be installed in the discharges specified to be foam capable.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 9.9% in 0.1% increments.
- Show current flow-per-minute of water.
- Show total volume of water discharged during and after foam operations are completed.
- Show total amount of foam concentrate consumed.
- Simulate flow rates for manual operation.
- Perform setup and diagnostic functions for the computer control microprocessor.
- Flash a low concentrate warning when the foam concentrate tank runs low.
- Flash a no concentrate warning and shut the foam concentrate pump off, preventing damage to the

pump, should the foam tank(s) empty.

A 12 volt electric motor driven positive displacement foam concentrate pump, rated up to 2.5 GPM, with operating pressures up to 400 PSI, shall be installed in a suitable compartment near the apparatus pump house. A pump motor electronic driver (mounted to the base of the pump) shall receive signals from the computer control display, and power the ½ horsepower electric motor. The electric motor is directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate preset by the pump operator is injected into the water stream.

System capacity shall be as follows:

Foam Concentrate	Model 2001 Maximum Water Flow GPM
0.2%	1300
0.5%	520
1.0%	260
3.0%	85

A full flow check valve shall be provided to prevent foam contamination of fire pump and water tank or water contamination of foam tank.

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

- Operator control and display.
- Paddlewheel flow meter.
- Pump and electric motor/motor driven.
- Wiring harnesses.
- Low level tank switch.
- Foam injection check valve.

Installation and operation manual shall be provided for the unit, along with a one-year limited warranty. A system schematic placard and a system rating placard shall be supplied and installed in accordance with NFPA standards.

## **FOAM PROPORTIONING SYSTEM TESTING**

The foam proportioning system shall be tested and certified after final installation as per NFPA 1901, newest edition.

## **CROSSLAY PRECONNECT HOSE BED**

Crosslay preconnects shall have 90 degree elbow type swivel on discharge outlets.

The dividers between the hose bed areas shall be fabricated of 3/16" aluminum. It shall be mounted in a channel on each end for adjustability.

The crosslay hose bed and dividers shall have a maintenance free abraded finish.

## **ALUMINUM CROSSLAY COVER**

There shall be an aluminum non-slip treadbrite cover installed on the crosslay hose bed. The cover shall not interfere with hose loading when in the open position. When in the open position, the cover shall remain open due to automatically engaging mechanisms that require no type of latch operation to engage or release.

The cover shall be provided with one full length stainless steel piano style hinge that shall attach the cover to the body.

The cover shall be light yet rigid. Opening of the cover may be performed by one person on one side of the apparatus and yet the cover shall be rigid enough to support weight without deformation.

## **CROSSLAY END COVER**

There shall be a webbing restraint located on each end of the pre-connected crosslay / speedlay. The webbing shall be easily opened in the center with Velcro closures.

## **CROSSLAYS – 1-1/2"**

There shall be two (2) 1-1/2" crosslays above the side mount control panel. Each crosslay shall be plumbed with a full-flow 2" Akron style 8820 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 1-1/2" male swivel elbow. The swivel for each crosslay hose bed shall be located outboard for ease of making connections while changing hose.

The floor of the crosslay shall be covered with Dura-Dek fiber reinforced material. The Dura-Dek shall have "T" beams in parallel connected with cross slats that are first mechanically bonded and then epoxied. The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

Each crosslay hose bed shall have a capacity of 200' of 1-3/4" double jacket fire hose.

There shall be two (2) Thuemling individual pressure gauges installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

## **CROSSLAY – 2-1/2"**

There shall be one (1) 2-1/2" crosslay above the side mounted operator's control panel. The crosslay shall be plumbed with a full-flow 2-1/2" Akron style 8825 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 2-1/2" male swivel elbow. The swivel for the crosslay hose bed shall be located outboard for ease of making connections while changing hose.

The floor of the crosslay shall be covered with Dura-Dek fiber reinforced material. The Dura-Dek shall have "T" beams in parallel connected with cross slats that are first mechanically bonded and then epoxied. The

"T" sections shall be spaced  $\frac{3}{4}$ " apart to allow for drainage and ventilation.

The crosslay hose bed shall have a capacity of 200' of 2-1/2" double jacket fire hose.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

### **CROSSLAY ROLLERS**

Stainless steel rollers shall be provided at each end of the crosslay hose bed to facilitate deployment of hose. Vertical rollers shall be installed on each side of the hose bed opening, and a horizontal roller shall be installed under the opening.

### **FRONT BUMPER 1-1/2" DISCHARGE**

There shall be one (1) 1-1/2" NST discharge with swivel installed in the front hose well of the apparatus. The discharge shall be plumbed with a 2" Akron valve and 2" plumbing. Class 1 high pressure flex hose with stainless steel couplings shall be used in the plumbing of this discharge.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

### **LEFT REAR 2-1/2" DISCHARGE**

There shall be one (1) 2-1/2" NST discharge located at the left rear of the apparatus. The discharge shall be plumbed with a 2-1/2" Akron valve and 2-1/2" plumbing.

The 2-1/2" valve shall be controlled by a Trident quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum  $\frac{3}{4}$ " rod with a polished chrome plated zinc handle.

The centerline of any valve control shall be no more than 72" vertically above the platform that serves as the pump operator's position.

There shall be a 4" sleeve installed through the United Plastics Fabricating tank to accommodate plumbing for a rear discharge.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

There shall be one (1) South Park model SE394505AC, 2-1/2" NST swivel female x 2-1/2" NST male 45° adapter

provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

There shall be one (1) 2 ½" NST South Park HCC2808AC cap with chain provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

### **DELUGE MONITOR RISER**

There shall be one (1) 3" riser for a deluge monitor installed above the pump on the apparatus. The riser pipe shall be installed with a 3" valve, controlled from the pump operator's panel.

The discharge valve shall be controlled by an Elkhart RC-10 slow-closing remote linear output screw-type actuator. The actuator housing and push-rod shall be constructed of light weight extruded aluminum. A precision needle thrust bearing and hardened thrust washers shall assure smooth, efficient operation and accurate flow and pressure control capability. A 5" cast aluminum handwheel shall allow for compact through-the-panel installation.

The valve status indicator module shall provide the pump operator with the status of the valve at a glance. Red shall mean fully closed; Green shall mean fully opened; Yellow shall indicate a gated position. Incandescent lamps shall provide a reliable signal with a wide viewing angle even in bright sun light. Reliable solid state valve position sensors shall be water and lubricant resistant. The integrated circuit board and lamp sockets shall be completely encased in epoxy for total protection from the elements.

### **DECK GUN RISER**

The riser for the deck gun shall terminate 3" NPT.

There shall be one (1) Thuemling individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2-1/2" in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.

### **POLYPROPYLENE FOAM CELL**

There shall be one (1) 30 gallon polypropylene foam cell incorporated into the polypropylene water tank. There shall be one (1) pressure/vacuum vent installed on the foam tank. There shall be one (1) drain hose connected to the foam cell. The drain shall have a ¼ turn valve installed inside the pump house and it shall drain below the frame rail of the chassis.

### **WATER TANK**

The water tank shall have a capacity of 500 U.S. gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.

## **UPF POLY TANK CONSTRUCTION**

The UPF Poly-Tank<sup>®</sup> IIE shall be constructed of ½" thick PT2E™ polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermoplastic, black in color, and U.V. stabilized for maximum protection.

## **BOOSTER TANK**

The booster tank shall be of a specific configuration and shall be so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removal.

## **TANK BAFFLES**

The transverse swash partitions shall be manufactured of 3/8" PT2E™ polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.

## **TANK SUMP**

There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of ½" polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump to pre-vent air from being entrained in the water while pumping.

## **TANK FILL CONNECTION**

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.

## **TANK LID**

The tank lid shall be constructed of ½" thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped ½" x 13" to accommodate the lifting eyes.

## **TANK MOUNTING**

The UPF Poly-Tank IIE shall rest on the body cross members in conjunction with such additional cross members, as required by the tank manufacturer.

The tank shall be isolated from the cross members through the use of hard rubber strips with, a minimum Rockwell Hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation.

Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restraints to minimize movement during vehicle operation.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

## **LIFETIME TANK WARRANTY**

The tank shall have a lifetime warranty from UPF.

## **WATER TANK FILL TOWER**

The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of ½" PT2E polypropylene and shall be a minimum dimension of 8" x 8" at the outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have a ¼" thick removable polypropylene screen and a PT2E polypropylene hinged-type cover.

## **UPF TANK OVERFLOW**

The tank shall be equipped with a minimum of a 6" schedule 40 polypropylene overflow/air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.

## **TANK DRAIN VALVE**

One (1) 1-1/2" tank drain valve shall be provided under the tank sump. The valve shall have a locking lever to prevent accidental draining of the tank.

## **WATER TANK LEVEL GAUGE**

The apparatus shall be equipped with one (1) Class 1 "Intelli-Tank" level gauge on the pump operator's control panel. The tank level gauge shall indicate the water level on an easy to read LED display and show increments of 1/8 of a tank.

The tank level gauge system shall include:

- 1) A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- 2) A super bright LED 4-light display with a visual indication at nine accurate levels.
- 3) A set of weather resistant connectors to connect to the digital display, to the pressure transducer

and to the apparatus power.

## **CONTROL PANEL**

The left side of the pump enclosure shall be divided into two sections. The lower section shall be where all valve controls, the primer control, and other mechanical controls are located. This surface shall be referred to as the "control panel".

All valve controls shall be the self-locking type, activated by either direct control or with a direct linkage utilizing friction locking bell cranks and universal ball swivels. The primary valve handles shall have color coded tags installed in a recessed area to clearly denote the purpose of each control.

## **INSTRUMENT PANEL**

The surface above the control panel shall contain all instruments, gauges, test fittings, and optional controls. This surface shall be referred to as the "instrument panel". The instrument panel shall be independent and hinged and latched so that it may be opened. All instruments, gauges, and other equipment shall be installed with sufficient slack in any cabling, tubing, or plumbing to allow the panel to swivel to the fully open position.

The instrument and gauge panel shall be vertically hinged "swing out" to provide access for service.

## **COLOR CODED LABELS**

To improve identification of discharges and intakes, color coded tags shall be provided. The tags shall utilize an etching process to provide easy visibility and improved field service life. Tags shall be affixed using an industrial grade adhesive backing, eliminating the need for pop rivets or screws into the panel or control handle.

## **RIGHT SIDE PUMP PANEL**

A single panel shall be installed on the right side of the pump enclosure. This shall be the area where any right side discharges, inlets, steamers, and other pump associated equipment are located. This panel shall be easily removable and held in place with quick release push latches. It shall be fully removable for pump and plumbing access without the need to use hand tools. Any electrical equipment that may be installed shall be equipped with connectors so they may be easily separated from the opening created when the below described front access panel is removed.

## **PUMP PANEL LIGHTS**

The pump operator's control panel and the right side pump panel shall each be illuminated by On Scene LED night stick lighting.

The pump panel lights shall become energized upon setting the parking brake so the gauge information provided may be consulted at any time the apparatus is parked.

A shield shall be installed over the pump panel lights to further protect them from the elements and to act



as a reflector for additional illumination.

## **PANEL SURFACES**

The control panel, instrument panel, and right side pump panel shall be coated with a thermoplastic material for maximum resistance to abrasion and to minimize glare. The material shall be capable of withstanding the effects of extreme temperatures and weather.

## **PRESSURE/VACUUM TEST PORTS**

Class 1 model 115100 pressure and vacuum test ports shall be provided on the pump panel.

## **PUMP COOLER VALVE**

Class 1 model 38BV pump cooling control valve shall be provided on the pump panel.

## **ENGINE COOLER VALVE**

Class 1 model 38BV engine cooling control valve shall be provided on the pump panel.

## **WHITE FACE/ BLACK NUMERAL GAUGE DISPLAY**

The master pump gauges and individual pressure gauges shall have a white face with black numbers and lettering. This shall provide a high contrast and allow the gauges to be easily read by the operator.

## **THUEMLING INSTRUMENT PANEL MASTER PUMP GAUGES, PSI**

The pump vacuum and pressure gauges shall be supplied by Thuemling. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. The gauge shall read -30-0-400 PSI and shall be a minimum of 4-1/2" in diameter.

## **DUNNAGE COMPARTMENT**

There shall be a dunnage compartment above the pump compartment. The dunnage compartment shall be constructed of treadbrite.

## **INDEPENDENT PUMP COMPARTMENT**

The main body and the pump compartment shall be fabricated as individual units. Both the body and pump compartment shall be fabricated using precision holding fixtures to ensure proper dimensions. All attachment points shall be heavily reinforced.

## **ALUMINUM BODY CONSTRUCTION**

The apparatus body shall be fabricated from 1/8" 5052-H32, smooth aluminum sheet. The complete apparatus body shall be fabricated utilizing the break and bend techniques in order to form a strong, yet flexible, uni-body structure. The body shall be constructed with holding fixtures to ensure proper

dimensioning. Each apparatus body shall be specific in design in order to meet the unique requirements of the purchasing fire department.

The main body compartments on each side, as well as the rear center compartment if applicable, shall contain a sweep out floor design. Each compartment shall be made to the most practical dimensions in order to provide maximum storage capacity for the fire department's equipment. The door opening threshold will be positioned lower than the compartment floor permitting easy cleaning of the compartments.

Continuous, solid welded seams shall be located at the upper front and upper rear corners of the apparatus body. The flooring of all lower, main body compartmentation shall also have solid weld seams. All door jams, on both the top and the bottom, shall be solid welded as well. Each main door jamb shall consist of a double jam design; this is comparable to a double struck frame design, which provides superior strength and durability. All double door jams are to be welded together utilizing the plug weld technique. All remaining compartment walls shall be stitch welding.

The compartment floors, specifically L1 and R1, shall have a minimum of two (2) 1" x 2" rectangular tubes welded to the entire width of the compartment floor. The two (2) rear side compartments as well as the rear center compartment, if applicable, shall be welded to the rear deck support structure. This rear deck support structure is specially designed for the galvanized apparatus body substructure. A minimum of two (2) square tubes, which are 1/4" x 3" x 3", shall run the entire width of the body from sidewall to sidewall. Each lower, rear compartment will be adequately stitch welded to the cross tubes providing strength and durability to the entire apparatus body.

The body design shall include a "false wall" design in the lower portion of each lower, rear compartment. This is required in order to allow for easy accessibility to the rear electrical components found in the rear taillight cluster area.

The upper area of the apparatus body, directly above the side compartment door openings, a header is to be fabricated from smooth, aluminum sheet. This area shall be free from any body seams and shall be painted the same color as the apparatus body. The height of the header may vary depending on the following factors: apparatus design, lettering requirements, scene lights and warning light requirements as well as various other options.

## **BODY SUBFRAME**

To assure proper body alignment and clearance, the body sub frame shall be constructed in a jig and fitted directly on the chassis.

The chassis frame rails shall be fitted with fiber reinforced rubber to isolate the body frame members from direct contact with chassis frame rails.

The main body sub frame shall be constructed from steel tubing. The sub frame shall run the full length of the body and shall be spaced the same width as the chassis frame rails. The main sub frame shall also be the integral support for the water tank. Vertical drop tubes shall be welded to the sub frame. From these vertical drop tubes shall extend cross members constructed of steel angle. These cross members shall extend out to support the compartments. Cross members shall be located at the front and rear of the body

and in front and rear of the wheel well opening.

The compartment area behind the rear axle shall be supported by a drop frame fabricated of steel tube and steel angles. The rear drop frame shall be constructed using vertical drop tubes, welded to the main sub frame. All drop frame structures shall be welded directly to the body sub frame to allow the body to be a completely separate structure from the chassis.

After fabrication the subframe shall be hot dip galvanized for maximum protection against corrosion.

## **BODY MOUNTING**

The body sub frame shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece bracket. The two (2) brackets shall be fabricated of steel plates. The plates shall be painted to prevent any corrosion. Each mounting assembly shall utilize two (2) plated bolts and two (2) heavy duty springs. The assembly design shall allow the body and sub frame to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall limit stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strain due to load and chassis movement.

## **TANK MOUNTING**

The water tank shall rest on the sub frame cross members which are spaced as required by the tank manufacturer.

The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum Rockwell hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operations.

Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restrains to minimize movement during vehicle operations.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

## **LEFT SIDE COMPARTMENTS**

### **COMPARTMENT L1**

There shall be a full height compartment located ahead of the rear wheel on the left side of the apparatus body. This compartment shall be designated as L1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.

- Door Opening - 32" Wide x 60.5" High
- The compartment shall have a usable depth of 23.5".

**COMPARTMENT L2**

A compartment shall be located above the rear wheel on the left side of the apparatus body. This compartment shall be designated as L2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.

- Door Opening - 68" Wide x 31" High
- The compartment shall have a usable depth 23.5".

**COMPARTMENT L3**

There shall be a full height compartment located behind the rear wheel on the left side of the apparatus body. This compartment shall be designated as L3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.

- Door Opening - 32" Wide x 60.5" High
- The compartment shall have a usable depth of 23.5" in the upper portion and transverse in the lower portion.

**RIGHT SIDE COMPARTMENTS****COMPARTMENT R1**

There shall be a full height compartment located ahead of the rear wheel on the right side of the apparatus body. This compartment shall be designated as R1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.

- Door Opening - 32" Wide x 60.5" High
- The compartment shall have a usable depth of 23.5".

**COMPARTMENT R2**

A compartment shall be located above the rear wheel on the right side of the apparatus body. This compartment shall be designated as R2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.

- Door Opening - 42" Wide x 31" High
- The compartment shall have a usable depth 23.5".

**COMPARTMENT R3**

There shall be a full height compartment located behind the rear wheel on the right side of the apparatus body. This compartment shall be designated as R3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.

- Door Opening - 32" Wide x 60.5" High
- The compartment shall have a usable depth of 23.5" in the upper portion and transverse in the

lower portion.

## **TRANSVERSE REAR COMPARTMENTS**

The rear lower compartment shall be transverse from the left side of the body to the right side of the body.

### **REAR COMPARTMENT**

#### **COMPARTMENT T1**

There shall be a single compartment located at the rear of the apparatus. This compartment shall be designated T1 within these specifications and any ensuing paperwork or drawings after contract execution. The compartment shall be equipped with a roll-up door.

- Door Opening - 46" Wide x 38" High
- The compartment shall have a usable depth of 30".

The roll-up door shall be ROM shutter type with 34 millimeter slats that roll onto a spool at the top of the compartment. Each slat shall be equipped with nylon end shoes to assure operation without the need of constant lubrication.

The ROM roll-up door shall be supplied with a full width handle for ease of opening with only one hand, allowing quick access to equipment. There shall be nylon end shoes on every slat to assure operation without constant lubrication.

### **COMPARTMENT SCUFF PLATES**

Anodized aluminum angle scuff plates shall be installed in the bottom sill area of all major equipment carrying compartments to reduce paint damage from equipment. The scuff plates shall be attached using a permanent bonding double sided tape.

### **COMPARTMENT DOOR CONSTRUCTION**

The lap type compartment doors shall be of double panel construction. The outer panel shall be fabricated of .190, 5052-H32 aluminum and the inner panel of .125, 3003-H14 aluminum. There shall be a heavy-duty automotive type extruded rubber molding installed on the overlap area of the doors to insure a weatherproof seal and prevent water from collecting in the door sills. All of the compartment doors shall have a polished stainless steel continuous hinge connected to both the body and the door with stainless steel bolts and nuts. The hinge pin shall be stainless steel with a minimum diameter of ¼".

### **COMPARTMENT DOOR HANDLES**

Compartment door handles shall be non-locking stainless steel recessed "D" ring type handles. There shall be a safety latch with striker plate included with the door handle assembly.

### **COMPARTMENT DOOR HOLDERS**

Cleveland style spring loaded door holders shall be furnished on all vertically hinged, swing-open compartment doors to hold the door in either the fully open or partially closed position. The spring-loaded door holder shall close the door automatically when it is positioned past center or return the door to the fully open position if the center point is not reached and the door is released. The door strut attachment tabs will be designed in such a way to prevent them from cracking or breaking due to stress.

Pressurized gas filled cylinders shall be furnished on all horizontally hinged, lift-up compartment doors to hold the door in the open position and assist in raising it. The gas filled cylinders shall assist in closing the door automatically when the door is positioned over center.

## **COMPARTMENT LIGHTING**

All compartments that are equipped with a lap style door and have an opening of less than 42" shall be furnished with one (1) ON SCENE LED compartment light mounted on the front corner of the compartment. All compartments that are equipped with a lap style door and have a door opening that is 42" wide or wider shall have a light installed on the front and rear corner of the compartment.

The lights shall be rated at 100,000 hours of service with 74 lumens per 18" light. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8" Lexan tube. Multi-clip attachment shall allow for installation into any roll up, or standard door configuration.

An automatic door switch shall activate the compartment lights.

## **NFPA STEP REQUIREMENTS**

All steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of at least 500 pounds. Steps shall be provided at any area that personnel may need to climb and shall be adequately lighted.

## **BOLT-ON STEPS**

Four (4) Cast Product steps shall be installed on the left rear of the apparatus. These steps shall be used to gain access to the hose bed. There shall be lights installed in order to provide ample illumination for personnel.

There shall be a protective plate installed on the rear of the apparatus between the body and the bolt on steps. The plate shall be constructed of 1/8" treadbrite aluminum and shall protect the finish of the apparatus from scuff marks when the steps are used. The plate shall be one continuous piece of aluminum from the top step to the bottom step.

## **FOLDING STEPS**

Each folding step shall have two large open slots to prevent buildup of ice or mud and to provide a handhold when necessary.

Steps shall be provided in the following locations:

- Three (3) folding steps on the left front compartment
- Three (3) folding steps on the right front compartment.

### **RIGHT SIDE PUMP ACCESS DOOR**

There shall be a treadbrite door above the right hand side pump panel to allow access to the pump compartment. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing a pushbutton latch. A gas strut shall be provided on the door.

This door shall be wired into the door ajar warning light circuit. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching.

### **PUMP ACCESS WITH DOOR**

There shall be a treadbrite access panel provided on the front of the pump compartment. The panel shall be of the single pan design and shall be positively latched in the closed position utilizing a pushbutton latch. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. This area shall be accessible when the cab is tilted.

### **COMPARTMENT VENTING**

Each body compartment shall be properly vented in a manner that will reduce the amount of dirt and water that may enter the compartment. Venting shall be directly to the atmosphere rather than into another compartment, which would only spread moisture throughout the body rather than dissipate it. The vent opening, which is located in the lower corner of the compartment, shall have a filter which is easily removable to allow cleaning.

Additionally, each compartment shall be equipped with drain holes to allow standing water to exit.

### **HEAT DEFLECTOR SHIELD**

Increased standards for emission have caused most exhaust temperatures to increase. To keep the exhaust heat from adversely affecting anything stored in the body, a deflector shield shall be provided to aid in dissipating the heat.

### **MODULAR RUNNING BOARDS**

A modular running board shall be installed on the left side of the pump compartment module. The running board shall be constructed of non-slip treadbrite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.

A modular running board shall be installed on the right side of the pump compartment module. The running board shall be constructed of non-slip treadbrite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.

All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

## **MODULAR REAR DECK**

A modular bolt-on deck shall be installed on the rear of the apparatus to form a full width step area. The rear deck shall be constructed of non-slip treadbrite. The outside edge of the rear deck shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.

All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

## **ULTRA STAINLESS™ MARUTEX® SCREWS**

Stainless steel screws shall be provided throughout the body in locations such as: overlays, pump panels, and other numerous hardware mounting locations. In these locations the following screw specification shall apply.

The special ingredient in Ultra Stainless™ is Marutex®, which adds 2% molybdenum (moly) to 410 stainless. Moly is the significant component of 316 stainless that provides extra corrosion resistance. The moly is now added to 410 self drilling screws to produce Ultra Stainless™. This combination provides for unprecedented corrosion resistance combined with hardness for drilling.

Marutex® screws are tempered and quenched; regular T-140 self-drilling screws are case hardened. The additional carbon in Marutex® provides hardness for better drilling.

In certified testing the Marutex® screws have shown far superior corrosion resistance than that of 410 stainless, and 304 Bimetal screws. The screws were tested using two methods, the first was a 500 hour salt spray test, and the second was the European Air Pollution Test using the Kesterich method. In this test a combination of condensation water and atmosphere containing sulfur dioxide was sprayed on the screws. In both tests the Marutex® screws did not show any signs of rust, the 410 and 304 samples on the other hand did.

As part of quality control standards, samples from each batch of Ultra Stainless™ Marutex® screws shall be subject to a salt spray test for a minimum of 2500 hours. The test results shall be provided at any time upon request by the customer.

## **STEPPING, STANDING, WALKING SURFACES**

All exterior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be constructed of grip strut or textured treadbrite and shall provide a highly slip resistant surface, even when the surface is wet. All interior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be slip resistant when the surface is dry.

The degree of slip resistance shall be in compliance with the intent of NFPA 1901 newest version.

It is the desire of the fire department to purchase an apparatus that utilizes aluminum treadplate as an overlay of the main apparatus body structure. Aluminum treadplate may also be utilized in the construction of enclosure doors, lids and covers where applicable. Aluminum treadplate is not to be utilized as a main structural member of the apparatus body or pump enclosure.



## **TREADBRITE OVERLAYS**

There shall be aluminum treadbrite overlays installed on the apparatus in those areas designated as walking areas or where additional scuff protection of the apparatus finish is desired.

The top treadbrite overlay shall be mounted flush with the outer edges of the apparatus body. A "J" channel shall be incorporated into the body design in order to provide a rain gutter to further assist in preventing excessive moisture from getting into the compartments.

Overlays shall be totally insulated from the apparatus with nylon shoulder washers that extend into the hole that is drilled into the body. Stainless steel cap nuts shall be employed where bolts may damage equipment or cause injury. After painting and final construction overlays shall be additionally sealed at the edges with a caulking compound.

Overlays shall be provided in the following areas:

- Front compartment vertical areas on both sides.
- Above the forward section of the water tank.

## **REAR WHEEL WELLS**

The fenders shall be integral with the body sides and compartments with a seamless appearance. The fenders shall be fitted with bolt-in removable full circular inner liners in the wheel well area for ease of cleaning and maintenance. There shall be sufficient clearance provided in the wheel well to allow the use of tire chains when the apparatus fully loaded.

## **REAR FENDERETTES**

Two (2) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, one on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce build-up of road grime. The fenderettes shall be constructed of stainless steel that has been polished to a high quality finish.

## **BODY RUB RAILS**

Rub rails shall be installed beneath the compartment doors to protect them from damage should the body be brushed or rubbed against another object. The rub rails shall be 3/16 inch aluminum channel, 2-1/2 inch x 1 inch. The rub rails shall be highly polished and then bright dip anodized.

They shall be installed on the body utilizing non-corrosive nylon spacers and secured with stainless steel bolts. The outside edge of the rub rails shall be even with the fenderettes and bolt-on steps to prevent snagging.

## **REAR TOW HOOK**

One (1) rear tow hook shall be installed directly below the rear of the chassis frame rails. The tow hook shall be capable of a 15,000 lb. straight pull rating.

## **HANDRAILS**

All handrails, unless otherwise stated, shall be constructed of knurled aluminum of not less than 1-1/4" in diameter. All railing shields and brackets shall be chrome plated, and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.

Handrails shall be provided in the following areas:

- Horizontal rear hand rail above the rear center compartment.
- Grab handle on top of catwalk on the left side of the apparatus in front of the tank fill tower.
- Grab handle on top of catwalk on the right side of the apparatus.
- Left rear vertical hand rail from top of body to just above the rear step.

## **HYDRAULIC LADDER RACK WITH PIKE POLE STORAGE**

The ladders shall be mounted above the high compartments on the right side of the apparatus on a pivoting ladder rack. The pivoting ladder rack shall be operated hydraulically, lowering the ladders firmly to shoulder height for easy removal and reloading.

The hydraulic ladder rack shall be painted the same color as the apparatus and shall have space available for three (3) pike poles to be stored directly on the ladder rack.

The control switch shall be located on the right side of the body to allow viewing the ladder rack when operating the mechanism. The control shall be wired to the parking brake and shall only be operable when the parking brake is applied.

The ladder rack shall be modular in design and built in a "T" shape pivoting on a 20 inch wide arm. The module shall be located between the high side compartments. There shall be no guide arms or stabilizer arms located on the ends of the folding ladder rack. The right side compartments shall be accessible when the ladder rack is in either the up or down position.

When in the up position the ladder rack lifting mechanism shall be fully retracted into the apparatus body and is flush with the side of the apparatus. Pilot operated check valves shall be installed in the hydraulic system to lock the rack in the stored position by maintaining pressure on the hydraulic cylinder.

There shall be a master shut off switch and a flashing indicator light on the chassis dash to warn the driver when the ladder rack is in the down position or in motion when the chassis parking brake is disengaged. The warning light shall be operative regardless of the position of the master switch.

Reflective striping shall be applied to the ladder rack assembly in a manner that will readily indicate a hazard or obstruction to personnel.

In addition to the reflective striping, Whelen TIR3 series LED lights shall be affixed to the front and rear of the ladder rack. These lights shall automatically become energized any time the ladder rack is not fully bedded.

## **LADDER RACK SHIELD**

There shall be a treadbrite shield installed on the hydraulic ladder rack. The shield shall protect the lifting mechanism of the ladder rack when in the up and stored position.

## **GROUND LADDER BRACKETS**

The ground ladder brackets shall provide a quick method of removing and reloading the ladders. A quick release allows personnel to loosen and unhook the strap in order to remove the ladders, a ratchet style mechanism securely and easily fastens the ladders back into place.

The bracket will allow the sectional ladder to still be clamped into position when the roof ladder has been removed.

One (1) set of Zico model FLB mounting brackets shall be installed in order to accommodate a folding attic ladder.

## **GROUND LADDERS AND PIKE POLES**

The following ladders and pike poles shall be provided by the apparatus manufacturer:

- One (1) 14' roof ladder, Duo Safety 775A
- One (1) 24' two section extension ladder, Duo Safety 900A
- One (1) 10' folding attic ladder, Duo Safety 585A with brackets.
- One (1) 8' fiberglass pike pole, Duo Safety FP8
- One (1) 10' fiberglass pike pole, Duo Safety FP10

## **SHELVING CHANNELS**

There shall be four (4) strut channels, two (2) per side, installed in two (2) compartments for shelves. The strut channels shall be installed in Compartments L2 & R2.

There shall be two (2) strut channels, one (1) per side, installed in three (3) compartments for shelves. The strut channels shall be installed in Compartments L3, R1, R3 and T1.

There shall be four (4) strut channels, two (2) per side, installed in one (1) full height compartment for shelves. The strut channels shall be installed in Compartment L1.

## **ADJUSTABLE SHELVES**

There shall be seven (7) adjustable shelves constructed of 3/16" aluminum sheet with 2" lips. The shelves shall be coated with Line-X™, a thermoplastic polyurethane coating. The shelves shall be fabricated in such a manner that liquids readily drain when spilled.

One shelf shall be installed in each compartment.

## **ROLL OUT EQUIPMENT TRAY - 300**

There shall be one (1) rollout tray installed on the apparatus. Each tray shall be provided with a SlideMaster™ model SM3-LP roller type assembly. The roller assembly shall have a rated capacity of 300 lb. distributed load, and shall have 100% extension capabilities. A mechanical lock assembly shall be provided to lock the tray in the extended position and the retracted position. The tray shall be constructed of 3/16" aluminum sheet with 3" lips. The tray shall be coated with Line-X™, a thermoplastic polyurethane coating. The tray roller assembly shall have a powder coated finish for added corrosion protection.

The roll-out tray shall be installed on the floor in compartment L1. The tray shall have sides approximately 6" high.

### **ROLL OUT EQUIPMENT TRAY- 600**

There shall be one (1) rollout tray installed on the apparatus. Each tray shall be provided with a SlideMaster™ model SM2-MP roller type assembly. The roller assembly shall have a rated capacity of 600 lb. distributed load, and shall have 70% extension capabilities. A mechanical lock assembly shall be provided to lock the tray in the extended position and the retracted position. The tray shall be constructed of 3/16" aluminum sheet with 3" lips. The tray shall be coated with Line-X™, a thermoplastic polyurethane coating. The tray roller assembly shall have a powder coated finish for added corrosion protection.

The roll-out tray shall be installed in compartment T1.

### **ADJUSTABLE HEIGHT ROLL OUT EQUIPMENT TRAYS**

There shall be two (2) rollout trays installed on the apparatus. Each tray shall be provided with a SlideMaster™ model SM3-LP, roller type assembly. The roller assembly shall have a rated capacity of 300 lb. distributed load, and shall have 100% extension capabilities. A mechanical lock assembly shall be provided to lock the trays in the extended position and the retracted position. The trays shall be constructed of 3/16" aluminum sheet with 3" lips. The trays shall be coated with Line-X™, a thermoplastic polyurethane coating. The tray roller assembly shall have a powder coated finish for added corrosion protection.

The trays shall be installed on vertical tracks to allow it to be adjusted in height.

The roll-out trays shall be installed in compartment L1. The tray sides shall be approximately 3" high.

### **AIR BOTTLE COMPARTMENTS**

There shall be four (4) single cylinder air bottle compartments installed in the rear wheel well area. The tubes shall be constructed from injection molded plastic to assist in preventing damage to the air cylinders. There shall be a drain hole in the rear of the compartment.

### **AIR BOTTLE COMPARTMENT DOOR**

The single air bottle compartment shall have a stainless steel Fire Shoppe hinged door. All hinges and mounting hardware shall be concealed. A Southco latch shall be utilized for opening and securely closing the door. Weather stripping will also be provided to keep the inside of the compartment dry.

## **HOSE BED CAPACITY**

The hose bed shall have the capacity for 600 feet of 5" hose, 600 feet of 2-1/2" hose and two separate beds for 200 feet of 1-3/4" hose each.

## **HOSE BED FLOORING**

The floor of the hose bed compartment shall be constructed of Dura-Dek fiber reinforced plastic material. The flooring shall be fabricated of "T" beam pultrusions in parallel connected with cross slats that are first mechanically bonded and then epoxied, forming a large sheet.

The top portion of each "T" cross section shall measure 1-1/4" wide and 3/16" thick with beaded ends. The vertical portion shall be 3/8" thick, beading out at the bottom to a thickness of 1/2" and tall enough to result in an overall height of 1". The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation. Each "T" beam shall be constructed utilizing a core of 250,000 continuous glass fiber strands that are high in resistance to tension, compression and bending. An outer sheath consisting of a continuous strand mat to prevent lineal splitting and shipping shall surround the core. The sheath shall also serve to draw the protective resin to the bar surface. Both reinforcements shall be pulled through an isophthalic polyester resin, treated with antimony trioxide for fire resistance, to form a solid length. The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. This bright white coating shall be baked on and shall provide a pleasing contrast when installed in the apparatus.

## **HOSE BED STORAGE COMPARTMENT**

A storage compartment shall be provided to the right rear of the hose bed to store two (2) customer furnished backboards. In addition, there shall be storage for one customer furnished 6' rubbish hook.

The compartment shall be equipped with a hinged, treadbrite door at the rear with a pop latch in insure that items stored within stay secure.

## **ALUMINUM HOSE BED PARTITIONS**

Three (3) hose bed partitions shall be installed in the hose bed. The partitions shall be fabricated from 1/4" smooth aluminum plate and an aluminum extrusion.

The partitions shall be mounted on hot-dipped galvanized slide rails at the front and rear of the hose bed. Where no obstruction such as a fill tower is present, the slide rails shall allow full movement of the partition along the width of the hose bed. Each hose bed partition shall have an oval shaped hand hold slot to assist in moving the partition. This shall provide the capability for variable hose load configurations & capacities.

The three (3) adjustable hose bed dividers shall have a maintenance free abraded finish.

## **VINYL HOSE BED COVER**

There shall be a heavy duty vinyl coated nylon hose bed cover installed on the apparatus. The front edge of the cover shall be retained in a "C" channel to prevent wind from lifting it. In addition the end flap shall be secured with a positive means to prevent unintentional deployment of the hose.

The cover shall be fastened at the sides and rear with shock cords. The cover shall be red in color.

## **HARD SUCTION HOSE**

There shall be one (1) hard suction hose tray located inside the body above the left side high compartments with the capacity to store one (1) 10' section of hard suction hose. Access to the hard suction shall be from the rear of the apparatus through a hinged treadbrite door.

There shall be one (1) hard suction hose tray located inside the body above the right side high compartments with the capacity to store one (1) 10' section of hard suction hose. Access to the hard suction shall be from the rear of the apparatus through a hinged treadbrite door.

The following hard suction hose shall be supplied by body builder at the time of delivery:

- Two (2) 6" x 10' lengths of flexible PVC hard suction hose.

## **12 VOLT SYSTEM SCHEMATIC**

A complete electrical schematic for the apparatus shall be provided. This schematic shall be specifically prepared for this individual unit rather than a generic schematic designed to accommodate all apparatus.

## **12 VOLT SYSTEMS TEST**

After completion of the unit, the 12 volt electrical system shall undergo a battery of tests as listed in the latest addition of NFPA Pamphlet 1901. These tests shall include, but not be limited to: a reserve capacity test, alternator performance test at idle, alternator performance test at full load, and a low voltage alarm test. Certification of the results shall be supplied with the apparatus at the time of delivery.

## **REAR WORK LIGHT SWITCH**

A switch shall be installed above the tail light bezel on the left side. The switch shall be wired to the backup lights to provide additional work lighting. The rear work light circuit shall be deactivated when the park brake is disengaged. In addition to the lights being activated by the above switch, the lights shall also come on when the transmission is placed in reverse.

## **MIDSHIP TURN SIGNALS**

There shall be one (1) Truck-Lite model 21 LED midship auxiliary / turn signal lights installed in the rub rail, on each side of the body.

## **LED CLEARANCE LIGHTS**

Grote model 65282 red LED clearance lights shall be installed on the rear of the body as necessary to be in full compliance with applicable I.C.C. and D.O.T. codes and regulations.

## **GROUND LIGHTING**

Truck-Lite model 40 lights shall be installed beneath the apparatus in areas where personnel may be expected to climb on and off of the apparatus. The lights shall illuminate the ground within 30" of the apparatus to provide visibility of any obstructions or hazards. These areas shall include, but not be limited to, side running boards and the rear step area.

## **WALKWAY LIGHTS**

Lights shall be mounted in a manner that illuminates all walkways and steps for safe operation of the apparatus. These lights shall become illuminated when the parking brake is engaged.

## **WIRING HARNESSES**

Wiring harnesses shall be the automotive type, engineered specifically for the builder's apparatus, and shall meet the following criteria. Under no circumstances shall diodes, resistors, or fusible links be located within the wiring harness. All such components shall be located in an easy to access wiring junction box or the main circuit breaker area. All wire shall meet white book, baseline advanced design transit coach specification and Society of Automotive Engineers recommended practices. It shall be stranded copper wire core with cross linked polyethylene insulation complying with SAE specification J1128. Each wire shall be hot stamp function coded every three inches starting one inch from the end and continuing throughout the entire harness. In addition to function coding, each wire shall be number, color, and gauge coded.

Wire harnesses shall be wrapped with a high abrasion and chemical resistant thermoplastic polyester elastomer coated polyester yarn for braiding constructions of electrical wiring systems. The braid yarn shall have a minimum tensile strength of 15 lbs. before breaking and have a maximum of 20% elongation before breaking. Temperature properties for the yarn shall range from a minimum 280° F service temperature to a maximum -112° F brittleness temperature with a cold flex tolerance of at least -49° F).

Harnesses shall be modular in design; a main harness system subdivided into several smaller sub-harnesses. The harness subsections shall be connected using Deutsch branded, heavy duty, environmentally sealed, connectors with silicone seals and a rear insertion/removal contact system. For isolation of electrical "zones" the harness subsections shall consist of a main harness, a pump harness with a separate pump gauge panel harness, a left body harness with a separate left compartment harness, a right body harness with a separate right compartment harness, and a rear body harness with two separate rear compartment harnesses.

The main harness and three body harnesses shall interconnect at a central, easy to reach location and their connectors shall not be obstructed by other harnesses or fuel/air lines. In addition, the main and body harness connectors shall be color coded for ease of identification with their respective colors noted on the accompanying electrical diagrams.

Where connectors are not provided by the electrical component manufacturer, all 12 volt lights and other electrical components (excluding rocker and toggle switches) shall connect to the harnesses using Deutsch brand connectors; butt connectors are considered unacceptable.

All Deutsch connectors shall meet the following criteria:

- All connectors shall have a minimum IP67 rating.

- Temperature range from -67° F to 257° F continuous at rated current.
- Only solid contacts will be used. Stamped and formed contacts are unacceptable.
- All contacts shall be soldered unless a crimping tool or machine is used that gives an even and precise pressure for the terminal being used.
- All contacts shall be pull-tested to insure their integrity.

## V-MUX ELECTRICAL MANAGEMENT SYSTEM

The apparatus shall be equipped with a V-MUX Multiplex System. There are several key benefits to multiplexing, one is to reduce the number of connections in a vehicles electrical system, because of this it is important to limit the amount of modules that control certain functions of the vehicle.

### Outputs:

The outputs shall perform all the following items without added modules to perform any of the tasks.

1. Load Shedding: The System shall have the capability to Load Shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like Load Shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs.
2. Load Sequencing: The System shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system.
3. Output Device: The System shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than 100 times that of a relay.
4. Flashing Outputs: The System shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, or 160 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with.
5. PWM: The modules shall have the ability to PWM at some outputs so that a Headlight PWM module is not needed.
6. Diagnostics: An output shall be able to detect either a short or open circuit.

### Inputs:

1. The inputs shall have the ability to switch by a ground or battery signal.
2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.



### **System Network:**

The Multiplex system contains a peer-to-peer network. A master/slave type network is not suitable for the Fire/Rescue industry. A peer-to-peer network means that all the modules are equal on the network; a master is not needed to tell other nodes when to talk.

### **System Reliability:**

The Multiplex system shall be able to perform in extreme temperature conditions, from -40° to +185° F. The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

### **FIRECOM 3010 INTERCOM**

There shall be a Firecom 3010 intercom system provided on the apparatus. The system shall include six (6) positions in the cab, and one (1) at the pump panel. Each position in the system shall have intercom capabilities.

The following positions shall have radio interface capabilities: Driver, Officer, and Pump Panel.

There shall be two (2) Firecom model UH-10, part number 105-0192-00 under the helmet, radio transmit headset(s) included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a red push to talk button.

There shall be four (4) Firecom model UH-20, part number 105-0193-00 under the helmet, intercom only headset(s) included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a momentary push and hold to talk button.

There shall be one (1) Firecom model HE-150, part number 108-0675-15, 15' coiled extension cable supplied. The cable shall be compatible with any single plug Firecom headset.

There shall be six (6) Firecom HM-10, headset plug-in modules, part number 107-0407-00 installed. The modules are designed for interior mounting and shall accommodate a Firecom single plug headset. The headset plug-in module shall be located in the cab near each sitting position.

There shall be one (1) Firecom model PP-20, part number 107-0413-00, waterproof headset module installed. The module shall have a snap tight spring hinged lid to protect against moisture and allow for exterior mounting. The module shall be designed to accommodate Firecom single plug headsets. The headset plug-in module shall be located at the pump panel.

There shall be a Firecom model MR-XX, mobile interface cable provided with the intercom system. The cable is radio specific and will allow the Firecom intercom system to interface with the mobile radio system.

The model of headsets used shall determine which personal shall have radio transmit ability.

### **PUMP COMPARTMENT LIGHT**

The pump compartment shall be equipped with On Scene Night Stick LED compartment lighting. The lights shall be rated at 100,000 hours of service with 74 lumens per 18" light. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8" Lexan tube. Multi-clip attachments shall allow for easy installation.

### **TAIL LIGHTS**

There shall be a Whelen 600 series LED tail light assembly installed on each side of the rear of the apparatus. Each assembly shall include one (1) red LED stop/tail light model number 60R00BRR, one (1) amber LED model 60A00TAR turn light with arrow and one (1) clear halogen backup light model 60F00OCR. The lights shall be mounted in a chrome plated composite housing.

### **STREAMLIGHT RECHARGEABLE LIGHTS**

There shall be two (2) Streamlight, model 45102 20 watt spot, rechargeable LiteBoxes supplied and installed on the apparatus. The lights shall be wired direct to the chassis batteries.

### **CUSTOMER SUPPLIED RADIO AND ANTENNA**

There shall be one (1) customer supplied radio and one (1) customer supplied antenna shipped to the apparatus manufacturer for installation.

### **GOLIGHT REMOTE CONTROL SEARCH LIGHT**

There shall be two (2) Golight model 2020 permanent mount search lights installed on the apparatus, one each side of the chassis cab roof. Each light shall provide 400,000 candle power of light output from a weather resistant halogen bulb. The Golight shall be capable of 370° rotation and 120° tilt. Each light shall be equipped with two a hard wired remote controls located in the chassis cab, one each side near the driver and officer positions.

### **ONAN HYDRAULIC GENERATOR SET**

An Onan model 8RBAB hydraulic driven generator set shall be installed on the apparatus. The generator shall be rated at 8,000 watts at 120/240 volts. Current frequency shall be stable at 60 hertz.

The power generating unit shall be modular unit, housed in stainless steel with an acoustical material added for maximum sound dampening. The module shall consist of the hydraulic motor, generator, blower, cooler, and all other necessary components.

For ease of maintenance, the only part of the system that shall require accessibility shall be the oil reservoir which shall be located so as to facilitate periodic checks and the adding of hydraulic fluids.

The generator shall be located ahead of the hosebed in front of the fill towers.

## **WARRANTY PERIOD**

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the 8RBAB series hydraulic generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

A ninety (90) day adjustment policy is free of charge. This policy provides that Cummins Inc. will make minor adjustments to the generator set during the first three (3) months you own the unit.

In addition to the five (5) year or one thousand (1,000) hour warranty, a travel time repair allowance of 2-1/2 hours and mileage cost up to one hundred (100) miles shall be included for the first two (2) years.

## **GENERATOR HOT SHIFT PTO CONNECTION**

The hydraulic pump for the generator system shall be connected to the chassis transmission through a "Hot Shift", electrically engaged power-take-off system. The control to engage and disengage the power-take-off system shall be installed in the chassis cab.

## **GENERATOR DISPLAY METER**

There shall be an LED generator display meter provided with the generator. The display meter shall automatically sense a generator signal and begin displaying information. The digital meter display shall constantly monitor and display voltage, frequency and amps. The display shall be capable of displaying total accumulated run time hours when the MODE button is pressed once. Press the MODE button twice to display the temperature of the oil returning to the oil reservoir.

The frog display shall be located on the pump panel.

## **LOAD CENTER**

The entire 120/240 volt electrical system shall be installed in strict compliance with NFPA Pamphlet 1901, newest edition. This shall include all testing, labeling, wiring methodology, and dimensional requirements. Certification of compliance shall accompany the apparatus at the time of delivery.

There shall be a 120/240 volt load center incorporated into the 120/240 volt wiring system. The load center shall include adequate circuit breakers to protect the loads specified on this apparatus.

All 120/240 volt A.C. Wiring shall be done in accordance with NFPA Pamphlet 1901 as well as nationally accepted electrical codes.

The load center shall be located as determined at the pre-construction conference.

## **BRANCH CIRCUIT OVERCURRENT PROTECTION**

Over current protection devices shall be provided for circuits in accordance with NFPA 1901 newest version. The load center shall be equipped with a non-GFI two pole main breaker when the six or more individual branch circuits are present. Over current protection devices shall be marked with labels to

identify the function of the circuit they protect.

## **PROTECTION FOR ELECTRICAL TERMINALS**

All ungrounded electrical terminal shall have a protective cover or be in an enclosure.

## **ELECTRIC REWIND CORD REEL**

There shall be one (1) Akron Brass Model ERWC-15-10 electric rewind cord reel installed. Each reel shall be equipped with a universal frame that will allow the 12 volt motor to be mounted in four different positions. All metal parts, except for the electric motor and sprocket teeth, shall be powder painted red. All hardware shall be stainless steel. The cord reel disks shall have rolled edges to prevent sharp edges. The cord reel shall include the solenoid, switch and circuit breaker. The reel shall be covered by an Akron Brass 5 year warranty.

The reel shall be equipped with 200' of yellow STW Seoprene 105 degree Celsius 10/3 wire installed with a cable stop to prevent damage to cable fittings. Rollers shall be supplied to prevent damage to the electrical cable if pulled in any direction.

The cord reel shall be located on the ceiling in the rear center compartment.

## **CORD REEL JUNCTION BOX**

There shall be one (1) Extenda-Lite model EJB-CS back lighted electrical junction box, equipped with four (4) electrical receptacles, two on each side. Each receptacle shall be equipped with a spring loaded snap cover. A cord reel shall be prewired to the cast aluminum junction box to supply power to the four receptacles. An extension cord shall be connected to the junction box through a heavy duty water resistant strain relief and flexible extender. Each side of the junction box shall be fitted with polypropylene faceplates which are back lighted so that plug orientation to the receptacles is quick and easy to align.

## **RECEPTACLES**

There shall be four (4) NEMA L5-20, 120 volt, 20 ampere rating twist lock type receptacles wired to the generator. The receptacles shall have spring loaded weather resistant covers.

The receptacles shall be located one each side at the rear for the portable lights and two as designated by the fire department.

## **PORTABLE 500 WATT FLOODLIGHT**

There shall be two (2) Fire Research Optimum model OPA700-S50 portable lights provided. The base shall be cast aluminum with three legs for stability. Wiring shall extend from the side of the base.

The lamphead shall have one (1) quartz halogen 500 watt 120 volt bulb. The bulb shall draw 4.2 amps and generate 10,500 lumens. The bulb shall be accessible through the front. The lamphead shall incorporate a vacuum deposit polished reflector and two optimizing mirrors to produce a uniform beam that lights up an area 100° vertically by 150° horizontally. The lamphead shall have a heat dissipating curved front lens. The

curve of the lens shall have a radius of 5.16 inches to optimize light emission. The lamphead shall be no more than 4 3/4" deep by 5 1/8" high by 8 3/4" wide. Lamphead and brackets shall be powder coated white.

The above 120 volt lights shall be controlled with the circuit breaker. In addition, there shall be a remote switch provided in the chassis cab.

## **TELESCOPING 240 VOLT LIGHTS**

The following 240 volt telescoping lights shall be mounted to the rear of the cab.

There shall be two (2) Fire Research NightMaster model LTA510-M12 telescopic light installed. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position.

The lamphead shall have one (1) quartz halogen 1000 watt 240 volt bulb. The bulb shall draw 4.2 amps and generate 22,000 lumens. The bulb shall be accessible through the front. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a star shaped locking knob. The lamphead shall be no more than 5 3/8" deep by 10 1/2" high by 16 1/2" wide. Lamphead and mounting arm shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

The telescopic lights shall be installed one each side at the rear of the cab.

The above 240 volt lights shall be controlled with the circuit breaker.

## **KNIGHT LIGHT TOWER**

The apparatus shall be equipped with one (1) Knight Light KL450, all electric floodlight tower. The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights shall not acceptable alternatives to the all-electric light tower specified.

The light tower shall be capable of overhanging the side of the vehicle to provide maximum illumination and a warning area adjacent to the vehicle, no exceptions.

The light tower shall have six (6) weatherproof, 500 watt, 120 volt quartz halogen lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position.

The light tower shall have slip-rings for full 360 rotation. Further the tower shall be capable of rotating either direction from a stowed position.

Light tower shall be controlled with a hand-held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

- Three (3) switches, one (1) for each light bank.
- One (1) light bank rotation switch.
- One (1) switch for elevating lower stage.

- One (1) switch for elevating upper stage.
- One (1) indicator light to indicate when light bank is out of roof nest position.
- One (1) indicator light to indicate when light bank is rotated to proper nest position.

The tower base shall have a light that illuminates the envelope of motion during any movements of the light tower mast.

The light tower shall have a full extension over 7 feet from mounted position and extend from nest position to full upright in 15 seconds. The overall size of nested light tower shall be approximately 23" wide x 47" long x 11 3/4" high, and weight approximately 120 lbs. The light tower shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The light tower shall be mounted on top of the chassis cab.

### **DEUTSCH PLUGS ON WARNING LIGHTS**

All warning lights shall be supplied with Deutsch plugs connectors. Failure to do so in areas where harsh elements such as snow, ice & road treatment chemicals may cause corrosion will VOID the vendor warranty on selected lighting.

### **UPPER ZONE A VISUAL WARNING**

There shall be one (1) Whelen Engineering model FN72VLED, with part number 9LLTH82 added to make a custom length of 82", light bar installed on the chassis cab roof. The light bar shall be equipped with two (2) forward facing linear "Red" LED's, two (2) forward facing linear "White" LED's, two (2) corner forward facing "Red" LED's, and two (2) side facing "Red" LED's.

The light bar shall be equipped with clear lenses. All clear LEDs in the light bar shall be deactivated in the Blocking Right of Way mode.

### **OPTICOM EMITTER**

There shall be one (1) low profile LED Opticom emitter located in the light bar. The emitter shall be have a performance range of up to 2,500 feet to provide preemption of all intersections equipped with the Opticom infrared system.

The emitter shall be wired in such a manner as to be disabled when the park brake is set. A switch in the main switch panel shall control the unit in conjunction with the park brake circuit.

### **UPPER ZONE C VISUAL WARNING**

There shall be two (2) Whelen Engineering model MCFLED2R Micro Edge LED lights installed high at the rear of the apparatus. The lights shall have red lenses.

### **LOWER ZONE B VISUAL WARNING**

There shall be one (1) Whelen Engineering model 60R02FRR super LED lights with flanges installed in the

lower warning zone. The lights shall be red with red lenses.

### **LOWER ZONE C VISUAL WARNING**

There shall be two (2) Whelen Engineering model 60R02FRR super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.

### **LOWER ZONE D VISUAL WARNING**

There shall be one (1) Whelen Engineering model 60R02FRR super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.

### **THERMOPLASTIC COATING**

In the designated areas, Line-X™, a two component spray-in-place thermoplastic polyurethane system shall be used for maximum protection of the body and equipment. The system shall utilize flexible 100% solids applied with high pressure impingement-mix polyurethane dispensing equipment.

The coating shall be a fast cure, textured surface, multi-purpose material designed for commercial and industrial applications. It shall exhibit excellent adhesion to the body and serve as a protective, abrasion resistant liner where applied.

The density of the material shall be a minimum of 70 PCF as measured using ASTM test method D-1622. The taber abrasion resistance shall be a minimum of 0.03% per 1000 cycles as measured utilizing ASTM test method D-4060.

The minimum tensile strength as measured using ASTM D-2370 shall be 1540 pounds per square inch.

### **BODY COMPARTMENTATION COATING**

The interior of the body compartments shall be coated with a gray thermo-plastic polyurethane coating. The coating shall be durable enough to withstand every day abuse of equipment removal and shifting.

### **BODY PAINT PREPARATION**

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

All aluminum sections of the body shall undergo a thorough cleaning process starting with a phosphoric acid solution to begin the etching process followed by a complete rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the aluminum surface for greater film adhesion.

After the cleaning process the body and its components shall be primed with a High Solids primer and the

seams shall be caulked.

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

## **PAINT PROCESS**

The paint process shall follow the strict standards as set forth by PPG Fleet Finish Guidelines. The body shall go through a three-stage paint process: primer coat, base coat (color), and clear coat. In the first stage of the paint process the body shall be coated with PPG F3980 Low VOC / High Solids primer to achieve a total thickness of 2-4 mills. In the second stage of the paint process the body shall be painted with PPG FBCH Delfleet™ High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve hiding. In the final stage of the paint process the body shall be painted with PPG DCU-2002 Clear Coat. A minimum of two to three coats shall be applied to achieve a total dry film thickness of 2-3 mills.

As part of the curing process the painted body shall go through a Force Dry / Bake Cycle process. The painted components shall be baked at 185 degrees for 3 hours to achieve a complete coating cure on the finished product.

## **HAND POLISHED**

After the force dry / bake cycle and ample cool down time, the coated surface shall be sanded using 3M 1000, 1200, and or 1500 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed with 3M superduty compound to add extra shine to coated surface. No more than .5 mil of clear shall be removed in this process.

## **APPARATUS BODY COLOR**

The apparatus shall be painted with PPG High Solids Polyurethane Base Coat. The apparatus shall be painted (RED) PPG #FBCH - 71096-ALT.

## **TOUCH UP PAINT**

Two (2) touch up paint pens shall be supplied.

## **CORROSION PREVENTION**

One (1) 3.75 ounce tube shall be provided to use whenever additional items are mounted to the apparatus. ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

## **NFPA COMPLIANT REFLECTIVE STRIPING**

Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with the National Fire Protection Association Pamphlet 1901, latest edition. It shall consist of a straight, 6" wide stripe along



the front of the chassis and along the sides, staying below the tops of the wheel well areas. The reflective striping shall be white in color.

### **CHEVRON REFLECTIVE STRIPING, REAR OF UNIT**

In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The reflective striping shall cover at least 50% of the rear facing vertical surface, per NFPA 1901 newest edition.

The striping shall consist of alternating reflective stripes. Each stripe shall be a minimum of 6" in width and shall be applied to the apparatus at 45° angle.

The chevron striping shall consist of 3M part numbers 1172 EC, red and 3983, fluorescent yellow-green.

### **RUB RAIL REFLECTIVE STRIPING**

There shall be 2" reflective striping installed in the rub rail channel. The reflective striping shall be diamond grade quality material for increased visibility. The reflective shall be silver in color.

### **UNDERCOATING**

The apparatus shall undergo a two (2) step undercoating process. The first step shall be a rubberized polyurethane base compound that is applied after the body has been primed. The materials used shall incorporate unused paint products to reduce the amount of waste released into the environment. This coat shall be applied to all hidden pockets and surfaces that shall not be visible after completion.

As a final step, the entire underside of the body shall be coated with a bituminous based automotive type undercoating when the apparatus is completed. During this application, special care shall be taken to avoid spraying the product on air lines, cables, or other items that would cause normal maintenance to be hindered.

### **MUD FLAPS**

There shall be two (2) mud flaps at the front of the chassis which are provided by the custom chassis supplier. Two (2) at the rear of the unit will be provided by the apparatus manufacturer. The mud flaps shall be a minimum of 3/8" thick to prevent "sailing".

### **WHEEL CHOCKS & MOUNTING**

There shall be one (1) pair of Cast Products, Inc. wheel chocks provided with the apparatus. The chocks shall be mounted in brackets that are easily accessible under the left side body.

### **ADDITIONAL HARDWARE**

There shall be one (1) bag of stainless steel nuts, bolts, and washers supplied with the apparatus for mounting of equipment.

## HELMET BRACKETS

The apparatus manufacturer shall supply brackets for mounting helmets in the chassis cab. These brackets shall comply with NFPA 1901, newest edition.

These brackets shall meet the 9G requirements of NFPA 1901, newest edition. The Zico model UHH-1 brackets shall hold both traditional and contemporary style helmets without any adjustments necessary. Storing and removing a helmet that is on the bracket is quick and easy.

## FUEL FILL

The fuel fill pocket shall be located in the left rear wheel well area. The fuel fill shall have a Cast Products aluminum door with bezel installed.

## FUEL TANK GAUGE ACCESS PANEL

There shall be a removable panel provided in the rear compartment to allow for access to the fuel tank gauge without removing the fuel tank.

## MANUFACTURING LABELS

A permanent plate shall be mounted in the driver's compartment specifying the quantity and type of the following fluids that may be used in the apparatus for normal maintenance. Where a fluid is not applicable to the unit, the plate shall be marked N/A to inform the service technician who may not be familiar with the apparatus.

- Engine oil
- Engine coolant
- Transmission fluid
- Pump transmission fluid
- Pump primer fluid
- Drive axle fluid
- Air conditioning refrigerant
- Power steering fluid
- Cab tilt mechanism fluid
- Transfer case fluid
- Equipment rack fluid
- Air compressor system lubricant
- Generator system lubricant
- Front tires air pressure
- Rear tires air pressure

A permanent plate shall be affixed in the driver's area that states the maximum number of personnel allowed to ride on the apparatus at any time.

A sign shall be affixed in the chassis cab, in plain sight of the driver that states the overall travel height, overall length, and gross GVWR of the apparatus.

On any gated inlet on the apparatus, a permanent label shall be provided that states:

"WARNING: Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations."

All other appropriate labels to ensure safe operation of the apparatus shall be permanently affixed in conspicuous locations.

## **PRE-CONSTRUCTION MEETING**

There shall be a pre-construction meeting held at the factory. The pre-construction meeting is the most important meeting during the after-sale process of purchasing an apparatus. The purpose of this meeting is to finalize all aspects the specifications, discuss and clarify all design details of the apparatus, and to share or provide all information so all parties are in agreement on the apparatus being constructed. The ultimate goal of the pre-construction meeting is for the purchaser and dealer representative to discuss and clarify all aspects of the proposed apparatus and to provide all necessary information to the apparatus manufacturer that shall ensure the apparatus is built to the satisfaction of all parties involved.

The apparatus manufacturer shall create and forward to the dealer a "Pre-construction" binder containing the following items:

- Complete Specifications including the Body, Chassis and Aerial (if applicable).
- Detailed Amp Draw Report
- A listing of clarifications or questions from the manufacturer that require attention, such as shelf locations, lettering details, etc.
- Full Size "C" Drawings, minimum of five
- 11" x 17" Drawing
- Paint Sample Plates for color matching of existing apparatus
- Paint Confirmation form

During this pre-construction meeting, any changes or clarifications must be documented on a manufacturer issued change order. The change order shall be signed by the Customer and Dealership and ultimately by the apparatus manufacturer. The change order officially becomes an extension of the contract upon official signatures of all three parties. All change order items resulting from the pre-construction meeting shall be implemented into the official shop order document.

Expenses shall be provided by the customer including travel, meals and lodging.

## **PRE-PAINT INSPECTION**

There shall be an inspection of the apparatus in the pre-paint stage of production by the customer at the Smeal Fire Apparatus showroom. The customer shall be given the opportunity to visually inspect the chassis, pump panel, plumbing, and all other body options so that any discrepancies may be addressed prior to the painting process. A Smeal Fire Apparatus representative shall be present at the inspection to answer all questions. Smeal Fire Apparatus will give adequate notice to the dealer as to when the apparatus will be available for inspection.

Expenses shall be provided by the customer including travel, meals and lodging.

### **FINAL INSPECTION**

There shall be an inspection of the apparatus in the final stage of production by the customer at the Smeal Fire Apparatus showroom. The customer shall be given the opportunity to visually inspect the completed apparatus including the chassis, pump panel, plumbing, and all other body options so that any discrepancies may be addressed prior to the apparatus leaving the factory. A Smeal Fire Apparatus representative shall be present at the inspection to answer all questions. Smeal Fire Apparatus will give adequate and accurate notice to the dealer as to the date the apparatus will be completed.

If any discrepancies are found during the final inspection, they will be addressed immediately and then the apparatus will be ready for delivery.

Expenses shall be provided by the customer including travel, meals and lodging.

### **DELIVERY AND DEMONSTRATION**

Our proposal includes delivery of the completed apparatus to Grand Junction, Colorado.

On initial delivery of the fire apparatus we shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the purchaser regarding the operation, care, and maintenance of the apparatus and equipment supplied at the purchasers location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by Purchaser. After delivery of the fire apparatus, the purchaser shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment as defined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

## Smeal Fire Apparatus Load Accounting Report



**Bid # 6463**

**06/06/11**

City of Grand Junction, Grand Junction, CO  
 Side Mount Pumper, Spartan Metro Star Chassis Weldon V-Mux System  
 Cummins ISL9-400, 400 HP Diesel Engine  
 270 Amp Leece-Neville Alternator

**DIRECTIONS**

1. The average draw of the strobe pack is used when strobe lights are used.
2. One half of the steady burn current is used when determining load for flashing lights.
3. If several different light styles are used in a given circuit, for example: marker lights, the total amperage draw for the circuit is shown.
4. Headlight draw based on High Beams On, or Low Beams with Alternating High Beams, whichever is higher.
5. "On Scene" refers to loads which could be in operation while the vehicle is at an emergency scene.  
 Responding" refers to loads which could be in operation while the vehicle is in route to the emergency scene.
6. The Q2B siren (when used) is figured into "Responding" calculations due to its large current draw and the possibility of its extended use in route to an emergency even though it is considered a momentary load.
7. All total loads are figured into the calculations due to the large current draw and the possibility of their extended use in route to or at an emergency even though they may be considered a momentary load.
8. (S) denotes Strobe Light, (O) denotes Oscilaser, (B) denotes Beacon, (F) denotes Flashing Halogen.
9. \* denotes a partial or complete load that can be load managed or de-energized with Park Brake.

WARNING LIGHTS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
WHELEN FN82QLED LIGHT BAR	1	8.0	6.0	8.0
OPTICOM EMITTER	1	5.0	0.0	5.0
LOWER FRONT WARNING (LED)	4	.25/PR	0.5	0.5
LOWER SIDE WARNING (LED)	6	.25/PR	0.75	0.75
LOWER REAR WARNING (LED)	2	.25/PR	0.25	0.25
UPPER REAR WARNING MCFLED2R	2	6.0/PR	6.0	6.0
<b>WARNING TOTAL</b>	<b>16</b>	<b>N/A</b>	<b>13.5</b>	<b>20.5</b>

SPOT/SCENE LIGHTS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
GO LIGHT CAB SPOTLIGHT	2	5.5	11.0	11.0
GROUND LIGHTS	8	1.6	12.8	0.0
<b>SPOT/SCENE TOTAL</b>	<b>10</b>	<b>N/A</b>	<b>23.8</b>	<b>11.0</b>

SIREN/HORN	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
FEDERAL Q2B MECHANICAL SIREN	1	100.0	0.0	100.0
ELECTRONIC SIREN	1	10.0	0.0	10.0
<b>SIREN/HORN TOTAL</b>	<b>2</b>	<b>N/A</b>	<b>0.0</b>	<b>110.0</b>

BODY LIGHTS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
COMPARTMENT LTS (ON SCENE)	36'	0.13/FT	4.7	0.0
WALKWAY/STEP	8	0.3	2.4	0.0
<b>BODY TOTAL</b>	<b>44</b>	<b>N/A</b>	<b>7.1</b>	<b>0.0</b>

## Smeal Fire Apparatus Load Accounting Report

CHASSIS LIGHTS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
HEADLIGHTS (Overall Max Draw)	1	18.2	18.2	18.2
SPARTAN DOME LTS (Std Red/Clear)	5	3.9	19.5	19.5
TAIL LIGHT (LED)	2	0.6	1.2	1.2
BACKUP LIGHTS	2	2.1	4.2	0.0
CLEARANCE/MARKER	12	0.30	3.6	3.6
<b>CHASSIS TOTAL</b>	<b>22</b>	<b>N/A</b>	<b>46.7</b>	<b>42.5</b>

PUMP COMPONENTS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
PUMP COMPARTMENT LIGHTS	2	0.5	1.0	0.0
PUMP PANEL LTS (ON SCENE LED)	12'	.13/FT	1.6	1.6
GAUGES AND BUZZERS	1	5.0	5.0	0.0
PUMP SHIFT INDICATORS	3	0.3	1.0	0.0
<b>PUMP COMPONENTS TOTAL</b>	<b>18</b>	<b>N/A</b>	<b>8.6</b>	<b>1.6</b>

MISCELLANEOUS	# OF PARTS	AMPS EACH	ON SCENE	RESPONDING
AIR CONDITIONER/HEAT *	1	50.0	50.0	50.0
HEATED MIRRORS *	2	3.0	6.0	6.0
ELECTRONIC ENGINE ECU	1	15.0	15.0	15.0
ELECTRONIC TRANSMISSION	1	10.0	10.0	10.0
FUEL/WATER SEPARATOR	1	15.5	15.5	15.5
AIR DRYER	1	9.0	9.0	9.0
ANTI-LOCK BRAKES	1	5.0	0.0	5.0
<b>MISCELLANEOUS TOTAL</b>	<b>8</b>	<b>N/A</b>	<b>105.5</b>	<b>110.5</b>

Totals for Bid # 6463	ON SCENE	MANAGEABLE LOAD ***	ON SCENE MANAGED	RESPONDING
WARNING LIGHTS	13.5		13.5	20.5
SPOT/SCENE LIGHTS	23.8		23.8	11.0
SIREN/HORN	0.0		0.0	110.0
BODY LIGHTS	7.1		7.1	0.0
CHASSIS LIGHTS	46.7		46.7	42.5
PUMP COMPONENTS	8.6		8.6	1.6
MISCELLANEOUS	105.5	56.0	49.5	110.5
<b>GRAND TOTAL</b>	<b>205.1</b>	<b>N/A</b>	<b>149.1</b>	<b>296.1</b>

270 AMP LEECE-NEVILLE ALTERNATOR RATED: 270 AMPS

MINIMUM OUTPUT: @ 700 RPM (200°F) 130 AMPS (72° F) 160 AMPS

MEDIAN OUTPUT: @ 1000 RPM (200°F) 185 AMPS (72° F) 227 AMPS

MAXIMUM OUTPUT: @ 1650 RPM (200°F) 212 AMPS (72° F) 253 AMPS

Weldon V-Mux Multiplex System is capable of shedding any output (barring NFPA restriction) at 8 different voltage levels. Some loads which could be load managed:

LOAD # 1 AIR CONDITIONER 50 AMPS

LOAD # 2 HEATED MIRRORS 6 AMPS

Some items listed (or not listed) in this document may or may not be included in the specifications. The Specifications shall be the final authority to determine what is supplied with the apparatus.

## Description

**VEHICLE**

S	0100-011	<b>MODEL</b>	Metro Star 2010 Emissions
O	8012-002	<b>CUSTOMERS / OEMS</b>	Smeal (02070)
S	8011-012	<b>MODEL YEAR</b>	Model Year - 2012
S	8001-001	<b>COUNTRY OF SERVICE</b>	Country of Service United States Of America
O	8006-009	<b>APPARATUS TYPE</b>	Apparatus Type Pumper
S	8008-001	<b>VEHICLE TYPE</b>	Vehicle Type Straight Truck
S	0104-001	<b>AXLE CONFIGURATION</b>	Axle Configuration 4x2 (Rear Axle Drive Only)
O	0101-003	<b>GROSS AXLE WEIGHT RATINGS FRONT</b>	GAWR Front 20000#
O	0102-003	<b>GROSS AXLE WEIGHT RATINGS REAR</b>	GAWR Rear 24000#
O	8010-002	<b>PUMP PROVISION</b>	Pump Provision Driveline Midship

**CAB**

O	1000-004	<b>CAB STYLE</b>	Cab Style MFD 10" Raised Roof
S	1501-002	<b>CAB FRONT FASCIA</b>	Cab Frt Fascia Classic
S	1518-013	<b>FRONT GRILLE</b>	Cab Frt Grille Classic Styled
S	1551-002	<b>CAB UNDERCOAT</b>	Cab Undercoat
S	1552-002	<b>CAB SIDE DRIP RAIL</b>	Cab Side Drip Rail
S	1521-001	<b>CAB PAINT EXTERIOR</b>	Cab Paint Exterior Single Color
S	1533-001	<b>CAB PAINT MANUFACTURER</b>	Cab Paint Manufacturer PPG
O	1522-075	<b>CAB PAINT PRIMARY/LOWER COLOR</b>	Cab Paint Primary/Lower Color PPG Red FBCH 71096 ALT
S	8013-019	<b>CAB PAINT WARRANTY</b>	Cab Paint Warranty 2012 (10) Year/100,000 Miles
S	1334-016	<b>CAB PAINT INTERIOR</b>	Cab Paint Int Zolatone Silver Gray
O	1005-001	<b>CAB ENTRY DOORS</b>	Cab Entry Doors (4)
S	1101-001	<b>CAB ENTRY DOOR TYPE</b>	Cab Entry Door Type Full Length
S	8004-009	<b>CAB STRUCTURAL WARRANTY</b>	Cab Structural Warranty 2012 (10) Year/100,000 Miles
S	9001-006	<b>CAB TEST INFORMATION</b>	Cab Test Information Crash Test ECE-R29/SAE J2420/SAE J2422

**ELECTRICAL POWER DISTRIBUTION**

O	5000-002	<b>ELECTRICAL SYSTEM</b>	Elec System 12V DC MUX
O	5008-011	<b>OEM WIRING</b>	OEM Wir Smeal Prewire For Gateway MUX
O	5005-010	<b>MULTIPLEX DISPLAY</b>	MUX Display Weldon Touchscreen LH Sw Pnl
O	5622-003	<b>DATA RECORDING SYSTEM</b>	Data Recording Sys Vehicle Data MUX
S	5031-003	<b>POWER &amp; GROUND STUD</b>	Pwr & Gnd Stud 40A Batt Dir & 15A Ign Sw
O	5030-002	<b>AUXILIARY POWER &amp; GROUND STUD</b>	Aux Pwr & Gnd Stud Bhd Sw Pnl 40A Mstr Sw
O	5032-016	<b>ADDITIONAL POWER &amp; GROUND STUD</b>	Addl Pwr & Gnd Stud Bhd Sw Pnl 40A Ign Sw

S 5011-001 **EXTERIOR ELECTRICAL TERMINAL COATING** Exterior Electrical Terminal Coating Spray On Plasti Dip

## ENGINE

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O 1701-127 **ENGINE** Engine Diesel 400HP Cummins ISL9

S 1329-001 **CAB ENGINE TUNNEL** Cab Engine Tunnel Small/Medium

S 1731-002 **DIESEL PARTICULATE FILTER CONTROLS** DPF Ctrl Regeneration Sw & Inhibit Sw

S 1718-002 **ENGINE PROGRAMMING HIGH IDLE SPEED** Engine Programming High Idle Speed 1250 RPM

O 1719-005 **ENGINE HIGH IDLE CONTROL** Engine High Idle Ctrl Manual and Automatic w/V-MUX

S 1710-001 **ENGINE PROGRAMMING ROAD SPEED GOVERNOR** Engine Programming Road Speed Governor Enabled

O 1713-010 **AUXILIARY ENGINE BRAKE** Aux Engine Brake Compression Brake w/VG Turbo

O 1708-008 **AUXILIARY ENGINE BRAKE CONTROL** Aux Engine Brake Ctrl Off/Low/Med/High MUX

S 1715-008 **FLUID FILLS** Fluid Fills Under Cab

S 1735-001 **ENGINE DRAIN PLUG** Engine Drain Plug

S 1720-003 **ELECTRONIC ENGINE OIL LEVEL INDICATOR** Elec Engine Oil Level Indicator

S 8002-001 **ENGINE WARRANTY** Engine Warranty Cummins (5) Year/100,000 Miles

O 1707-016 **REMOTE THROTTLE HARNESS** Rmt Throttle Harness Cab Harness Only

O 1721-002 **ENGINE PROGRAMMING REMOTE THROTTLE** Engine Program Rmt Throttle On

S 1727-001 **ENGINE PROGRAMMING IDLE SPEED** Engine Programming Idle Speed 700 RPM

## COOLING

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S 2704-001 **ENGINE FAN DRIVE** Engine Fan Drive Direct

S 2701-010 **ENGINE COOLING SYSTEM** Engine Cooling Sys Serial Flow Medium

S 2711-002 **ENGINE COOLING SYSTEM PROTECTION** Engine Cooling System Protection Light Duty Skid Plate

S 2708-001 **ENGINE COOLANT** Engine Coolant Extended Life

O 2707-002 **ENGINE COOLANT FILTER** Engine Coolant Filter

S 2706-003 **ELECTRONIC COOLANT LEVEL INDICATOR** Elec Low Coolant Level Indicator

O 2705-002 **ENGINE PUMP HEAT EXCHANGER** Engine Pump Heat Exchanger

S 2709-001 **COOLANT HOSES** Coolant Hoses Silicone

## AIR INTAKE

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S 2801-001 **ENGINE AIR INTAKE** Engine Air Intake Filtration and Restriction

## EXHAUST

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O 2901-030 **ENGINE EXHAUST SYSTEM** Eng Exhaust Sys Under Frm RH Fwd Outboard w/DPF/SCR Inline



O	2907-003	<b>DIESEL EXHAUST FLUID TANK</b>	Diesel Exhaust Fluid Tank LH 6 Gal Fill Thru Rr Step
S	2902-010	<b>ENGINE EXHAUST ACCESSORIES</b>	Engine Exh Acc Exh Temp Mitigation
S	2906-002	<b>ENGINE EXHAUST WRAP</b>	Engine Exhaust Wrap

### TRANSMISSION

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S	1801-015	<b>TRANSMISSION</b>	Transmission GEN IV-E Allison 3000 EVS
S	1806-001	<b>TRANSMISSION MODE PROGRAMMING</b>	Transmission Mode Programming 4th Startup/5th Mode
O	1811-001	<b>TRANSMISSION FEATURE PROGRAMMING</b>	Transmission Feature Programming I/O Package 198/Pumper
S	1815-002	<b>ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR</b>	Elec Transmission Oil Level Indicator
S	1807-003	<b>TRANSMISSION SHIFT SELECTOR</b>	Transmission GEN IV-E Shift Sel Key Pad/Push Button
S	1814-002	<b>TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE</b>	2nd Gear Pre-Select
S	1808-007	<b>TRANSMISSION COOLING SYSTEM</b>	Transmission Cooling System
S	1817-001	<b>TRANSMISSION DRAIN PLUG</b>	Transmission Drain Plug
S	8005-001	<b>TRANSMISSION WARRANTY</b>	Transmission Warranty Allison (5) Year

### DRIVELINE

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S	3001-001	<b>DRIVELINE</b>	Driveline Spicer 1710 HD
O	3005-002	<b>MIDSHIP PUMP / GEARBOX</b>	Midship Pump Jackshaft Only
O	3008-085	<b>MIDSHIP PUMP / GEARBOX MODEL</b>	Midship Pump/Gearbox Model Waterous CSUC20
O	3009-007	<b>MIDSHIP PUMP RATIO</b>	Midship Pump Ratio 2.27:1
O	3048-007	<b>MIDSHIP PUMP GEARBOX DROP</b>	Midship Pump Gearbox Drop Waterous "C"
O	3010-0800	<b>MIDSHIP PUMP LOCATION C/L SUCTION FROM REAR AXLE</b>	Midship Pump Location C/L Suction 80"

### FUEL SYSTEMS

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S	3109-021	<b>FUEL FILTER/WATER SEPARATOR</b>	Fuel Filter/Wtr Separator Fleetguard FS1003 w/Lt & Alarm
S	3111-001	<b>FUEL LINES</b>	Fuel Lines Nylon
S	3101-001	<b>FUEL TANK</b>	Fuel Tank 50 Gallon
S	3102-007	<b>FUEL TANK FILL PORT</b>	Fuel Tank Fill Port RH Mid/LH Rwd

### FRONT AXLE

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O	2401-003	<b>FRONT AXLE</b>	Frt Axle Meritor MFS 20000# Beam
S	8059-008	<b>FRONT AXLE WARRANTY</b>	Front Axle Warranty Meritor 2012
S	2405-001	<b>FRONT WHEEL BEARING LUBRICATION</b>	Frt Wheel Bearing Lube Oil

### FRONT SUSPENSION

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S	2502-002	<b>FRONT SHOCK ABSORBERS</b>	Frt Shock Absorbers Bilstein
O	2501-006	<b>FRONT SUSPENSION</b>	Frt Suspension 9 Leaf 20000-21500#

**STEERING**


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S	2601-005	<b>STEERING COLUMN/WHEEL</b>	Steering Column/Wheel Tilt/Telescopic 18" 2 Spoke
S	2603-001	<b>POWER STEERING PUMP</b>	Power Steering Pump TRW
S	2609-002	<b>ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR</b>	Elec Power Steering Fluid Level Indicator
O	2606-009	<b>FRONT AXLE CRAMP ANGLE</b>	Front Axle Cramp Angle 48L/44R Degrees
O	2610-003	<b>POWER STEERING GEAR</b>	Power Steering Gear TRW TAS 65 w/Assist
S	2608-001	<b>CHASSIS ALIGNMENT</b>	Chassis Alignment

**REAR AXLE**


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O	3401-002	<b>REAR AXLE</b>	Rear Axle 24000# Meritor RS-24-160
S	3403-001	<b>REAR AXLE DIFFERENTIAL LUBRICATION</b>	Rear Axle Differential Lubrication Oil
S	8061-005	<b>REAR AXLE WARRANTY</b>	Rear Axle Warranty Meritor 2012
S	3411-001	<b>REAR WHEEL BEARING LUBRICATION</b>	Rear Wheel Bearing Lubrication Oil
S	3408-004	<b>VEHICLE TOP SPEED</b>	Vehicle Top Speed 65 MPH

**REAR SUSPENSION**


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S	3501-032	<b>REAR SUSPENSION</b>	Rear Susp Reyco 79KB Spring 21000-31500# Conventional
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**TIRES**


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O	3601-014	<b>FRONT TIRE</b>	Frt Tire 385/65R 22.5 Michelin XZY3
O	3602-004	<b>REAR TIRE</b>	Rear Tire 11R 22.5 Michelin XDS
O	3413-538	<b>REAR AXLE RATIO</b>	Rear Axle Ratio 5.38
O	3614-012	<b>TIRE PRESSURE INDICATOR</b>	Tire Pressure Ind Frt & Rr Dial Voucher

**WHEELS**


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O	3701-016	<b>FRONT WHEEL</b>	Frt Wheel Accuride 22.5 x 12.25 Alum
O	3703-004	<b>REAR WHEEL</b>	Rr Whl Accuride 22.5 x 8.25 Alum
O	3702-002	<b>WHEEL TRIM</b>	Wheel Trim Hub & Nut Covers SS Shiploose

**BRAKES**


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O	3205-009	<b>BRAKE SYSTEM</b>	Brake System ABS/ATC/RSC Sgl Axle MUX Btn
O	3206-003	<b>FRONT BRAKES</b>	Frt Brakes Meritor EX225 Disc 17"
S	3207-001	<b>REAR BRAKES</b>	Rr Brakes S-Cam Drum 16.5" x 7"
S	3208-001	<b>PARK BRAKE</b>	Prk Brake Rr Wheels Only
S	3204-001	<b>PARK BRAKE CONTROL</b>	Prk Brake Ctrl LH Dash Mnt
S	3214-001	<b>REAR BRAKE SLACK ADJUSTERS</b>	Rr Brake Slack Adjusters Meritor
S	3202-001	<b>AIR DRYER</b>	Air Dryer Wabco System Saver 1200 Bhd RH Step
O	3215-004	<b>FRONT BRAKE CHAMBERS</b>	Frt Brake Chambers MGM Type 24 Long Stroke
S	3210-014	<b>REAR BRAKE CHAMBERS</b>	Rr Brake Chambers TSE 30/30

**AIR SUPPLY SYSTEMS**

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S	3320-001	<b>AIR COMPRESSOR</b>	Air Compressor Wabco SS318 18.7 CFM
S	3339-001	<b>AIR GOVERNOR</b>	Air Governor Mnt on Air Cleaner Bracket
O	3303-006	<b>MOISTURE EJECTORS</b>	Moisture Ejectors Manual/Auto Wet Tank
S	3307-001	<b>AIR SUPPLY LINES</b>	Air Sply Lines Nylon
O	3309-033	<b>AIR INLET CONNECTION</b>	Air Inlet Connection
O	3349-002	<b>AIR INLET LOCATION</b>	Air Inlet Location LH Lwr Frt Step Fwd
O	3327-002	<b>PLUMBING AIR INLET CONNECTION</b>	Plumbing Air Inlet Conn
O	3326-002	<b>AIR INLET/OUTLET FITTING TYPE</b>	Air Inlet/Outlet Manual Conn Tru-Flate Interchange 1/4"
O	3315-002	<b>VEHICLE TOWED AIR SUPPLY PACKAGE</b>	Vehicle Towed Air Supply Package Glad Hand Frt LH Horiz Fwd
S	3338-002	<b>REAR AIR TANK MOUNTING</b>	Rear Air Tank Mnt Any Bhd Rear Axle Perpendicular w/Frame

**FRAME**

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O	2103-1740	<b>WHEELBASE</b>	Wheelbase 174.0"
S	2106-0510	<b>REAR OVERHANG</b>	Rear Overhang 51.0"
S	2101-001	<b>FRAME</b>	Frame Single Channel 34.25" Width
S	8007-007	<b>FRAME WARRANTY</b>	Frame Warranty Lifetime 2012
S	2110-101	<b>FRAME PAINT</b>	Frame Paint Powder Coat Black

**BUMPER**

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O	2201-002	<b>FRONT BUMPER</b>	Frnt Bumper Structural Steel Channel Severe Duty
O	2202-004	<b>FRONT BUMPER EXTENSION LENGTH</b>	Frnt Bumper Extension Length 18"
S	2226-005	<b>FRONT BUMPER EXTENSION FRAME WIDTH</b>	Frnt Bumper Extension Frame Width 47.50"
O	2206-001	<b>FRONT BUMPER PAINT</b>	Frnt Bumper Paint Primary/Lower Cab Color
O	2208-005	<b>FRONT BUMPER APRON</b>	Frnt Bumper Apron 18"
O	2211-004	<b>FRONT BUMPER COMPARTMENT CENTER</b>	Frnt Bumper Cmpt Ctr Hose Tray w/Cover
A	2210QXX	<b>FRONT BUMPER COMPARTMENT COVER HARDWARE</b>	Frnt Bumper Cmpt Cover Hardware Gas Cylinder/ Flush Latch
O	5503-002	<b>MECHANICAL SIREN</b>	Mechanical Siren Federal Signal Q2B
O	2218-026	<b>MECHANICAL SIREN LOCATION</b>	Mech Siren Location Frnt Bmpr Face LH Nested
O	5501-020	<b>AIR HORN</b>	Air Horn (2) 21" Round Hadley E-Tone
O	2216-010	<b>AIR HORN LOCATION</b>	Air Horn Location (2) Frnt Bmpr Face R/L IB
O	2232-002	<b>AIR HORN RESERVOIR</b>	Air Horn Reservoir (1) 1200 Cu In
O	5504-010	<b>ELECTRONIC SIREN SPEAKER</b>	Elect Siren Speaker (1) 100W Whelen SA122FMP
O	2217-005	<b>ELECTRONIC SIREN SPEAKER LOCATION</b>	Elec Siren Speaker Location Frnt Bmpr Face RH OB
O	2203-005	<b>FRONT BUMPER TOW HOOKS</b>	Frnt Bumper Tow Hooks Chrome Side Rwd
O	2231-002	<b>TOW FORK PROVISION</b>	Tow Fork Provision

**CAB TILT**

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S	2301-001	<b>CAB TILT SYSTEM</b>	Cab Tilt System
S	2305-001	<b>CAB TILT CONTROL RECEPTACLE</b>	Cab Tilt Ctrl Receptacle Temp

**CAB GLASS**

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S	1401-009	<b>CAB WINDSHIELD</b>	Cab Windshield
S	1402-005	<b>GLASS FRONT DOOR</b>	Glass Frt Dr Roll Down/XDuty Regulator
O	1407-002	<b>GLASS TINT FRONT DOOR</b>	Glass Tint Frt Dr Automotive Dark Gray
O	1419-012	<b>GLASS REAR DOOR RIGHT HAND</b>	Glass Rr Dr RH Roll Down/XDuty Regulator
O	1430-002	<b>GLASS TINT REAR DOOR RIGHT HAND</b>	Glass Tint Rr Door RH Automotive Dark Gray
O	1412-013	<b>GLASS REAR DOOR LEFT HAND</b>	Glass Rr Dr LH Roll Down/XDuty Regulator
O	1431-002	<b>GLASS TINT REAR DOOR LEFT HAND</b>	Glass Tint Rr Door LH Automotive Dark Gray
O	1410-003	<b>GLASS SIDE MID RIGHT HAND</b>	Glass Side Mid RH Fxd 16"W x 26"H
O	1432-002	<b>GLASS TINT SIDE MID RIGHT HAND</b>	Glass Tint Side Mid RH Automotive Dark Gray
O	1409-003	<b>GLASS SIDE MID LEFT HAND</b>	Glass Side Mid LH Fxd 16"W x 26"H
O	1433-002	<b>GLASS TINT SIDE MID LEFT HAND</b>	Glass Tint Side Mid LH Automotive Dark Gray

**CLIMATE CONTROL**

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O	1614-101	<b>CLIMATE CONTROL</b>	Climate Ctrl Htr Defroster Frt Ovrhd/Htr A/C Tunnel Mnt
O	1632-002	<b>CLIMATE CONTROL DRAIN</b>	Climate Control Drain Gravity
O	1617-101	<b>CLIMATE CONTROL ACTIVATION</b>	Climate Ctrl Actv Device Mnt Ovrhd/Device Mnt Tunnel
O	1606-003	<b>AUXILIARY CLIMATE CONTROL FRONT UNDERSEAT</b>	Aux Climate Ctrl Frt Underseat Htr MUX
O	1603-003	<b>A/C CONDENSER LOCATION</b>	A/C Condenser Location Roof Mnt Fwd Ctr
O	1601-001	<b>A/C COMPRESSOR</b>	A/C Compressor Large Capacity
S	1322-002	<b>CAB INSULATION</b>	Cab Insulation
S	1530-001	<b>UNDER CAB INSULATION</b>	Under Cab Insulation Engine Tunnel

**CAB INTERIOR**

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S	1327-001	<b>INTERIOR TRIM FLOOR</b>	Interior Trim Floor
S	1302-001	<b>INTERIOR TRIM</b>	Interior Trim Vinyl
S	1368-002	<b>REAR WALL INTERIOR TRIM</b>	Rear Wall Interior Trim Vinyl
S	1306-001	<b>HEADER TRIM</b>	Header Trim ABS
S	1337-001	<b>INTERIOR TRIM SUNVISOR</b>	Interior Trim Sunvisor Vinyl
O	1305-014	<b>TRIM CENTER DASH</b>	Trim Center Dash XDuty
O	1339-002	<b>TRIM LEFT HAND DASH</b>	Trim LH Dash XDuty
O	1321-004	<b>TRIM RIGHT HAND DASH</b>	Trim RH Dash XDuty Glove Cmpt/MDT Prov
S	1307-002	<b>ENGINE TUNNEL TRIM</b>	Eng Tnl Trim Flr Mat
O	5042-010	<b>AUXILIARY POWER POINT ENGINE TUNNEL</b>	Aux Pwr Pnt Eng Tnl Batt Dir (2) Rr R/L
S	1303-017	<b>STEP TRIM</b>	Step Trim Grip Strut Lwr Flex-Tred Mid

O	1379-003	<b>UNDER CAB ACCESS DOOR</b>	Under Cab Access Door Rear Step LH Painted
S	1102-013	<b>INTERIOR DOOR TRIM</b>	Interior Door Trim Painted
S	1323-001	<b>DOOR TRIM CUSTOMER NAMEPLATE</b>	Door Trim Customer Nameplate
S	1105-001	<b>CAB DOOR TRIM REFLECTIVE</b>	Cab Dr Trim Reflective 1" Vert/6" Chevron w/Logo
S	1308-001	<b>INTERIOR GRAB HANDLE "A" PILLAR</b>	Interior Grab Handle 'A' Pillar 11" Molded
S	1332-008	<b>INTERIOR GRAB HANDLE FRONT DOOR</b>	Interior Grab Handle Frt Door Horiz 9"
O	1345-002	<b>INTERIOR GRAB HANDLE REAR DOOR</b>	Int Grab Handle Rr Dr Alum Window Span 30" Black Powder Coat
S	1301-003	<b>INTERIOR TRIM VINYL COLOR</b>	Interior Trim Vinyl Color Gray
S	1318-003	<b>INTERIOR ABS TRIM COLOR</b>	Interior ABS Trim Color Gray
S	1304-001	<b>INTERIOR FLOOR MAT COLOR</b>	Interior Floor Mat Color Gray
S	1335-002	<b>CAB PAINT INTERIOR DOOR TRIM</b>	Cab Paint Int Dr Trim Zolatone Silver Gray
O	1370-002	<b>TRIM CENTER DASH INTERIOR PAINT</b>	Trim Center Dash Interior Paint Zolatone Silver Gray
O	1378-002	<b>TRIM LEFT HAND DASH INTERIOR PAINT</b>	Trim LH Dash Interior Paint Zolatone Silver Gray
O	1373-002	<b>TRIM RIGHT HAND DASH INTERIOR PAINT</b>	Trim RH Dash Interior Paint Zolatone Silver Gray
S	1344-002	<b>DASH PANEL GROUP</b>	Dash Pnl Group 3-Pnl
O	1312-002	<b>SWITCHES CENTER PANEL</b>	Switches Ctr Pnl 6 Upr LH
O	1313-002	<b>SWITCHES LEFT PANEL</b>	Switches Left Pnl 1 Wiper
O	1314-009	<b>SWITCHES RIGHT PANEL</b>	Switches Right Pnl 3 Upr RH

### **CAB SEATS**

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O	1225-007	<b>SEAT BELT WARNING</b>	Seat Belt Warn Vista Display w/VDR
S	1237-001	<b>SEAT MATERIAL</b>	Seat Material Ballistic
S	1243-001	<b>SEAT COLOR</b>	Seat Color Gray/Red Seat Belts
S	1249-001	<b>SEAT BACK LOGO</b>	Seat Back Logo Spartan
O	1201-007	<b>SEAT DRIVER</b>	Seat Driver Bostrom Firefighter 8-Way Elect ABTS
O	1213-025	<b>SEAT BACK DRIVER</b>	Seat Back Driver Non-SCBA ABTS
S	1219-001	<b>SEAT MOUNTING DRIVER</b>	Seat Mounting Driver
O	1202-005	<b>SEAT OFFICER</b>	Seat Officer Bostrom Firefighter 2-Way Manual ABTS
O	1214-030	<b>SEAT BACK OFFICER</b>	Seat Back Officer SCBA Bostrom SecureAll w/Quick-Adjust
S	1220-002	<b>SEAT MOUNTING OFFICER</b>	Seat Mounting Officer
O	1297-002	<b>POWER SEAT WIRING</b>	Power Seats Wiring Battery Direct
O	1263-001	<b>SEAT REAR FACING OUTER LOCATION</b>	Seat RFO Location (2) R/L
O	1203-009	<b>SEAT CREW REAR FACING OUTER</b>	Seat Crew RFO Bostrom Firefighter Fixed
O	1215-027	<b>SEAT BACK REAR FACING OUTER</b>	Seat Back RFO SCBA Bostrom SecureAll w/Quick-Adjust
O	1221-009	<b>SEAT MOUNTING REAR FACING OUTER</b>	Seat Mounting RFO Rwd 2"
O	1273-001	<b>SEAT BELT ORIENTATION CREW</b>	Seat Belt Orientation Crew Outboard Shoulder To Inboard Hip

O	1266-001	<b>SEAT FORWARD FACING CENTER LOCATION</b>	Seat FFC Location (2) Ctr
O	1206-012	<b>SEAT CREW FORWARD FACING CENTER</b>	Seat Crew FFC Bostrom Firefighter Flip-Up
O	1218-031	<b>SEAT BACK FORWARD FACING CENTER</b>	Seat Back FFC SCBA Bostrom SecureAll w/Quick-Adjust
O	1224-002	<b>SEAT MOUNTING FORWARD FACING CENTER</b>	Seat Mounting Forward Facing Center
O	1269-101	<b>SEAT FRAME FORWARD FACING</b>	Seat Frm Fwd Fcg Dual
O	1281-102	<b>SEAT FRAME FORWARD FACING STORAGE ACCESS</b>	Seat Frm Fwd Fcg Strg Acc Dr (1) Ctr Fwd
O	1311-108	<b>CAB FRONT UNDERSEAT STORAGE ACCESS DOOR</b>	Cab Frt Undrst Strg Acc Dr Vented
S	1355-005	<b>SEAT COMPARTMENT DOOR FINISH</b>	Seat Compartment Door Finish Zolatone Silver Gray

### **CAB EXTERIOR**

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S	1511-003	<b>WINDSHIELD WIPER SYSTEM</b>	Windshield Wiper System Single Motor
S	1534-002	<b>ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR</b>	Electronic Windshield Fluid Level Indicator
S	1103-002	<b>CAB DOOR HARDWARE</b>	Cab Door Hardware Black
S	1111-001	<b>DOOR LOCKS</b>	Door Locks Manual
S	1503-002	<b>GRAB HANDLES</b>	Grab Handles SS 18"
O	1504-039	<b>REARVIEW MIRRORS</b>	Mirror Bus Style Ramco CRM-310-1750-CHCHR
O	1529-003	<b>REARVIEW MIRROR HEAT SWITCH</b>	Rearview Mirror Heat Sw MUX
O	1525-003	<b>EXTERIOR TRIM REAR CORNER</b>	Exterior Trim Rear Corner Scuff Plate Shiploose
O	1513-001	<b>CAB FENDER</b>	Cab Fender SS
O	1514-002	<b>MUD FLAPS FRONT</b>	Mud Flaps Frt
O	1526-008	<b>CAB EXTERIOR FRONT &amp; SIDE EMBLEMS</b>	Cab Ext Frt & Side Emblems Shiploose
O	1502-020	<b>CAB EXTERIOR MODEL NAMEPLATE</b>	Cab Exterior Model Nameplate Metro Star Shiploose

### **START / CHARGING SYSTEMS**

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S	5109-001	<b>IGNITION</b>	Ign Mstr Sw w/Keyless Start
O	5101-002	<b>BATTERY</b>	Batt (6) Group 31 Harris
O	5106-003	<b>BATTERY TRAY</b>	Batt Tray (2) R/L Steel
O	5107-007	<b>BATTERY BOX COVER</b>	Batt Box Cover (2) Steel w/Black Handles
S	5102-001	<b>BATTERY CABLE</b>	Batt Cables
S	5108-002	<b>BATTERY JUMPER STUD</b>	Batt Jumper Stud Frt LH Lwr Step
S	5104-001	<b>ALTERNATOR</b>	Alternator Leece-Neville 270A

### **LINE VOLTAGE ELECTRICAL POWER DISTRIBUTION**

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O	5202-004	<b>BATTERY CONDITIONER</b>	Batt Cond Kusssmaul 1200
O	5203-002	<b>BATTERY CONDITIONER DISPLAY</b>	Batt Cond Display LH Mid Glass
O	5204-055	<b>ELECTRICAL INLET</b>	Elec Inlet 120V 20A Auto Eject

O	5209-002	<b>ELECTRICAL INLET LOCATION</b>	Elec Inlet Location LH Cab Side Mid
O	5210-004	<b>ELECTRICAL INLET CONNECTION</b>	Elec Inlet Conn to Batt Conditioner
O	5206-003	<b>ELECTRICAL INLET COLOR</b>	Elec Inlet Color Red

## LIGHTING

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S	5301-100	<b>HEADLIGHTS</b>	Headlights 4 Headlamps Halogen
O	5303-005	<b>FRONT TURN SIGNALS</b>	Frnt Turn Signals Whelen 600 LED Above Frnt Warn
S	5337-001	<b>HEADLIGHT LOCATION</b>	Headlights Below Frnt Warn Lts
O	5336-003	<b>SIDE TURN/MARKER LIGHTS</b>	Side Turn/Marker Lts LED
S	5302-003	<b>MARKER &amp; ICC LIGHTS</b>	Marker & ICC Lts Face Mnt LED
O	5350-060	<b>HEADLIGHT AND MARKER LIGHT ACTIVATION</b>	Hdlt & Mrkr Lt Actv MUX/DRL
O	5308-010	<b>GROUND LIGHTS</b>	Ground Lts LED Resp Side Dr & Vista MUX
O	5309-003	<b>STEP LIGHTS</b>	Step Lts LED
O	5312-003	<b>ENGINE COMPARTMENT LIGHT</b>	Engine Compartment Work Lt LED (1)
O	5305-104	<b>INTERIOR OVERHEAD LIGHTS</b>	Interior Overhead Lights Whelen LED
O	5349-002	<b>LIGHT TOWER PROVISION</b>	Light Tower Prov Reinforcement Pad
O	5352-008	<b>LIGHT TOWER MODEL</b>	Light Tower Model Command Knight KL450
O	1009-002	<b>LIGHT TOWER ORIENTATION</b>	Lt Tower Orientation Parallel to Rear Wall
O	1013-003	<b>LIGHT TOWER HORIZONTAL JUSTIFICATION</b>	Lt Tower Horizontal Justification Centered Left To Right
O	1014-002	<b>LIGHT TOWER LIGHT HEAD ORIENTATION</b>	Lt Tower Lt Head Orientation LH
O	1015-003	<b>LIGHT TOWER FORE/AFT ORIENTATION</b>	Lt Tower Fore/Aft Orientation Rear

## OPTICAL WARNING DEVICES

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O	5406-007	<b>DO NOT MOVE APPARATUS LIGHT</b>	Do Not Move App Lt Flashing Red Whelen 500 Series 5mm LED w/Alarm
O	5422-002	<b>MASTER WARNING SWITCH</b>	Mstr Warn Sw MUX
O	5409-002	<b>HEADLIGHT FLASHER</b>	Headlight Flasher Alternating
O	5425-003	<b>HEADLIGHT FLASHER SWITCH</b>	Headlight Flasher Sw MUX
O	5401-002	<b>INBOARD FRONT WARNING LIGHTS</b>	Inboard Frnt Warn Lts Whelen 600 Series Super LED Chrm Bezel
O	5413-002	<b>INBOARD FRONT WARNING LIGHTS COLOR</b>	Inboard Frnt Warn Lts Color Red
O	5414-002	<b>OUTBOARD FRONT WARNING LIGHTS</b>	Outboard Frnt Warn Lts Whelen 600 Super LED Chrm Bezel
O	5415-002	<b>OUTBOARD FRONT WARNING LIGHTS COLOR</b>	Outboard Frnt Warn Lts Color Red
O	5423-003	<b>FRONT WARNING SWITCH</b>	Frnt Warn Sw MUX
O	5404-002	<b>INTERSECTION WARNING LIGHTS</b>	Intersection Warn Lts Whelen 600 Series Super LED
O	5419-002	<b>INTERSECTION WARNING LIGHTS COLOR</b>	Int Warn Lts Color Red
O	5420-002	<b>INTERSECTION WARNING LIGHTS</b>	Intersection Warn Lts Location Bumper Tail

**LOCATION**

O	5402-002	<b>SIDE WARNING LIGHTS</b>	Side Warn Lts Whelen 600 Super LED
O	5418-002	<b>SIDE WARNING LIGHTS COLOR</b>	Side Warn Lts Color Red
O	5412-002	<b>SIDE WARNING LIGHTS LOCATION</b>	Side Warn Lts Location Lwr Mid
O	5424-003	<b>SIDE AND INTERSECTION WARNING SWITCH</b>	Side & Intersection Warn Sw MUX

**AUDIBLE WARNING DEVICES**

O	5510-006	<b>SIREN CONTROL HEAD</b>	Siren Ctrl Head Whelen 295HFSA7
O	5514-006	<b>HORN BUTTON SELECTOR SWITCH</b>	Horn Btn Sel Sw Elec Horn/Elec Srn MUX
O	5512-029	<b>AIR HORN ACTIVATION</b>	Air Horn Actv LH Ft Sw/Rkr Sw
O	5513-102	<b>MECHANICAL SIREN ACTIVATION</b>	Mech Siren Actv (2) Siren/Brk Combo Sw
O	5515-002	<b>ELECTRONIC SIREN AUXILIARY ACTIVATION</b>	Elec Siren Aux Actv Stg Wheel
O	5505-003	<b>BACK-UP ALARM</b>	Back-Up Alarm Preco-Matic 1059

**INSTRUMENTATION**

S	5601-005	<b>INSTRUMENTATION</b>	Instrumentation Standard
S	5624-001	<b>BACKLIGHTING COLOR</b>	Backlighting Color Red

**COMMUNICATIONS SYSTEMS**

S	5020-001	<b>PANEL LAYOUT</b>	Panel Layout
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**ADDITIONAL EQUIPMENT**

S	8814-002	<b>CAB EXTERIOR PROTECTION</b>	Cab Exterior Protection Front
S	8806-001	<b>FIRE EXTINGUISHER</b>	Fire Extinguisher Ship Loose
O	8807-002	<b>ROAD SAFETY KIT</b>	Road Safety Kit Ship Loose
S	8810-001	<b>DOOR KEYS</b>	Door Keys for Manual Locks (4)

**SALES ADMIN**

O	8003-030	<b>WARRANTY</b>	Warranty Cab and Chassis 2012 (3) Year
O	8030-009	<b>OPERATION MANUAL</b>	Operation Manual Hard Copy/Digital
O	8031-002	<b>ENGINE &amp; TRANSMISSION OPERATION MANUAL</b>	Engine & Transmission Operation Manual Hard Copy (2)
O	8032-002	<b>ENGINE SERVICE MANUAL</b>	Engine Service Manual Hard Copy Cummins ISC/ISL
O	8033-001	<b>TRANSMISSION SERVICE MANUAL</b>	Transmission Service Manual Hard Copy Allison 3000 EVS
O	8805-005	<b>AS BUILT WIRING DIAGRAMS</b>	As Built Wiring Diagrams Hard Copy/Digital

**ENGINEERING**

O	2124-002	<b>EFCM/REAR CROSSMEMBERS</b>	End of Frame Cross Member
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**MODEL**

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

**MODEL YEAR**

The chassis shall have a vehicle identification number that reflects a 2012 model year.

**COUNTRY OF SERVICE**

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

**APPARATUS TYPE**

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

**VEHICLE TYPE**

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

**AXLE CONFIGURATION**

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

**GROSS AXLE WEIGHT RATINGS FRONT**

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

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

**GROSS AXLE WEIGHT RATINGS REAR**

The rear gross axle weight rating (GAWR) of the chassis shall be 24,000 pounds.

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

## **PUMP PROVISION**

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

## **CAB STYLE**

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

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

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

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

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

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

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

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

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

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

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.50 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 21.50 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

### **CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.125 of an inch thick, one hundred percent primary aluminum plate which shall be an integral part of the cab.

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

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

### **FRONT GRILLE**

The front fascia shall include a box style, stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches.

### **CAB UNDERCOAT**

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

### **CAB SIDE DRIP RAIL**

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

## **CAB PAINT EXTERIOR**

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

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

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

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

The cab shall be painted with PPG Industries paint.

The lower paint color shall be PPG FBCH 71096 ALT Red.

## **CAB PAINT WARRANTY**

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

## **CAB PAINT INTERIOR**

The visible cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

## **CAB ENTRY DOORS**

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

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

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

## **CAB ENTRY DOOR TYPE**

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

## **CAB STRUCTURAL WARRANTY**

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

## **CAB TEST INFORMATION**

The cab shall have successfully achieved survival of the International crash test ECE-R29, Addendum 28, Revision 1 standards as indicated below. It shall also meet SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks and SAE J2422 Cab Roof Strength Quasi-Static Roof Load test requirements.

As part of testing, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 lbs./ft. of force to the cab front face.

The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse.

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

## **ELECTRICAL SYSTEM**

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

## **OEM WIRING**

The wiring system shall include a custom J1939 interface harness drop provided by the chassis manufacturer to the required specifications required by the OEM.

## **MULTIPLEX DISPLAY**

The multiplex electrical system shall include a Weldon Vista III Touchscreen display which shall be located on the left side of the dash in the switch panel. The Touchscreen display shall feature a full color LCD screen. The display shall include a message bar displaying the time of day, and important messages

requiring acknowledgement by the user. There shall be virtual controls for the on-board diagnostics. The display screen shall be video ready for back- up cameras, thermal cameras, and DVD. A DIN type input connector ready for GPS interfacing shall be incorporated into the back of the display.

The Touchscreen display shall measure approximately 6.25 inches wide x 3.38 inches in height. The display shall offer varying fonts and background colors. The display shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

## **DATA RECORDING SYSTEM**

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

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

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

## **POWER & GROUND STUD**

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud that shall be 0.38 inch diameter.

## **ADDITIONAL POWER AND GROUND STUDS**

Power and grounding studs shall be provided and installed behind the electrical center cover with a breaker. The studs shall be #10 and capable of carrying up to a 40 amp load through the master power switch.

An additional set of power and grounding studs shall be provided and installed behind the rocker switch panel. The power and ground stud shall be circuit protected with a 40 amp breaker. The studs shall be .375 inch diameter and capable of carrying up to a 40 amp ignition switched load.

## **EXTERIOR ELECTRICAL TERMINAL COATING**

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

## **ENGINE**

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 400 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liter) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

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

## **CAB ENGINE TUNNEL**

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

## **DIESEL PARTICULATE FILTER CONTROLS**

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

## **ENGINE PROGRAMMING HIGH IDLE SPEED**

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

## **ENGINE HIGH IDLE CONTROL**

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the Vista screen for the high idle speed control.

## **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

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

## **AUXILIARY ENGINE BRAKE**

A compression brake, for the six (6) cylinder engine shall also be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

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

## **AUXILIARY ENGINE BRAKE CONTROL**

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

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

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

## **FLUID FILLS**

The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible through the front left side mid step.

## **ENGINE DRAIN PLUG**

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

## **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

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



## **ENGINE WARRANTY**

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

## **REMOTE THROTTLE HARNESS**

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness and shall terminate in the left frame rail behind the cab for connection by the body builder. The harness shall include circuits deemed for a pump panel and shall contain connectors for a hand throttle, and a multiplexed gauge. Separate circuits shall also be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indicator light.

## **ENGINE FAN DRIVE**

The engine cooling system fan shall be direct drive belt driven on the engine.

## **ENGINE COOLING SYSTEM**

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

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

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

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

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

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

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

### **ENGINE COOLING SYSTEM PROTECTION**

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

### **ENGINE COOLANT**

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

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

### **ENGINE COOLANT FILTER**

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

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

### **ELECTRONIC COOLANT LEVEL INDICATOR**

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

### **ENGINE PUMP HEAT EXCHANGER**

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

### **COOLANT HOSES**

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.

## **ENGINE AIR INTAKE**

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

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

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

## **ENGINE EXHAUST SYSTEM**

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

The system shall utilize 0.065 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

## **DIESEL EXHAUST FLUID TANK**

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

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

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

## **ENGINE EXHAUST ACCESSORIES**

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

## **ENGINE EXHAUST WRAP**

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

## **TRANSMISSION**

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

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

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

The transmission gear ratios shall be:

- 1st 3.49:1
- 2nd 1.86:1
- 3rd 1.41:1
- 4th 1.00:1
- 5th 0.75:1
- Rev 5.03:1

## **TRANSMISSION MODE PROGRAMMING**

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

## **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

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

## **TRANSMISSION SHIFT SELECTOR**

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall provide a prognostic indicator (wrench symbol) on the digital display between the selected and attained indicators. The prognostics monitor various operating parameters to determine and shall alert you when a specific maintenance function is required.

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

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

## **TRANSMISSION COOLING SYSTEM**

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

## **TRANSMISSION DRAIN PLUG**

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

## **TRANSMISSION WARRANTY**

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

## **DRIVELINE**

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

## **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

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

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

## **FUEL LINES**

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

## **FUEL TANK**

The fuel tank shall have a capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

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

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

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

## **FRONT AXLE**

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

## **FRONT AXLE WARRANTY**

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

## **FRONT WHEEL BEARING LUBRICATION**

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

## **FRONT SHOCK ABSORBERS**

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

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

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

## **FRONT SUSPENSION**

The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

## **STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, two (2) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

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

## **POWER STEERING PUMP**

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

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

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

## **FRONT AXLE CRAMP ANGLE**

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

## **POWER STEERING GEAR**

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

## **CHASSIS ALIGNMENT**

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

## **REAR AXLE**

The rear axle shall be a Meritor model RS-24-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a rated capacity of 24,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.50 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

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

## **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with oil.

## **REAR AXLE WARRANTY**

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

## **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with oil.

## **VEHICLE TOP SPEED**

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

## **REAR SUSPENSION**

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

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

## **FRONT TIRES**

The front tires shall be Michelin 385/65R-22.5 18PR "J" tubeless radial XZY3 mixed service tread.

The front tire stamped load capacity shall be 18,740 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

The front tire US Fire Service Intermittent Usage load capacity shall be 20,000 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.



## **REAR TIRES**

The rear tires shall be Michelin 11R-22.5 16PR "H" tubeless radial XDS tread for year-round traction optimized for severe winter conditions.

The rear tire stamped load capacity shall be 24,020 pounds per axle with a speed capacity of 65 miles per hour when properly inflated to 120 pounds per square inch.

The rear tire US Fire Service Intermittent Usage load capacity shall be 24,820 pounds per axle with a speed capacity of 65 miles per hour when properly inflated to 120 pounds per square inch.

## **REAR AXLE RATIO**

The rear axle ratio shall be 5.38:1.

## **TIRE PRESSURE INDICATORS**

There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front and rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

## **FRONT WHEELS**

The front wheels shall be Accuride hub piloted, 22.50 inch X 12.25 inch polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall be forged from a single piece of aluminum, designed to be corrosion resistant and are engineered for a long life.

## **REAR WHEELS**

The rear wheels shall be Accuride hub piloted, heavy duty, 22.50 inch x 8.25 inch aluminum wheels. Each outer wheel shall have a polished aluminum finish on the exterior surface and each inner wheel shall have a machine finish. The wheels shall be forged from a single piece of aluminum which shall be corrosion resistant, engineered to be lightweight and provide exceptional performance. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

## **WHEEL TRIM**

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

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

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

## **BRAKE SYSTEM**

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

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

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

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

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

Additional handling capabilities shall include Roll Stability Control (RSC). The RSC system shall continually check and update lateral acceleration of the tractor and compare it to a critical threshold where rollover may occur. When the critical threshold is met, RSC shall intervene by reducing the engine torque and engaging the engine retarder, while automatically applying the brakes. Normal vehicle operation shall resume once the problematic conditions cease. The RSC system shall be integral with the ABS and ATC systems. The RSC capability shall be based on operating weight, rather than capacity and shall be a minimum of 17,000 pounds.

## **FRONT BRAKES**

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17" vented rotors.

## **REAR BRAKES**

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

## **PARK BRAKE**

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

## **PARK BRAKE CONTROL**

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

The parking brake actuation valve shall be mounted on the left hand dash to the right of the steering column within easy reach of the driver.

## **REAR BRAKE SLACK ADJUSTERS**

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

## **AIR DRYER**

The brake system shall include a Wabco System Saver 1200 air dryer with an integral 100 watt heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.

## **BRAKE CHAMBERS**

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

The rear axle shall include TSE 30/30 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 30 brake chamber shall offer a 30.00 square inch effective area.

## **AIR COMPRESSOR**

The air compressor provided for the engine shall be a Wabco<sup>®</sup> SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce

weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

## **AIR GOVERNOR**

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.

## **MOISTURE EJECTORS**

An automatic moisture ejector with a manual drain provision shall be installed on the wet tank of the air supply system. Manual pet-cock type drain valves shall be installed on all remaining reservoirs of the air supply system.

## **AIR SUPPLY LINES**

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

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

## **AIR INLET**

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

The air inlet shall be installed in the left hand side lower front step in the forward position.

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

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

## **VEHICLE TOWED AIR SUPPLY PACKAGE**

The chassis shall include a vehicle towing air supply package. The air service brake connection shall be accomplished via trailer glad hands located under the left side of the front bumper. The mating surface of the glad hand connections shall be rotated horizontal. The glad hand connections shall be located in the forward position and shall protrude beyond the face of the front bumper when connected.

The glad hands shall allow a service tow truck to tie into the disabled vehicle's air system and unlock the rear brakes.

## REAR AIR TANK MOUNTING

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

## WHEELBASE

The chassis wheelbase shall be 174.00 inches.

## REAR OVERHANG

The chassis rear overhang shall be 51.00 inches.

## FRAME

The frame shall consist of single rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, 10.25 inch web X 3.50 inches deep upper and lower flanges X 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each single rail shall be rated by a Resistance Bending Moment (RBM) minimum of 1,830,400 inch pounds and have a minimum section modulus of 16.64 cubic inches calculated by the radius method. The outside dimension frame shall measure 34.25 inches in width.

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

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

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

## FRAME WARRANTY

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

## FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The

direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

## **FRONT BUMPER**

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be .38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

## **FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended approximately 18.00 inches ahead of the cab.

## **FRONT BUMPER EXTENSION FRAME WIDTH**

The front bumper extension frame shall feature an overall width of 47.50 inches.

## **FRONT BUMPER PAINT**

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

## **FRONT BUMPER APRON**

The 18.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

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

## **FRONT BUMPER COMPARTMENT**

The front bumper shall include a hose tray compartment in the bumper apron located in the center that shall measure 58.00 inches wide X 6.00 inches deep. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall include a cover constructed of 0.19 inch thick bright embossed aluminum tread plate and shall include two (2) rubber hold downs.

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

## **MECHANICAL SIREN**

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10.00 feet. The Q2B™ siren produces a distinctive warning sound that is recognizable at long distances. A unique clutch design provides a longer

coast down sound while reducing the amp draw to 100 amps. The siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep.

The siren shall be mounted behind the left hand side of the bumper in a hidden position with the motor parallel to the bumper face. An angled sound deflector will direct the sound from the siren through a stainless grille mounted to the face of the bumper.

## **AIR HORNS**

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

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

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

## **ELECTRONIC SIREN SPEAKER**

The bumper shall include one (1) Whelen Engineering Inc. model SA122FMP cast aluminum speaker with a polished aluminum grille recess mounted within the bumper fascia. The speaker shall feature 100 watts of power. The speaker shall measure 7.44 inches high X 7.44 inches long X 5.19 inches deep.

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

## **FRONT BUMPER TOW HOOKS**

Two (2) heavy duty chrome plated tow hooks shall be installed in a rearward position out of the approach angle area, bolted directly to the outside of each chassis frame rail with grade 8 bolts.

## **TOW FORK PROVISION**

A tow bar provision shall be installed on the front of the chassis and attached to the frame rails which shall allow the vehicle to be picked up from the front and towed.

## **CAB TILT SYSTEM**

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

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

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

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

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

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

### **CAB TILT CONTROL RECEPTACLE**

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

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

### **CAB WINDSHIELD**

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

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

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

### **GLASS TINT**

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

### **FRONT DOOR GLASS**

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.



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

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

### **REAR DOOR GLASS**

The rear side doors shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

### **SIDE MID GLASS**

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

### **CLIMATE CONTROL**

The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

The cab shall also include a combination heater air-conditioning unit mounted on the engine tunnel. This unit shall offer eight (8) adjustable louvers, (4 forward facing, four rearward facing) a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

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

### **CLIMATE CONTROL DRAIN**

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

### **CLIMATE CONTROL ACTIVATION**

The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.

## **AUXILIARY CLIMATE CONTROL FRONT UNDERSEAT**

Two (2) 13,500 BTU heaters shall be provided and installed in the face of the seat riser storage area for the left and right front seats, one (1) each side. The fan controls shall be located on the Vista display and control screen(s).

The auxiliary heater system hoses shall be silicone with stainless steel constant torque clamps approved for use with silicone hose. The auxiliary heater system shall include one (1) seasonal shut-off valve. The valve shall be supplied at the front of the right hand corner of the cab. The cab must be tilted to access the shut-off valve.

## **CONDENSER LOCATION**

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

## **COMPRESSOR**

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

## **CAB INSULATION**

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

## **UNDER CAB INSULATION**

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

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

The engine tunnel insulation shall measure approximately .75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb./ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

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

## **INTERIOR TRIM FLOOR**

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall

be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

### **INTERIOR TRIM VINYL**

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

### **REAR WALL INTERIOR TRIM**

The rear wall of the cab shall be trimmed with vinyl.

### **HEADER TRIM**

The cab interior shall include the header above the driver and officer positions which shall be constructed of vacuum formed ABS panel.

### **SUN VISORS**

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

### **DASH LAYOUT**

The main center dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical access cover for ventilation.

The left hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate for a perfect fit around the instrument panel and the lower control panels to the left and right of the steering column.

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.

### **ENGINE TUNNEL TRIM**

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

## **AUXILIARY POWER POINT ENGINE TUNNEL**

The cab interior shall include two (2) 12 volt cigarette lighter type receptacles to provide power sources for 12 volt electrical equipment. The receptacles shall be connected directly to the batteries. The receptacles shall be located on the top of the engine tunnel near the rear, one (1) at the left corner and one (1) at the right corner.

## **STEP TRIM**

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

## **UNDER CAB ACCESS DOOR**

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

## **INTERIOR DOOR TRIM**

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

## **DOOR TRIM CUSTOMER NAMEPLATE**

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

## **CAB DOOR TRIM REFLECTIVE**

The interior of each door shall include high visibility reflective tape. A white reflective tape that measures 1.00 inch in width shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

## **INTERIOR GRAB HANDLES**

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

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

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

## **INTERIOR TRIM COLOR**

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

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

The cab interior floor mat shall be gray in color.

## **INTERIOR DOOR TRIM**

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

## **DASH TRIM**

The entire center dash shall be coated with Zolatone #20-72 silver gray texture finish. Any accessory pods attached to the dash shall also be painted this color.

The left hand dash shall be painted with a Zolatone #20-72 silver gray texture finish.

The right hand dash shall be painted with Zolatone #20-72 silver gray texture finish.

## **DASH PANEL GROUP**

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

## **PANEL SWITCHES**

The center dash panel shall include six (6) switch positions in the upper left portion of the panel. A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

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

The right dash panel shall include three (3) rocker switch positions in the upper right hand portion of the panel. A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be

two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

### **SEAT BELT WARNING**

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

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

### **SEAT MATERIAL**

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear.

### **SEAT COLOR**

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

### **SEAT BACK LOGO**

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

### **SEAT DRIVER**

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

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

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

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of

3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

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

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

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

## **SEAT OFFICER**

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

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

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

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

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

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

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

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

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

## **SEATS - REAR FACING OUTER LOCATION**

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

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion.

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

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

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

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

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

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



The SecureAll™ shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.

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

The rear facing outer seats shall offer special mounting positions which shall be 2.00 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.

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

## **SEATS - FORWARD FACING CENTER LOCATION**

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

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

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

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

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

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

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

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

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

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

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

### **SEAT FRAME - FORWARD FACING**

The forward facing center seating positions shall include an enclosed seat frame which is located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of 5052-H32 Marine Grade 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

There shall be one (1) access point to the storage area centered on the front of the seat frame. This access point shall be covered by a hinged door to allow access for storage in the seat box.

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

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

### **SEAT COMPARTMENT DOOR FINISH**

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

### **WINDSHIELD WIPER SYSTEM**

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

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

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

## **CAB DOOR HARDWARE**

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

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

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

## **DOOR LOCKS**

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

## **GRAB HANDLES**

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

## **REARVIEW MIRRORS**

Ramco model CRM-310-1750-CHCHR bus style mirrors shall be provided. The mirror heads shall be injection molded chrome plated ABS plastic and shall measure 9.50 inches wide X 17.50 inches high. The mirrors shall be mounted one (1) on each the driver and officer doors of the cab with polished die-cast aluminum arms.

The mirrors shall feature an upper heated remote controlled flat glass and a lower heated manually adjustable convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions.

## **REARVIEW MIRROR HEAT SWITCH**

The heat for the rearview mirrors shall be controlled through a virtual button on the multiplex display.

## **EXTERIOR TRIM REAR CORNERS**

There shall be stainless steel scuff plates on the outside corners at the back of the cab which shall be shipped loose and installed by the OEM. The stainless steel plate shall feature a number seven mirror finish and shall include two sided adhesive tape.

## **CAB FENDERS**

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

## **MUD FLAPS FRONT**

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

## **CAB EMBLEMS**

The cab shall include three (3) Spartan emblems. There shall be one (1) for the front air intake grille and two (2) for the exterior sides of the cab shipped loose with the chassis for installation by the body manufacturer.

The "Metro Star" nameplates on the front driver and officer side doors shall be shipped loose with the cab.

## **IGNITION**

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a ¼ turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

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

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

## **BATTERIES**

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

## **BATTERY TRAYS**

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

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

## **BATTERY BOX COVERS**

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

## **BATTERY CABLES**

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

## **BATTERY JUMPER STUD**

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

## **ALTERNATOR**

The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.

## **BATTERY CONDITIONER**

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

## **BATTERY CONDITIONER DISPLAY**

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

## **ELECTRICAL INLET**

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

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

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

The electrical inlet shall be connected to the battery conditioner.

The Kussmaul electrical inlet connection shall include a red cover.

## **HEADLIGHTS**

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

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

## **FRONT TURN SIGNALS**

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed in a polished aluminum housing above and outboard of the front warning and head lamps.

## **SIDE TURN/MARKER LIGHTS**

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

## **MARKER AND ICC LIGHTS**

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

## **HEADLIGHT AND MARKER LIGHT ACTIVATION**

The headlights and marker lights shall be controlled via a virtual button on the Vista display. There shall be a virtual dimmer control on the Vista display to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

## **GROUND LIGHTS**

Each door shall include an LED NFPA compliant ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the door on the respective cab side as well as through the Vista screen.

## **STEP LIGHTS**

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

## **ENGINE COMPARTMENT LIGHT**

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

which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

## **INTERIOR OVERHEAD LIGHTS**

The cab shall include a two-section Whelen LED dome lamp with a red and clear lens located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portion can be activated by individual switches on each lamp.

An additional two-section Whelen LED dome lamp with a red and clear lens shall be provided over the engine tunnel which can be activated by individual switches on the lamp.

## **LIGHT TOWER PROVISION**

The cab roof shall include reinforcement for a light tower. The reinforcement shall consist of four (4) aluminum pads mounted to the exterior of the cab roof and additional internal cab roof structure. The entire reinforcement shall be integral with the roof for rigidity. The light tower shall be provided and installed by the body manufacturer.

The light tower provisions shall be for a Command Light Knight model KL450 light tower.

The roof reinforcement shall be installed parallel to the rear wall of the cab.

The roof reinforcement shall be justified to the center of the cab left to right.

The roof reinforcement shall be oriented in order for the light head on the light tower to be to the left side while in the stored position.

The roof reinforcement shall be oriented on the roof of the cab towards the rear wall of the cab.

## **DO NOT MOVE APPARATUS LIGHT**

The front headliner of the cab shall include a red Whelen 500 Series 5mm LED light, located in the center for greatest visibility. The light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.

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

## **MASTER WARNING SWITCH**

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

## **HEADLIGHT FLASHER**

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

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

## **HEADLIGHT FLASHER SWITCH**

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

## **INBOARD FRONT WARNING LIGHTS**

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

The front warning lights mounted on the fascia in the inboard positions shall be red.

## **OUTBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include dual Whelen series 600 Super LED warning lights which shall offer 14 flash patterns plus a steady burn for solid colors and 20 flash patterns plus a steady burn for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the outboard position.

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

## **FRONT WARNING SWITCH**

The front warning lights shall be controlled through a virtual control on the MUX display. This switch shall be clearly labeled for identification.

## **INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Whelen series 600 Super LED 4.00 inch X 6.00 inch intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

The intersection lights shall be red.

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



## **SIDE WARNING LIGHTS**

The cab sides shall include a Whelen series 600 Super LED 4.00 inch X 6.00 inch warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

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

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

## **SIDE AND INTERSECTION WARNING SWITCH**

The side warning lights shall be controlled through a virtual button on the Vista display and control panel. This button shall be clearly labeled for identification.

## **SIREN CONTROL HEAD**

A Whelen 295HFS A7 200 watt "hands free" remote dual siren amplifier control head shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall offer radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

## **HORN BUTTON SELECTOR SWITCH**

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

## **AIR HORN ACTIVATION**

The air horn activation shall be accomplished by a left hand side Linemaster model SP491-S81 foot switch for the driver and a single rocker switch on the panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

## **MECHANICAL SIREN ACTIVATION**

The mechanical siren shall be actuated by two (2) dual function momentary rocker switches in the switch panel on the dash which shall activate the siren in the upper position and engage the siren brake in the lower position.

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

## **ELECTRONIC SIREN AUXILIARY ACTIVATION**

The electronic siren shall include activation by the steering wheel horn button.

## BACK-UP ALARM

A Preco-Matic model 1059 dual function, dual sound backup alarm shall be installed at the rear of the chassis with an auto-adjusting output level of 87 dB to 112 dBa. The alarm shall automatically activate when the transmission is placed in reverse.

## INSTRUMENTATION

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

The instrument panel shall contain the following gauges:

- One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.
- One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.
- One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.
- One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical level of engine oil pressure. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of coolant temperature. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of

decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen.

## **INSTRUMENT PANEL LIGHT BAR**

The instrument panel shall include a light bar that will contain the following LED indicator lights:

### **RED LAMPS**

- Low Primary Air Pressure (located in gauge)
- Low Secondary Air Pressure (located in gauge)
- Stop Engine-indicates critical engine fault
- Air Filter Restricted-indicates excessive engine air intake restriction
- Park Brake-indicates parking brake is set
- Seat Belt Indicator-indicates when a seat is occupied and corresponding seat belt remains unfastened
- Volts-indicates high or low system voltage (located in gauge)
- Low Oil Pressure-indicates low engine oil pressure (located in gauge)
- High Coolant Temperature-indicates excessive engine coolant temperature (located in gauge)
- DEF Level Bar-DEF level is at critically low level (located in gauge)

### **AMBER LAMPS**

- MIL-indicates an engine emission control system fault
- Check Engine-indicates engine fault
- Check Trans-indicates transmission fault
- High Transmission Temperature-indicates excessive transmission oil temperature
- ABS-indicates anti-lock brake system fault
- Wait to Start-indicates active engine air preheat cycle
- HEST-indicates a high exhaust system temperature
- Water in Fuel-indicates presence of water in fuel filter
- DPF-indicates a restriction of the diesel particulate filter
- Regen Inhibit-indicates regeneration has been postponed due to user interaction
- Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
- SRS-indicates a problem in the RollTek supplemental restraint system
- Low Fuel-indicates low fuel, (located in gauge)
- DEF-indicates a low level of DEF fluid (located in gauge)
- DEF Level Bar-DEF level is at a low level (located in gauge)

### **GREEN LAMPS**

- Left and Right turn signal indicators
- ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system
- High Idle-indicates engine high idle is active.
- Cruise Control-indicates cruise control is active
- OK to Pump-indicates the pump engage conditions have been met

- Pump Engaged-indicates the pump is currently in use
- Auxiliary Brake-indicates secondary braking device is active
- DEF Level Bar-indicates useable levels of DEF: 25%, 50%, 75%, 100% (located in gauge)

### **BLUE LAMPS**

- High Beam Indicator

### **CONSTANT AUDIBLE ALARMS**

- High Transmission Temperature
- High or Low Voltage
- Seatbelt
- Check Engine
- Check Transmission
- Stop Engine
- Low Air Pressure
- Fuel Low
- Water in Fuel
- ESC
- High Coolant Temperature
- Low Engine Oil Pressure
- Low Coolant Level

### **OSCILLATING AUDIBLE ALARMS**

- Air Filter
- Extended Left and Right Turn remaining on
- Cab Ajar
- Door Ajar
- Low Oil Level

### **BACKLIGHTING COLOR**

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

### **CAB EXTERIOR PROTECTION**

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

### **FIRE EXTINGUISHER**

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

### **ROAD SAFETY KIT**

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

## **DOOR KEYS**

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

## **WARRANTY**

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of thirty-six (36) months, or the first 50,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty may include conditional items listed in the detailed warranty document which shall be provided upon request.

## **OPERATION MANUAL**

There shall be two (2) complete sets of chassis operation manuals provided with the chassis. One (1) set shall be a printed hard copy and one (1) set shall be a digital copy. Each manual shall include a parts list specific to the chassis model.

## **ENGINE AND TRANSMISSION OPERATION MANUALS**

There shall be two (2) printed hard copy sets of the engine operation manual and two (2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.

## **ENGINE SERVICE MANUALS**

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

## **TRANSMISSION SERVICE MANUALS**

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

## **AS BUILT WIRING DIAGRAMS**

The cab and chassis shall include two (2) complete sets of wiring schematics and option wiring diagrams. One (1) set shall be a printed hard copy, one (1) set shall be a digital copy.



**UNITED PLASTIC FABRICATING, INC.**

# **WARRANTY**

**FOR: POLY-TANK®, POLYSIDE®, INTEGRATOR™, ELLIPSE™, ELLIP-T-TANK™ & DEFENDER™**

service warranty. Other polypropylene components, including but not limited to compartments, wheel wells, fenders and other body related components shall be warranted by UPF for a period of ten years. The warranty for the PolySide® and Integrator™ units excludes paint or hardware, which shall be covered by the manufacturer of the paint/hardware.

All UPF tanks 50 gallons or less utilized for non-fire applications and installed on specialty vehicles such as ATVs, trailers, boats, etc. are covered under a separate warranty policy available from UPF. Further, UPF Protector™ foam and water trailers are warranted under a separate warranty policy available from UPF.

This UPF warranty is transferable within the United States only with prior written approval by UPF (except an original apparatus manufacturer may assign this warranty to the first titled owner/lessee of the apparatus).

**UPF will NOT reimburse any unnecessary work and/or work that has not been pre-approved. Any and all third party charges must be pre-authorized and approved in writing by UPF prior to commencing the work. Any unauthorized third party repairs, alterations, actions or modifications will not be covered and can void the warranty. UPF will be the sole determining authority as to whether a service claim will be valid and covered under this warranty.**

In no event will UPF be liable for an amount in excess of the purchase price of the booster/foam tank at the time of manufacture or for any loss or damage, whether direct, indirect, incidental, consequential, or otherwise arising out of failure of its product. Loss of contents (water, foam, etc.) shall not be the responsibility of UPF. Further, UPF is not responsible for costs associated with service repairs to chassis, sub-frames, bodies, valves, dumps, hoses, pressure vacuum vents, and other components (i.e. liquid level transducers, etc.). Further, UPF will not cover the cost for travel of the vehicle to and from a repair facility.

This warranty contains the entire warranty. It is the sole warranty and price agreements or representation, whether oral or written, are either merged herein or expressly cancelled. UPF neither assumes, nor authorizes any person supposing to act on its behalf to change, nor assume for it, any warranty or liability concerning its product.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow exclusion or limitation or incidental or consequential damage, so the above limitation or exclusion may not apply to you. Since some states do not allow limitations on the length of an implied warranty, the above limitation may not apply to you.

**THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATION OR LIABILITIES ON THE PART OF UPF.**

 **UNITED PLASTIC FABRICATING, INC.**  
**WARRANTY**  
**FOR: POLY-TANK®, POLYSIDE®, INTEGRATOR™, ELLIPSE™, ELLIP-T-TANK™ & DEFENDER™**

## LIFETIME SERVICE WARRANTY

United Plastic Fabricating, Inc. (hereinafter called "UPF") warrants each POLY-TANK®, Booster/Foam Tank POLYSIDE® Wetside Tank, Integrator Tank/Body, ELLIPSE™ Elliptical Tank, Ellip-T-Tank Tank and DEFENDER™ Skid Tank to be free from defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in an emergency response for fire suppression). All UPF Tanks must be installed and operated in accordance with the UPF Installation and Operating Guidelines. Failure to do so can void the warranty.

Every UPF Tank is inspected and tested before leaving our facility. Should your UPF Tank require service, please notify UPF via email, fax, in writing or by calling UPF at 1-978-975-4520. Please provide the serial number, a description of the service request, the location along with the phone number and name of the contact person. Our goal is to have scheduled work completed within a reasonable time period.

Under a valid warranty claim, UPF will cover the cost to repair the UPF Tank including the customary and reasonable costs to make the tank accessible such as the removal and reinstallation of the tank if authorized in advance (pre-approved) by UPF. The warranty will not cover tanks that have been improperly installed, operated, misused, abused, or modified from its intended or designed use. Serial number must not have been altered, defaced or removed. Tanks that are not stored or installed properly which results in the tank suffering UV damage will not be covered by this agreement.

Should UPF determine that the service claim is valid under this warranty for a tank located outside of the United States and Canada, UPF will assume the costs for labor and material for the warranty repair as described above plus all travel costs to the U.S. port of embarkation. Costs for airline travel outside of the U.S. and Canada will not be the responsibility of UPF.

In the event the tank shall become stationed in an area of the world that is considered to be a war zone or where unsafe conditions exist for the safe passage of United States Nationals, as reported by the United States Department of State, (<http://www.state.gov>), and a request to perform service or warranty repairs, UPF reserves the right to refuse to honor such requests. It is the purchaser's responsibility to relocate the tank to an area where such repairs can be performed without undue risk to UPF employees or their designee. UPF will make every reasonable effort to support our products through alternative means.

For Ellipse™ elliptical tanks, a separate five year warranty provided by the subcontractor is applied to the sub-frames, chute linings (rubber isolation strips) and metal components. The stainless steel wrap provided by UPF shall be warranted by the subcontractor performing the wrap installation in accordance with their warranty in place at the time of the installation. UPF will not be liable for any warranty costs associated with the wrap, sub-frames, chute linings (rubber isolation strips) and metal components but will assist with all claims on behalf of its customer.

For PolySide® wetsided tanks and Integrator™ Tank/Body units, all polypropylene components related to the tank shall carry the standard UPF lifetime

## CONDITIONAL 5-YEAR WARRANTY POLICY

*WATEROUS warrants, to the original Buyer only, that products and parts manufactured by WATEROUS will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date the product is first placed in service, or five and one-half (5-1/2) years from the date of shipment by Waterous, whichever period shall be the first to expire; provided the Buyer notifies WATEROUS, in writing, of the defect in said product within the warranty period, and said product is found by WATEROUS to be nonconforming with the aforesaid warranty. When required in writing by WATEROUS, defective products must be promptly returned by Buyer to WATEROUS at WATEROUS' plant at South St. Paul, Minnesota, or at such other place as may be specified by WATEROUS, with transportation and other charges prepaid. A Returned Material Authorization (RMA) is required for all products and parts and may be requested by phone, fax or mail. The aforesaid warranty excludes any responsibility or liability of WATEROUS for:*

- (a) damages or defects due to accident, abuse, misuse, abnormal operating conditions, negligence, accidental causes, or improper maintenance, or attributable to written specifications or instructions furnished by Buyer;*
- (b) defects in products manufactured by others and furnished by WATEROUS hereunder, it being understood and agreed by the parties that the only warranty provided for such products shall be the warranty provided by the manufacturer thereof which, if assignable, WATEROUS will assign to Buyer, if requested by Buyer;*
- (c) any product or part, altered, modified, serviced or repaired other than by WATEROUS, without its prior written consent; and*
- (d) the cost of dismantling, removing, transporting, storing, or insuring the defective product or part and the cost of reinstallation.*
- (e) normal wear items (packing, strainers, filters, light bulbs, anodes, intake screens, mechanical seals, etc.).*

*This warranty is subject to WATEROUS' Conditions of Sale (Waterous Company form number F-2190) as currently in effect all of which are herein incorporated and by this reference made a part hereof.*

*All other warranties are excluded, whether express or implied by operation of law or otherwise, including all implied warranties of merchantability or fitness for purpose. WATEROUS shall not be liable for consequential or incidental damages directly or indirectly arising or resulting from the breach of any of the terms of this limited warranty or from the sale, handling, or used of any WATEROUS product or part. WATEROUS' liability hereunder, either for breach of warranty or for negligence, is expressly limited at WATEROUS' option:*

- (A) to the replacement at the agreed point of delivery of any product or part, which upon inspection by WATEROUS or its duly authorized representative, is found not to conform to the limited warranty set forth above, or*
- (B) to the repair of such product or part, or*
- (C) to the refund or crediting to buyer of the net sales price of the defective product or part.*

*Buyer's remedies contained herein are exclusive of any other remedy otherwise available to Buyer.*

**Waterous Company**  
125 Hardman Avenue South  
South St. Paul, MN 55075 USA  
[www.waterousco.com](http://www.waterousco.com)

**WATEROUS**

**Fire Pumps – Since 1886**

F-2113



## WHAT IS NOT COVERED

- **DAMAGE DUE TO ACCIDENT, MISUSE, or ALTERATION** — Defects and damage caused as the result of any of the following are not covered:

- Flood, collision, fire, theft, freezing, vandalism, riot, explosion, or objects striking the vehicle;
- Misuse of the vehicle;
- Installation into unapproved applications and installations;
- Alterations or modification of the transmission or the vehicle, and
- Damage resulting from improper storage (refer to long-term storage procedure outlined in the applicable Allison Service Manual)
- Anything other than defects in Allison Transmission material or workmanship

**NOTE:** This warranty is void on transmissions used in vehicles currently or previously titled as salvaged, scrapped, junked, or totaled.

- **CHASSIS, BODY, and COMPONENTS** — The chassis and body company (assemblers) and other component and equipment manufacturers are solely responsible for warranties on the chassis, body, component(s), and equipment they provide. Any transmission repair caused by an alteration(s) made to the Allison transmission or the vehicle which allows the transmission to be installed or operated outside of the limits defined in the appropriate Allison Installation Guideline is solely the responsibility of the entity making the alteration(s).
- **DAMAGE CAUSED by LACK of MAINTENANCE or by the USE of TRANSMISSION FLUIDS NOT RECOMMENDED in the OPERATOR'S MANUAL** — Defects and damage caused by any of the following are not covered:
  - Failure to follow the recommendations of the maintenance schedule intervals applicable to the transmission;
  - Failure to use transmission fluids or maintain transmission fluid levels recommended in the Operator's Manual.
- **MAINTENANCE** — Normal maintenance (such as replacement of filters, screens, and transmission fluid) is not covered and is the owner's responsibility.
- **REPAIRS by UNAUTHORIZED DEALERS** — Defects and damage caused by a service outlet that is not an authorized Allison Transmission Distributor or Dealer are not covered.
- **USE of OTHER THAN GENUINE ALLISON TRANSMISSION PARTS** — Defects and damage caused by the use of parts that are not genuine Allison Transmission parts are not covered.
- **EXTRA EXPENSES** — Economic loss and extra expenses are not covered. Examples include but are not limited to: loss of vehicle use; inconvenience; storage; payment for loss of time or pay; vehicle rental expense; lodging; meals; or other travel costs.
- **"DENIED PARTY" OWNERSHIP** — Warranty repair parts and labor costs are not reimbursed to any participating or non-participating OEMs, dealers or distributors who perform warranty work for, or on behalf of, end users identified by the United States as being a "denied party" or who are citizens of sanctioned or embargoed countries as defined by the U.S. Department of Treasury Office of Foreign Assets Control. Furthermore, warranty reimbursements are not guaranteed if the reimbursement would be contrary to any United States export control laws or regulations as defined by the U.S. Department of Commerce, the U.S. Department of State, or the U.S. Department of Treasury.

## OTHER TERMS APPLICABLE TO CONSUMERS AS DEFINED by the MAGNUSON-MOSS WARRANTY ACT

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Allison Transmission does not authorize any person to create for it any other obligation or liability in connection with these transmissions.

**ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO THESE TRANSMISSIONS IS LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. PERFORMANCE OF REPAIRS AND NEEDED ADJUSTMENTS IS THE EXCLUSIVE REMEDY UNDER THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (SUCH AS, BUT NOT LIMITED TO, LOST WAGES OR VEHICLE RENTAL EXPENSES) RESULTING FROM BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.\*\***

\*\* Some states do not allow limitations on how long an implied warranty will last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

## OTHER TERMS APPLICABLE TO OTHER END-USERS

**THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE ALLISON TRANSMISSION MODELS LISTED ABOVE AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALLISON TRANSMISSION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH SUCH TRANSMISSIONS. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTY.**

## QUESTIONS

If you have any questions regarding this warranty or the performance of warranty obligations, you may contact any Allison Transmission Distributor or Dealer or write to:

Allison Transmission, Inc.

P.O. Box 894

Indianapolis, IN 46206-0894

Attention: Warranty Administration PF-9

Form SE0616EN (200606)

## NEW PRODUCT WARRANTY



**PARTICIPATING OEM SALES  
DISTRIBUTOR SALES**

### LIMITED WARRANTY ON NEW ALLISON AUTOMATIC TRANSMISSIONS USED IN AUTOMOTIVE FIRE APPARATUS APPLICATIONS

Allison Transmission will provide for repairs or replacement, at its option, during the warranty period of each new Allison transmission listed below that is installed in an Automotive Fire Apparatus in accordance with the following terms, conditions, and limitations.

#### WHAT IS COVERED

- **WARRANTY APPLIES** — This warranty is for new Allison transmission models listed below installed in an Automotive Fire Apparatus and is provided to the original and any subsequent owner(s) of the vehicle during the warranty period.
- **REPAIRS COVERED** — The warranty covers repairs or replacement, at Allison Transmission’s option, to correct any transmission malfunction resulting from defects in material or workmanship occurring during the warranty period. Needed repairs or replacements will be performed using the method Allison Transmission determines most appropriate under the circumstances.
- **TOWING** — Towing is covered to the nearest Allison Transmission Distributor or authorized Dealer only when necessary to prevent further damage to your transmission.
- **PAYMENT TERMS** — Warranty repairs, including parts and labor, will be covered per the schedule shown in the chart contained in section “APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE.”
- **OBTAINING REPAIRS** — To obtain warranty repairs, take the vehicle to any Allison Transmission Distributor or authorized Dealer within a reasonable amount of time and request the needed repairs. A reasonable amount of time must be allowed for the Distributor or Dealer to perform necessary repairs.
- **TRANSMISSION REMOVAL AND REINSTALLATION** — Labor costs for the removal and re-installation of the transmission, when necessary to make a warranty repair, are covered by this warranty.
- **WARRANTY PERIOD** — The warranty period for all coverages shall begin on the date the transmission is delivered to the first retail purchaser, with the following exception:

**Demonstration Service** - A transmission in a new truck or bus may be demonstrated to a total of 5000 miles (8000 kilometers). If the vehicle is within this limit when sold to a retail purchaser, the warranty start date is the date of purchase. Normal warranty services are applicable to the demonstrating Dealer. Should the truck or bus be sold to a retail purchaser after these limits are reached, the warranty period will begin on the date the vehicle was first placed in demonstration service and the purchaser will be entitled to the remaining warranty.

#### APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE

APPLICABLE MODELS	WARRANTY LIMITATIONS (Whichever occurs first)		ADJUSTMENT CHARGE TO BE PAID BY THE CUSTOMER	
	Months	Transmission Miles Or Kilometers	Parts	Labor
<b>MT, MD 3000, 3200, 3500, 3700</b>	0-24	No Limit	No Charge	No Charge
<b>HT with Hydraulic Controls</b>	0-24	No Limit	No Charge	No Charge
<b>AT, 1000 Series™, 2000 Series™, 2400 Series™</b>	0-36	No Limit	No Charge	No Charge
<b>HT with Electronic Controls</b>	0-60	No Limit	No Charge	No Charge
<b>HD 1000 EVS, 2100 EVS, 2200 EVS 2350 EVS, 2500 EVS, 2550 EVS, 3000 EVS, 3500 EVS, 4000, 4000 EVS, 4500, 4500 EVS, 4700 EVS 4800 EVS</b>	0-60	No Limit	No Charge	No Charge

**CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL  
OR CONSEQUENTIAL DAMAGES.**

\* Airport operated crash trucks and fire department operated trucks employed to respond to fires, hazardous material releases, rescue and other emergency-type situations.

\*\* United States includes American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Puerto Rico and the U.S. Virgin Islands.



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exhaust fluid.

This Warranty does not apply to accessories supplied by Cummins which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans, air conditioning compressors, clutches, filters, transmissions, torque converters, vacuum pumps, power steering pumps, fan drives and air compressors. Cummins branded alternators and starters are covered for the first two years from the date of delivery of the Engine to the first user, or the expiration of the Base Engine Warranty, whichever occurs first.

Failures resulting in excessive oil consumption are not covered beyond the duration of the Coverage or 100,000 miles (160,935 kilometers) or 7,000 hours from the date of delivery of the Engine to the first user, whichever of the three occurs first. Before a claim for excessive oil consumption will be considered, Owner must submit adequate documentation to show that consumption exceeds Cummins published standards.

Failures of belts and hoses supplied by Cummins are not covered beyond the first year from the date of delivery of the Engine to the first user or the duration of the Warranty, whichever occurs first.

Parts used to repair a Warrantable Failure may be new Cummins parts, Cummins approved rebuilt parts or repaired parts. Cummins is not responsible for failures resulting from the use of parts not approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining Coverage hereunder.

Cummins Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

**CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.**

**CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

**THIS WARRANTY AND THE EMISSION WARRANTY SET FORTH HEREINAFTER ARE THE SOLE WARRANTIES MADE BY CUMMINS IN REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

# Emission Warranty

## Products Warranted

This Emission Warranty applies to new Engines marketed by Cummins that are used in the United States\*\* in vehicles designed for transporting persons or property on a street or highway. This Warranty applies to Engines delivered to the first user on or after September 1, 1992.

## Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built and equipped so as to conform at the time of sale by Cummins with all U.S. federal emission regulations applicable at the time of manufacture and that it is free from defects in material or factory workmanship which would cause it not to meet these regulations within the longer of the following periods: (A) Five years or 100,000 miles (160,935 kilometers) of operation, whichever occurs first, as measured from the date of delivery of the Engine to the first user or (B) The Base Engine Warranty.

If the vehicle in which the Engine is installed is registered in the state of California, a separate California Emission Warranty also applies.

## Limitations

Failures, other than those resulting from defects in material or factory workmanship, are not covered by this Warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine.

Any unauthorized modifications to the aftertreatment could negatively effect emissions certification and void Warranty.

Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all applicable taxes, all business costs or other losses resulting from a Warrantable Failure.

# Coverage

## Products Warranted

This Warranty applies to new diesel Engines sold by Cummins and delivered to the first user on or after April 1, 2007, that are used in fire apparatus truck and crash truck\* applications Worldwide.

## Base Engine Warranty

The Base Engine Warranty covers any failures of the Engine which result, under normal use and service, from a defect in material or factory workmanship (Warrantable Failure). This Coverage begins with the sale of the Engine by Cummins and ends five years or 100,000 miles (160,935 kilometers), whichever occurs first, after the date of delivery of the Engine to the first user.

Engine aftertreatment components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under Base Engine Warranty.

Additional Coverage is outlined in the Emission Warranty section.

**These Warranties are made to all Owners in the chain of distribution and Coverage continues to all subsequent Owners until the end of the periods of Coverage.**

# Cummins Responsibilities

Cummins will pay for all parts and labor needed to repair the damage to the Engine resulting from a Warrantable Failure.

Cummins will pay for the lubricating oil, antifreeze, filter elements, belts, hoses and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

Cummins will pay reasonable costs for towing a vehicle disabled by a Warrantable Failure to the nearest authorized repair location. In lieu of the towing expense, Cummins will pay reasonable costs for mechanics to travel to and from the location of the vehicle, including meals, mileage and lodging when the repair is performed at the site of the failure.

# Owner Responsibilities

Owner is responsible for the operation and maintenance of the Engine as specified in Cummins Operation and Maintenance Manuals. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the applicable Warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Except for Engines disabled by a Warrantable Failure, Owner must also deliver the Engine to the repair facility.

Service locations are listed on the Cummins Worldwide Service Locator at [cummins.com](http://cummins.com).

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items provided during Warranty repairs unless such items are not reusable due to the Warrantable Failure.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Engine repairs and for "downtime" expenses, cargo damage, fines, all applicable taxes, all business costs and other losses resulting from a Warrantable Failure.

Owner is responsible for a \$100 (U.S. Dollars) deductible per each service visit under this plan in the 3rd, 4th and 5th years of Base Engine Warranty. The deductible will not be charged during the first 2 years of the Base Engine Warranty.

# Limitations

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine.

Any unauthorized modifications to the aftertreatment could negatively effect emissions certification and void Warranty.

Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel

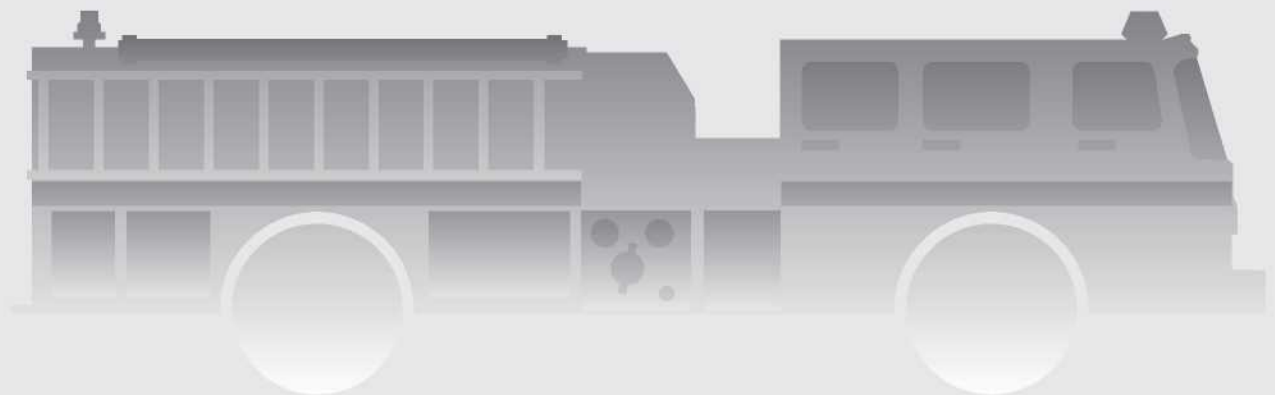




# Cummins Warranty

Worldwide

Fire Apparatus/Crash Trucks





## Fire Truck PPG Paint Limited Warranty

### What This Limited Warranty Covers

This warranty covers repair or replacement, at the sole option of Spartan Chassis, Inc. (hereinafter Spartan), of the PPG paint on your new Spartan fire truck if a defect in materials or workmanship appears under normal use, where maintenance has been performed as stated in the owners manual, or during servicing of the vehicle operated in the United States and/or Canada within the limited warranty period. REPAIR OR REPLACEMENT OF PAINT IS THE EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY.

**Coverage under this warranty is not subject to proration or deductibles.**

### How Long the Limited Warranty Lasts

The paint limited warranty is in effect for a period of **10 years** or **100,000 miles** (or 161,290 kilometers), whichever occurs first, from the date of delivery of the completed new fire truck to the end user, regardless of subsequent ownership. If the date of delivery to the end user is more than 24 months beyond the chassis VDM and/or the truck has been driven 7,501 or more miles, this paint warranty will be deemed to have started on the chassis VDM (Vehicle Date of Manufacture.) This limited warranty is not valid if the odometer is disconnected, or its reading has been altered, or actual mileage cannot be determined.

### Who is covered

This limited warranty covers the OWNER of a vehicle equipped with a **2012** model year new Spartan chassis, except for the Furion model line which is covered by its own specific warranties.

### How to Obtain the Limited Warranty

The original owner is responsible for submitting, or having the vehicle dealer submit, a "Spartan Chassis Warranty Registration" form to Spartan within 60 days of the purchase/in-service date. This form is located in the Spartan Chassis Owners Manual supplied with your new vehicle or may be completed online by going to the customer service tab at [www.spartanchassis.com](http://www.spartanchassis.com). THIS LIMITED WARRANTY IS NOT VALID IF THE SPARTAN CHASSIS WARRANTY REGISTRATION FORM IS NOT SENT TO SPARTAN WITHIN 60 DAYS AFTER THE DATE OF PURCHASE/IN-SERVICE BY THE FIRST OWNER.

### How to Get Service

See Chassis and Cab General Limited Warranty

### What This Warranty DOES NOT Cover

This warranty covers only repair or replacement of paint in which a defect in materials or workmanship appears. Spartan will not replace the fire truck or repurchase the fire truck from you. **Some examples of items NOT COVERED by this limited warranty include:**

- Any paint not applied by Spartan.
- Damage caused by fire, misuse, negligence, or accident.
- Damage from exposure to corrosive agents.
- Damage caused by theft, vandalism, riot or explosion.
- Damage caused by lightning, earthquake, windstorm, hail, flood, or use in an acidic environment.
- Any repairs, modifications, or alterations made without Spartan's authorization.
- Damage resulting from compromising the painted surface in any way, such as drilling holes.
- Damage from lack of maintenance and cleaning.
- Gold leaf, decals, or striping except that which is affected by repair.
- Loss of time, loss of use of the product, inconvenience, lodging, food or other consequential or incidental loss that may result from a failure.
- UV Paint fade.

THIS WARRANTY MAY NOT BE VALID IF THE CHASSIS IS RESOLD BEFORE IT BECOMES A COMPONENT IN A COMPLETE VEHICLE.

THIS WARRANTY IS FURTHER LIMITED by the terms and conditions stated in the Fire Truck Chassis and Cab General Warranty in sections titled "Limitation on Damages", "Limitation on Implied Warranties", and "Legal Remedies". Please review these provisions carefully as they will further limit warranty.



## Fire Truck Frame Limited Warranty

### What This Limited Warranty Covers

This warranty covers repair or replacement, at the sole option of Spartan Chassis, Inc. (hereinafter Spartan), of any part of your new Spartan frame and frame members in which a defect in materials or workmanship appears under normal use, where maintenance has been performed as stated in the owners manual, or during servicing of the vehicle operated in the United States and/or Canada within the limited warranty period. Required frame maintenance includes annual inspections and the proper repair of any paint damage and/or surface corrosion. The frame includes only the frame rails and cross members (ladder assembly), and does not include support brackets and hardware, such as the fuel tank mounting and cab mounting. REPAIR OR REPLACEMENT OF FRAME COMPONENTS IS THE EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY.

**Coverage under this warranty is not subject to proration or deductibles.**

### How Long the Limited Warranty Lasts

The frame limited warranty is in effect for the **lifetime** of a new vehicle. For purposes of the lifetime frame warranty, a life time is **50 years for frame rails and 20 years for cross members** from the date of delivery of the completed new fire truck to the end user, regardless of subsequent ownership. If the date of delivery to the first end user is more than 24 months beyond the chassis VDM (Vehicle Date of Manufacture) and/or the truck has been driven 7,501 or more miles, the lifetime frame warranty will be deemed to have started on the chassis VDM. This limited warranty is not valid if the odometer is disconnected, or its reading has been altered, or actual mileage cannot be determined.

### Who is covered

This limited warranty covers the OWNER of a vehicle equipped with a **2012** model year new Spartan chassis, except for the Furion model line which is covered by its own specific warranties.

### How to Obtain the Limited Warranty

The original owner is responsible for submitting, or having the vehicle dealer submit, a "Spartan Chassis Warranty Registration" form to Spartan within 60 days of the purchase/in-service date. This form is located in the Spartan Chassis Owners Manual supplied with your new vehicle or may be completed online by going to the customer service tab at [www.spartanchassis.com](http://www.spartanchassis.com). THIS LIMITED WARRANTY IS NOT VALID IF THE SPARTAN CHASSIS WARRANTY REGISTRATION FORM IS NOT SENT TO SPARTAN WITHIN 60 DAYS AFTER THE DATE OF PURCHASE/IN-SERVICE BY THE FIRST OWNER.

### How to Get Service

See Chassis and Cab General Limited Warranty

### What This Warranty DOES NOT Cover

This warranty covers only repair or replacement of any part of a Spartan frame in which a defect in materials or workmanship appears. Spartan will not replace the fire truck or repurchase the fire truck from you. **Some examples of items NOT**

#### **COVERED by this limited warranty include:**

- Damage caused by, but not limited to, failure to follow the required or recommended maintenance schedule, failure to ensure operating parameters are maintained, and failure to follow operating instructions.
- Additions or accessions not originally installed by Spartan, including ancillary equipment used in fire fighting, and any problems resulting from such additions or accessions.
- Installation of any "aftermarket" devices or modification of the frame by welding, cutting or splicing, or improper drilling of rail flanges without Spartan's prior express written approval and any problems resulting from such installation or modification.
- Damage caused by, but not limited to, abuse or neglect (e.g. overloading, driving over curbs, or corrosive or flooded environments).
- Damage caused by, but not limited to, collision, fire, theft, vandalism, or acts of God.
- Incidental expenses such as, but not limited to, loss of use, inconvenience, loss of time, vehicle rental, lodging or travel costs, etc.
- Damage to a Spartan vehicle that is leased or rented to a second party.
- Chassis frame components damaged as a result of corrosion, including but not limited to salt and/or acidic exposure.

THIS WARRANTY MAY NOT BE VALID IF THE CHASSIS IS RESOLD BEFORE IT BECOMES A COMPONENT IN A COMPLETE VEHICLE.

**THIS WARRANTY IS FURTHER LIMITED** by the terms and conditions stated in the Fire Truck Chassis and Cab General Warranty in sections titled "Limitation on Damages", "Limitation on Implied Warranties", and "Legal Remedies". Please review these provisions carefully as they will further limit warranty.





## Fire Truck Cab Structure Limited Warranty

### What This Limited Warranty Covers

This warranty covers repair or replacement, at the sole option of Spartan Chassis, Inc. (hereinafter Spartan), of any part of your new Spartan cab in which a defect in materials or workmanship appears under normal use, where maintenance has been performed as stated in the owners manual, or during servicing of the vehicle operated in the United States and/or Canada within the limited warranty period. The cab is defined as a modular structure, excluding all hardware, seats, mechanical items, electrical items, and paint finishes. REPAIR OR REPLACEMENT OF CAB COMPONENTS IS THE EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY.

**Coverage under this warranty is not subject to proration or deductibles.**

### How Long the Limited Warranty Lasts

The cab original limited warranty is in effect for a period of **10 years or 100,000 miles** (or 161,290 kilometers), whichever occurs first, from the date of delivery of the completed new fire truck to the end user, regardless of subsequent ownership. If the date of delivery to the end user is more than 24 months beyond the chassis VDM and/or the truck has been driven 7,501 or more miles, the cab structure warranty will be deemed to have started on the chassis VDM (Vehicle Date of Manufacture.) This limited warranty is not valid if the odometer is disconnected, or its reading has been altered, or actual mileage cannot be determined.

### Who is covered

This limited warranty covers the OWNER of a vehicle equipped with a **2012** model year new Spartan chassis, except for the Furion model line which is covered by its own specific warranties.

### How to Obtain the Limited Warranty

The original owner is responsible for submitting, or having the vehicle dealer submit, a "Spartan Chassis Warranty Registration" form to Spartan within 60 days of the delivery date. This form is located in the Spartan Chassis Owners Manual supplied with your new vehicle or may be completed online by going to the customer service tab at [www.spartanchassis.com](http://www.spartanchassis.com). THIS LIMITED WARRANTY IS NOT VALID IF THE SPARTAN CHASSIS WARRANTY REGISTRATION FORM IS NOT SENT TO SPARTAN WITHIN 60 DAYS AFTER THE DATE OF PURCHASE/IN-SERVICE BY THE FIRST OWNER.

### How to Get Service

See Chassis and Cab General Limited Warranty

### What This Warranty DOES NOT Cover

This warranty covers only repair or replacement of any part of a Spartan cab structure in which a defect in materials or workmanship appears. Spartan will not replace the fire truck or repurchase the fire truck from you. **Some examples of items NOT COVERED by this limited warranty include:**

- Normal maintenance.
- Damage caused by, but not limited to, failure to follow the required or recommended maintenance schedule, failure to ensure operating parameters are maintained, and failure to follow operating instructions.
- Additions or accessions not originally installed by Spartan, including ancillary equipment used in fire fighting, and any problems resulting from such additions or accessions.
- Installation of any "aftermarket" devices or modification of the cab by welding, cutting or splicing without Spartan's prior express written approval and any problems resulting from such installation or modification.
- Damage caused by, but not limited to, abuse or neglect (e.g. overloading, driving over curbs, or exposure to corrosive or flooded environments).
- Damage caused by, but not limited to, collision, fire, theft, vandalism, or acts of God.
- Incidental expenses such as, but not limited to, loss of use, inconvenience, loss of time, vehicle rental, lodging or travel costs, etc.
- Damage to a Spartan vehicle that is leased or rented to a second party.
- Cab components damaged as a result of corrosion, including, but not limited to salt and/or acidic exposure.

THIS WARRANTY MAY NOT BE VALID IF THE CHASSIS IS RESOLD BEFORE IT BECOMES A COMPONENT IN A COMPLETE VEHICLE.

**THIS WARRANTY IS FURTHER LIMITED** by the terms and conditions stated in the Fire Truck Chassis and Cab General Warranty in sections titled "Limitation on Damages", "Limitation on Implied Warranties", and "Legal Remedies". Please review these provisions carefully as they will further limit warranty.

- Additions or accessions not originally installed by Spartan, including ancillary equipment used in fire fighting, and any problems resulting from such additions or accessions.
- Installation of any "aftermarket" devices or the modification of any existing system or component originally installed by Spartan without Spartan's prior express written approval and any problems resulting from such installation or modification.
- Damage caused by, but not limited to, misuse, abuse or neglect (e.g. overloading, driving over curbs, or exposure to corrosive or flooded environments).
- Damage that arises outside of normal use.
- Damage caused by collision, fire, theft, vandalism, acts of God, or similar casualties.
- Damage or defects with respect to Covered Parts in a vehicle that is leased or rented to a second party for compensation.
- Chassis cab, frame, and structure if the frame is altered by welding, cutting or splicing, or improper drilling of rail flanges without Spartan's prior written approval.
- Cab and chassis systems and components damaged as a result of corrosion, including, but not limited to exposure to salt and/or acidic materials.
- Incidental expenses such as, but not limited to loss of use, inconvenience, loss of time, vehicle rental, towing, lodging or travel costs, etc.
- Parts that have been sold by an owner other than Spartan before the Covered Parts become a complete vehicle.
- Vehicles with 7,501 or more miles on the odometer or that are 24 months or more past the VDM on the date of delivery to the first end user are not considered "new" for purposes of this cab and chassis limited warranty, and may be covered exclusively by one of Spartan's demo/used fire truck chassis and cab limited warranty options. Check the odometer and VDM to determine whether the vehicle could be a demo/used vehicle by this definition and may be subject to a demo/used fire truck chassis and cab limited warranty instead of this Fire Truck Chassis and Cab Limited Warranty. If you have questions or wish to inquire as to whether the vehicle is considered a demo/used model, contact Spartan at (800) 543-5008.

### **Third Party Representations**

Spartan does not authorize any person to create for Spartan any other obligations or liability in connection with its chassis, and Spartan is not responsible for any representation, promise or warranty made by a dealer, component or vehicle manufacturer, or other person beyond what is expressly stated in this limited warranty.

### **How to Obtain the Limited Warranty**

The original retail owner is responsible for submitting, or having the vehicle dealer submit, a "Spartan Chassis Warranty Registration" form to Spartan within 30 days of the date of delivery. The "Spartan Chassis Warranty Registration" form is located in the Spartan Chassis Owners Manual supplied with your new vehicle or may be completed on-line by going to the customer service tab at [www.spartanchassis.com](http://www.spartanchassis.com). THIS LIMITED WARRANTY IS NOT VALID IF THE SPARTAN CHASSIS WARRANTY REGISTRATION FORM IS NOT SENT TO SPARTAN WITHIN 30 DAYS AFTER THE DATE OF PURCHASE BY THE FIRST OWNER.

### **How to Get Service**

To obtain warranty service for your Spartan chassis, call toll free Monday through Friday from 8:00 a.m. to 5:00 p.m. (Eastern Time) at 1-800-543-5008. Our customer service technicians can help answer questions regarding our products and services, provide information about warranty coverage and maintenance issues, help you arrange for service under third party warranties, and locate Spartan authorized service centers in your area. To find a current list of Spartan authorized service centers on-line, go to [www.spartanchassis.com](http://www.spartanchassis.com). ALL LIMITED WARRANTY WORK MUST BE AUTHORIZED BY SPARTAN BEFORE REPAIRS ARE MADE. When you call for service, please have the following information available so that we may expedite your service:

- Your Spartan VIN (Vehicle Identification Number)
- First owners date of purchase
- The current actual mileage
- The current actual engine hours

NO WARRANTY CLAIM WILL BE PROCESSED OR PAID WITHOUT PROOF OF ACTUAL MILEAGE AND FIRST OWNERS DATE OF PURCHASE.

### **Legal Remedies**

Any claim or controversy arising out of or relating to this limited warranty, or breach thereof, shall be settled by arbitration administered by the American Arbitration Association in the State of Michigan in accordance with the Commercial Arbitration Rules of the American Arbitration Association. The determination of the arbitrator(s) shall be in writing and shall include an explanation of the basis for the determination. The determination of the arbitrator(s) shall be final and binding and judgment upon such determination may be entered in any court having jurisdiction.

### **How State or Provincial Law Applies**

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province. In addition, some states and/or provinces will not enforce one or more of the limitations in this document, so one or more of the limitations may not apply to you.



## Fire Truck Chassis & Cab 3-Yr/50,000 Mile Limited Warranty

### What This Limited Warranty Covers

This limited warranty covers repair or replacement, at the sole option of Spartan Chassis, Inc. (hereinafter Spartan), of any part of your new Spartan chassis (hereinafter Covered Parts) in which a defect in materials or workmanship appears during normal use, maintenance or service within the limited warranty period, subject to the limitations and exclusions described below in "What This Limited Warranty Does Not Cover". REPAIR OR REPLACEMENT OF COVERED PARTS BY A SPARTAN AUTHORIZED SERVICE CENTER IS THE EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY. SPARTAN WILL NOT REPLACE THE FIRE TRUCK OR REPURCHASE THE FIRE TRUCK FROM YOU. The repair or replacement of a Covered Part does not extend the life of the limited warranty except where state or provincial law otherwise provides for an extension during the time that the Covered Part is being repaired or replaced under this limited warranty. Covered Parts are limited to chassis systems and components such as the driveline, cooling system, hydraulic system, suspension, air system, and climate control system. The frame, cab structure, and paint are each covered by specific warranty terms as defined in their individual warranties, included in this booklet. This limited warranty excludes the engine and transmission or any parts or components added to the chassis by another party. In addition to this Spartan limited warranty, original component manufacturers may provide their own warranties. Owners should check the original component manufacturer's warranty regarding its coverage. This limited warranty is valid only in the United States and Canada.

**Coverage under this warranty is not subject to proration or deductibles.**

### How Long the Limited Warranty Lasts

The original limited warranty is in effect for a period of **3 years or 50,000 miles** (or 80,645 kilometers), whichever occurs first, from the date of delivery of the completed new fire truck to the end user, regardless of subsequent ownership. This limited warranty is not valid if the odometer is disconnected, or its reading has been altered, or actual mileage cannot be determined.

### Who is Covered

This limited warranty covers the OWNER of a vehicle equipped with a **2012** model year new Spartan chassis, except for the Furion model line which is covered by its own specific warranties. The limited warranty may be transferred to subsequent owners during the warranty period by submitting to Spartan a new "Spartan Chassis Warranty Registration" form (see "How to Obtain the Limited Warranty" below). THIS LIMITED WARRANTY DOES NOT COVER A VEHICLE THAT HAS BEEN LEASED OR RENTED FOR COMPENSATION TO ANOTHER INDIVIDUAL OR ENTITY. THIS LIMITED WARRANTY DOES NOT COVER A CHASSIS THAT HAS BEEN SOLD BY AN OWNER OTHER THAN SPARTAN BEFORE IT BECOMES A COMPONENT IN A COMPLETE VEHICLE.

### What This Limited Warranty Does Not Cover

The exclusive remedy under this limited warranty or under any implied warranty that arises under state or provincial law is repair or replacement of any Covered Part in which a defect in materials or workmanship appears during normal use, maintenance or service within the warranty period, subject to the following exclusions:

**LIMITATION ON DAMAGES:** Spartan shall not be liable for incidental, consequential, direct, indirect or other damages (such as, but not limited to, lost wages or lost vehicle rental expenses) that result from breach of the written warranty or any implied warranty.

**LIMITATION ON IMPLIED WARRANTIES:** This limited warranty is in lieu of any other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose. Any implied warranties that arise by way of applicable state or provincial law notwithstanding the foregoing, including any implied warranty of merchantability or fitness for a particular purpose, are limited in duration to the term of this limited warranty and are limited in scope of coverage to those portions of the chassis covered by this limited warranty.

### SOME EXAMPLES OF ITEMS NOT COVERED BY THIS LIMITED WARRANTY ARE:

- The engine and transmission; however, the engine and transmission may be covered by warranties issued to you from the engine and transmission manufacturers. We will gladly help you arrange for service under those third party warranties. (See "How to Get Service".)
- Normal maintenance such as lubrication, batteries, tires, filter and oil replacement, belts and hoses, brake lining and adjustment, door check strap adjustment, vehicle alignments, etc. Normal wear parts such as electrical accessories, voltage regulator, flashers, windshield wipers, etc.
- Damage caused by, but not limited to, failure to follow the required or recommended maintenance schedule, failure to maintain proper fluid and lubricant levels, failure to ensure operating parameters are maintained (e.g. tire pressure, chassis ride height and alignment) and failure to follow operating instructions.



Warranty  
#0W-AU-0900

**SMEAL FIRE APPARATUS CO.**  
**Stainless Steel Plumbing/Piping Limited Warranty**  
**Ten (10) Year**

1. Smeal Fire Apparatus Company ("Smeal") warrants to each original purchaser only that the Stainless Steel plumbing piping shall be free from corrosion (perforation) is defined as an actual hole through the piping material caused by corrosion) for a period of ten (10) years, beginning on the 30<sup>th</sup> day from the invoice date for the completed apparatus. This warranty shall apply only to the piping for the discharges and intakes plumbed to the truck's main water pump and shall not include the pump or any of its accessories.

2. Smeal's sole obligation under this warranty is limited to the repair or replacement, as determined by Smeal, without charge to the original purchaser, which repairs shall be performed solely by Smeal at its principal place of business or at a repair facility selected by Smeal. This warranty covers only labor for repair or replacement which is reasonably necessary, as determined by Smeal, to make the repair or replacement deemed necessary by Smeal. Any labor, time, or amounts that are in excess of those reasonably necessary or deemed to be excessive by Smeal are not covered under this warranty. All repairs must be expressly approved in writing by Smeal's warranty department. The failure to obtain approval for repairs from Smeal or to have the apparatus or item repaired or replaced at Smeal or a place designated by Smeal shall void this warranty. Any repair or replacement performed by Smeal pursuant to this warranty shall be warranted under this warranty only for the duration of the original warranty.

3. This warranty is nontransferable and terminates upon transfer of ownership, lease, or disposition of the apparatus from the original purchaser to any other person or entity.

4. Smeal's obligation to render any performance under this warranty is subject to the following conditions:

- a) The claimed defect must manifest itself during the warranty period;
- b) The original purchaser must notify Smeal in writing of the claimed defect within thirty (30) days after the claimed defect manifests itself to the original purchaser; and
- c) The claimed defective item or items must be returned to Smeal or Smeal's designee immediately after notification of Smeal with transportation charges prepaid, unless otherwise directed by Smeal. Smeal shall have the unconditional right to thoroughly examine the claimed defects, including the apparatus and any part thereof, prior to conducting or approving any repair or replacement to determine whether the claimed defect is covered by this warranty. The failure of Smeal to conduct any such examination shall not be deemed to be a waiver of its right to deny warranty coverage.

5. This warranty is effective only under normal use and conditions. In addition, this warranty does not cover:

- a) Damage or corrosion due to improper use, improper maintenance, unauthorized alterations to the apparatus or repairs, chemical deterioration, accidents, or acts of God, or operation beyond rated capacity; or
- b) Any liability for direct or indirect damages or delays resulting from any defects, including but not limited to, special, incidental or consequential damages, loss of use, and loss of profits; or
- c) The cost of transporting original purchaser's apparatus or item to or from any repair facility.

At the request of Smeal, any allegedly defective vehicle shall be returned to Smeal by the purchaser for examination and/or repair. The purchaser shall be responsible for the cost of transportation and for the risk of loss of or damage to the vehicle during such transportation.

- d) Ordinary maintenance services or adjustments; or

6. This warranty is absolutely void if Smeal determines that the apparatus or any item has been misused, neglected, altered, overloaded, loaded beyond specified compartment weight limits, loaded to a state of excessive imbalance, or damaged. In addition this warranty is void if Smeal determines that the original purchaser has misrepresented or concealed any material fact in connection with this warranty claim or that the apparatus or item has been damaged in an accident or by an act of God, or that the defect is attributable to any use by the original customer of the product which is contrary to the intended use for which the product was manufactured or designed by Smeal. Also, any disturbance of a painted surface due to mounting of any type of equipment by anyone other than Smeal Fire Apparatus.

7. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE FOR A PARTICULAR PURPOSE AND ALSO INCLUDES, BUT NOT LIMITED TO, WARRANTIES IS FURTHER IN LIEU OF ALL OTHER REPRESENTATIONS TO THE ORIGINAL PURCHASER AND ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, ANY OBLIGATION OR LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. SMEAL NEITHER GIVES, ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO GIVE OR ASSUME ANY OTHER WARRANTY, OBLIGATION OR LIABILITY ON SMEAL'S BEHALF, UNLESS EXPRESSLY GIVEN OR ASSUMED IN WRITING BY SMEAL.

8. PERFORMANCE OF REPAIRS OR REPLACEMENT OF PARTS UNDER THE TERMS SET FORTH HEREIN ARE THE EXCLUSIVE REMEDIES AFFORDED TO THE BUYER AND NEITHER SMEAL NOR ANY OF ITS DISTRIBUTORS OR AGENTS SHALL BE LIABLE FOR ANY BREACH OF WARRANTY IN AN AMOUNT EXCEEDING THE PURCHASE PRICE OF THE DEFECTIVE APPARATUS EQUIPMENT OR ITEM. THIS WARRANTY SHALL NOT BE EXTENDED, ALTERED, OR VARIED EXCEPT BY WRITTEN AGREEMENT SIGNED BY SMEAL AND THE ORIGINAL PURCHASER.

9. Smeal reserves the right to make changes in design of and/or improvements on its products or to change specifications on materials as it may deem desirable at any time without imposing any obligations on itself to make corresponding changes or improvements in or on its products.



Warranty  
#0W-AU-0800

## SMEAL FIRE APPARATUS CO. Structural Body Integrity Warranty Ten (10) Year

1. Smeal Fire Apparatus Company ("Smeal") warrants that the body of each newly constructed apparatus which is manufactured by Smeal shall be free of structural or design failure or workmanship for a period of ten (10) years or 100,000 miles, beginning on the 30<sup>th</sup> day from the invoice date for the completed apparatus.

2. This warranty shall only cover tubular support, water tank cradle support, body/pump house mount structures, and other structural components as set forth in Smeal's body specifications.

3. Smeal reserves the right to thoroughly examine the apparatus or any parts thereof which are claimed to be defective and Smeal's obligation pursuant to this warranty shall be limited to the repair or replacement of the structural component or components which Smeal determines to have structurally failed due to defective manufacture, design, or workmanship. This repair or replacement shall be without charge to the original purchaser and Smeal shall have the sole right to elect whether the apparatus or items shall be repaired or replaced, which repairs shall be performed solely by Smeal at its principal place of business or at a repair facility selected by Smeal. This warranty covers only labor for repair or replacement which is reasonably necessary, as determined by Smeal, to make the repair or replacement deemed necessary by Smeal. Any labor, time or amounts which are in excess of those reasonably necessary or deemed to be excessive by Smeal are not covered under this warranty. All repairs must be expressly approved in writing by Smeal's Warranty department. The failure to obtain approval for repairs from Smeal or to have the apparatus or item repaired or replaced at Smeal or a place designated by Smeal shall void this warranty. Any repair or replacement performed by Smeal pursuant to this warranty shall be warranted under this warranty only for the duration of the original warranty.

4. This warranty is nontransferable and terminates upon transfer of ownership or possession of the apparatus from the original purchaser to any other third party or entity.

5. Smeal's obligation to render any performance under this warranty is subject to the following conditions:

a) The claimed failure must manifest itself during the warranty period.

b) The original purchaser must notify Smeal in writing of the claimed failure within thirty (30) days after the claimed failure manifests itself to the original purchaser.

c) The claimed defective apparatus or item must be returned to Smeal or Smeal's designee immediately after notification of Smeal with transportation charges prepaid, unless otherwise directed by Smeal. Smeal shall have the unconditional right to thoroughly examine the claimed failures, including the apparatus and any part thereof, prior to conducting or approving any repair or replacement to determine whether the claimed failure is covered by this warranty. The failure of Smeal to conduct any such examination shall not be deemed to be a waiver of its right to deny warranty coverage.

6. This warranty is effective only under normal use and conditions.

In addition, this warranty does not cover:

a) Damage or corrosion due to improper use, improper maintenance, unauthorized alterations to the structure or repairs, chemical deterioration, accidents, acts of God or operation beyond rated capacity; or

b) Any liability for direct or indirect damages or delays resulting from any failures, including but not limited to, special, incidental, or consequential damages, loss of use, and loss of profits; or

c) The cost of transporting original purchaser's apparatus or item to or from any repair facility.

At the request of Smeal, any allegedly defective vehicle shall be returned to Smeal by the purchaser for examination and/or repair. The purchaser shall be responsible for the cost of transportation and for the risk of loss of or damage to the vehicle during such transportation.

d) Non-structural cracks or breakage; or

e) Metal deformities, including buckling or material bending, unless the same was caused by the structural failure of a structural component.

7. This warranty is absolutely void if Smeal determines that the apparatus or any item has been misused, neglected, altered, overloaded, loaded to a state of excessive imbalance, or damaged. In addition this warranty is void if Smeal determines that the original purchaser has misrepresented or concealed any material fact in connection with this warranty claim or that the apparatus or item has been damaged in an accident or act of God or that the failure is attributable to any use by the original customer which is contrary to the intended use for which the product was manufactured or designed by Smeal.

8. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE FOR A PARTICULAR PURPOSE AND ALSO INCLUDES, BUT IS NOT LIMITED TO, WARRANTIES ARISING BY OPERATION OF LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS WARRANTY IS FURTHER IN LIEU OF ALL OTHER REPRESENTATIONS TO THE ORIGINAL PURCHASER AND ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, ANY OBLIGATION OR LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. SMEAL NEITHER GIVES, ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO GIVE OR ASSUME ANY OTHER WARRANTY, OBLIGATION OR LIABILITY ON SMEAL'S BEHALF, UNLESS EXPRESSLY GIVEN OR ASSUMED IN WRITING BY SMEAL.

9. Smeal reserves the right to make changes in the design of and/or improvements on its products or to change specifications on material as it may deem desirable to any item without imposing any obligations on itself to make corresponding changes or improvements in or on its products theretofore manufactured. Only the Smeal apparatus and its components manufactured by Smeal are bound by this warranty. Components of other manufacturers are covered only by such warranties set forth by the component manufacturer.



Warranty #0W-AU-0400

### SMEAL FIRE APPARATUS CO. Paint/Corrosion Limited Warranty Three (3) Year

1. LIMITED WARRANTY:

The warranty period shall begin on the 30<sup>th</sup> day from the invoice date for the completed apparatus.

Except as provided below, for a period of three (3) years after delivery to the original purchaser, Smeal Fire Apparatus Co. ("Smeal") warrants to the end user that its apparatus body and pump house is free of blistering, peeling or any other adhesion defect caused by defective manufacturing methods or paint material selection for exterior surfaces of the body of this vehicle. This limited warranty shall apply only if the vehicle is properly maintained and used in service which is normal to the particular vehicle. Normal service means service which does not subject the vehicle to stresses or impacts greater than normally result from the careful use of the vehicle. If the buyer discovers a defect or nonconformity it must notify Smeal in writing within thirty (30) days after the date of the discovery. This limited warranty is non transferable by the first user and is applicable to the vehicle in the following percentage costs of warranty repair, if any:

Topcoat Durability & Appearance: Gloss, Color Retention & Cracking	Integrity of Coating System: Adhesion, Blistering/Bubbling	Corrosion: Dissimilar Metal and Crevice
0-36 months    100%	0-36 months    100%	0-36 months    100%

This limited warranty applies only to the body exterior paint. Paint on the vehicles undercarriage, and body interior (Line-X coating included), or aerial structure related paint, if applicable, is warranted only under the Smeal Basic One Year Limited Warranty.

In addition to the foregoing, and subject to all terms and conditions of this Limited Warranty, except cost allocations, Smeal warrants its body exterior paint for a period of ten (10) years against corrosion perforation.

Smeal makes no warranty whatsoever as to: (a) integral parts, components, attachments or trade accessories not manufactured by Smeal, but instead, the applicable warranties, if any, of the respective manufacturers thereof shall apply; (b) any vehicle, chassis, or component, part, attachment or accessory damaged by misuse, neglect or accident; (c) any vehicle chassis or component, part, attachment or accessory shall have been repaired, altered or assembled in any way by others than Smeal which, in the sole judgement of Smeal, affects the performance, stability or purpose for which it was manufactured; and (d) products or parts which are not defective but which may wear out and have to be replaced during the warranty period. Smeal assumes no responsibility for the assembly of its parts or sub-assembly into finished products unless the assembly is performed by Smeal.

Warranty Inclusions:

- Peeling or delamination of the topcoat and/or other layers of paint
- Cracking or checking
- Excessive loss of gloss caused by cracking, checking or hazing

Warranty Exclusions:

- Paint deterioration caused by blisters or other film degradation due to rust or corrosion originating from the substrate
- Hazing, chalking or loss of gloss caused by improper care, abrasive polishes, cleaning agents, heavy-duty pressure washing, or aggressive mechanical wash systems
- Paint deterioration caused by abuse, scratches, chips, gloss reduction, accidents, acid rain, chemical fallout or acts of nature
- Claims presented without proper warranty documentation

In addition, this warranty does not cover:

The cost of transporting original purchaser's apparatus or item to or from any repair facility.

At the request of Smeal, any allegedly defective vehicle shall be returned to Smeal by the purchaser for examination and/or repair. The purchaser shall be responsible for the cost of transportation and for the risk of loss of or damage to the vehicle during such transportation.

2. DISCLAIMERS OF WARRANTIES:

THE WARRANTIES SET FORTH IN PARAGRAPH 1 ARE THE EXCLUSIVE WARRANTIES GIVEN BY SMEAL. SMEAL HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES WHETHER EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR USAGE OF TRADE.

3. BUYER'S REMEDIES:

If the product fails to conform to the warranties set forth in paragraph 1 and such nonconformity is not due to misuse or improper maintenance, the buyer shall notify Smeal as provided in paragraph 1, and shall make the product available for inspection by Smeal or its designated agent. At the request of Smeal, any defective vehicle shall be returned to Smeal for examination and/or repair. The cost of such transportation will be the responsibility of the buyer. Within a reasonable time, Smeal shall repair or replace any nonconforming or defective paint component. THIS REMEDY SHALL BE EXCLUSIVE AND SOLE REMEDY FOR ANY BREACH OF WARRANTY.

4. EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES:

IN NO EVENT SHALL SMEAL BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM NONDELIVERY OR FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OF FROM DEFECTS IN THE PRODUCT OR FROM THE NEGLIGENCE OF SMEAL OR FROM TORT. This exclusion applies regardless of whether such damages are sought for breach of warranty, breach of contract, negligence or strict liability in tort or under any other legal theory.



Warranty  
#BW-05-9010

**SMEAL FIRE APPARATUS CO.**  
**Basic Limited Parts & Labor Warranty**  
**Smeal Installed Purchased Parts**  
**Ninety (90) Day**

1. Smeal Fire Apparatus Company ("Smeal") warrants to each original purchaser only that the Smeal apparatus is free of defects in material and workmanship for a period of 90 days, beginning on the 30<sup>th</sup> day from the invoice date for the completed apparatus.

2. Smeal's sole obligation under this warranty is limited to the repair or replacement, as determined by Smeal, without charge to the original purchaser, which repairs shall be performed solely by Smeal at its principal place of business or at a repair facility selected by Smeal. This warranty only covers the repair or replacement of purchased components which are reasonably necessary, as determined by Smeal. Any labor, time, or amounts that are in excess of those reasonably necessary or deemed to be excessive by Smeal are not covered under this warranty. All repairs must be expressly approved in writing by the Smeal warranty department. The failure to obtain approval for repairs from Smeal or to have the apparatus or item repaired or replaced at Smeal or a place designated by Smeal shall void this warranty. Any repair or replacement performed by Smeal pursuant to this warranty shall be warranted under this warranty only for the duration of the original warranty at time of sale.

3. This warranty is nontransferable and terminates upon transfer of ownership, lease, or disposition of the apparatus from the original purchaser to any other person or entity.

4. Smeal's obligation to render any performance under this warranty is subject to the following conditions:

a) The claimed defect must manifest itself during this defined warranty period;

b) The original purchaser must notify Smeal in writing of the claimed defect within thirty (30), days after the claimed defect manifests itself to the original purchaser; and the claimed defective item or items must be returned to Smeal or Smeal's designee immediately after notification of Smeal. Smeal shall have the unconditional right to thoroughly examine the claimed defects, including the apparatus and any part thereof, prior to conducting or approving any repair or replacement to determine whether the claimed defect is covered by this warranty. The failure of Smeal to conduct any such examination shall not be deemed to be a waiver of its right to deny warranty coverage

c) Notwithstanding anything to the contrary herein, Smeal makes no warranty whatsoever as to (a) any integral parts, components, attachments or trade accessories of or to the vehicle that are installed on and/or supplied by the chassis, such as but not necessarily limited to axles, chassis frame, engines, transmissions, alternators.

e) Notwithstanding anything to the contrary herein, Smeal shall warrant, both replacement of defective part and associated labor, for (a) any integral parts, components, attachments or trade accessories of or to the vehicle that are attached or installed on the vehicle, by Smeal that is a part of the fire package, apparatus body, or aerial if applicable for the ninety (90) day period described within this document. Any and all failed components and/or parts must be returned to Smeal as stated within this document.

5. This warranty is effective only under normal use and conditions.

**In addition, this warranty does not cover:**

a) Damage or corrosion due to improper use, improper maintenance, unauthorized alterations to the apparatus or repairs, chemical deterioration, accidents, or acts of God, or operation beyond rated capacity; or

b) Any liability for direct or indirect damages or delays resulting from any defects, including but not limited to, special, incidental or consequential damages, loss of use, and loss of profits; or

c) The cost of transporting original purchaser's apparatus or item to or from any repair facility.

At the request of Smeal, any allegedly defective vehicle shall be returned to Smeal by the purchaser for examination and/or repair. The purchaser shall be responsible for the cost of transportation, and for the risk of loss of or damage to the vehicle during such transportation.

d) Ordinary maintenance services or adjustments; or

e) Replacement of any ordinary maintenance items, including but not limited to, filters, screens, lubricants, and light bulbs; or

f) Any item which is manufactured by any person or entity other than Smeal that is separately warranted in any manner by said person or entity.

6. This warranty is absolutely void if Smeal determines that the apparatus or any item has been misused, neglected, altered, overloaded, loaded to a state of excessive imbalance, or damaged. In addition this warranty is void if Smeal determines that the original purchaser has misrepresented or concealed any material fact in connection with this warranty claim or that the apparatus or item has been damaged in an accident or by an act of God, or that the defect is attributable to any use by the original customer of the product which is contrary to the intended use for which the product was manufactured or designed by Smeal. Also, any disturbance of a painted surface due to mounting of any type of equipment by anyone other than Smeal shall be cause for void of warranty.

7. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE FOR A PARTICULAR PURPOSE AND ALSO INCLUDES, BUT NOT LIMITED TO, WARRANTIES IS FURTHER IN LIEU OF ALL OTHER REPRESENTATIONS TO THE ORIGINAL PURCHASER AND ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, ANY OBLIGATION OR LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, SMEAL NEITHER GIVES, ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO GIVE OR ASSUME ANY OTHER WARRANTY, OBLIGATION OR LIABILITY ON SMEAL'S BEHALF, UNLESS EXPRESSLY GIVEN OR ASSUMED IN WRITING BY SMEAL.

8. PERFORMANCE OF REPAIRS OR REPLACEMENT OF PARTS UNDER THE TERMS SET FORTH HEREIN ARE THE EXCLUSIVE REMEDIES AFFORDED TO THE BUYER AND NEITHER SMEAL NOR ANY OF ITS DISTRIBUTORS OR AGENTS SHALL BE LIABLE FOR ANY BREACH OF WARRANTY IN AN AMOUNT EXCEEDING THE PURCHASE PRICE OF THE DEFECTIVE APPARATUS EQUIPMENT OR ITEM. THIS WARRANTY SHALL NOT BE EXTENDED, ALTERED, OR VARIED EXCEPT BY WRITTEN AGREEMENT SIGNED BY SMEAL AND THE ORIGINAL PURCHASER.

9. Smeal reserves the right to make changes in design of and/or improvements on its products or to change specifications on materials as it may deem desirable at any time without imposing any obligations on itself to make corresponding changes or improvements in or on its products theretofore manufactured. Only the Smeal apparatus and its components manufactured by Smeal are bound by this warranty. Components of other manufacturers are covered only by such warranties set forth by the component manufacturer.

Any surety bond, if required, shall apply only to the basic one year warranty and not to any other extended warranty or warranties made by Smeal or any of Smeal's suppliers.



Warranty  
#0W-AU-0100

**SMEAL FIRE APPARATUS CO.**  
**Basic Limited Parts & Labor Warranty**  
**Smeal Installed Purchased Parts**  
**One (1) Year**

1. Smeal Fire Apparatus Company ("Smeal") warrants to each original purchaser only that the Smeal apparatus is free of defects in material and workmanship for a period of one (1) year, beginning on the 30<sup>th</sup> day from the invoice date for the completed apparatus.
2. Smeal's sole obligation under this warranty is limited to the repair or replacement, as determined by Smeal, without charge to the original purchaser, which repairs shall be performed solely by Smeal at its principal place of business or at a repair facility selected by Smeal. This warranty only covers the repair or replacement of purchased components which are reasonably necessary, as determined by Smeal. Any labor, time, or amounts that are in excess of those reasonably necessary or deemed to be excessive by Smeal are not covered under this warranty. All repairs must be expressly approved in writing by the Smeal warranty department. The failure to obtain approval for repairs from Smeal or to have the apparatus or item repaired or replaced at Smeal or a place designated by Smeal shall void this warranty. Any repair or replacement performed by Smeal pursuant to this warranty shall be warranted under this warranty only for the duration of the original warranty at time of sale.
3. This warranty is nontransferable and terminates upon transfer of ownership, lease, or disposition of the apparatus from the original purchaser to any other person or entity.
4. Smeal's obligation to render any performance under this warranty is subject to the following conditions:
  - a) The claimed defect must manifest itself during this defined warranty period;
  - b) The original purchaser must notify Smeal in writing of the claimed defect within thirty (30) days after the claimed defect manifests itself to the original purchaser; and the claimed defective item or items must be returned to Smeal or Smeal's designee immediately after notification of Smeal. Smeal shall have the unconditional right to thoroughly examine the claimed defects, including the apparatus and any part thereof, prior to conducting or approving any repair or replacement to determine whether the claimed defect is covered by this warranty. The failure of Smeal to conduct any such examination shall not be deemed to be a waiver of its right to deny warranty coverage
  - c) Notwithstanding anything to the contrary herein, Smeal makes no warranty whatsoever as to (a) any integral parts, components, attachments or trade accessories of or to the vehicle that are installed on and/or supplied by the chassis, such as but not necessarily limited to axles, chassis frame, engines, transmissions, alternators.
  - d) Notwithstanding anything to the contrary herein, Smeal shall warrant, both replacement of defective part and associated labor, for (a) any integral parts, components, attachments or trade accessories of or to the vehicle that are attached or installed on the vehicle, by Smeal that is a part of the fire package, apparatus body, or aerial if applicable for the ninety (90) day period described within this document. Any and all failed components and/or parts must be returned to Smeal as stated within this document.
5. This warranty is effective only under normal use and conditions.

**In addition, this warranty does not cover:**

- a) Damage or corrosion due to improper use, improper maintenance, unauthorized alterations to the apparatus or repairs, chemical deterioration, accidents, or acts of God, or operation beyond rated capacity; or
  - b) Any liability for direct or indirect damages or delays resulting from any defects, including but not limited to, special, incidental or consequential damages, loss of use, and loss of profits; or
  - c) The cost of transporting original purchaser's apparatus or item to or from any repair facility.
- At the request of Smeal, any allegedly defective vehicle shall be returned to Smeal by the purchaser for examination and/or repair. The purchaser shall be responsible for the cost of transportation, and for the risk of loss of or damage to the vehicle during such transportation.
- d) Ordinary maintenance services or adjustments; or
  - e) Replacement of any ordinary maintenance items, including but not limited to, filters, screens, lubricants, and light bulbs; or
  - f) Any item which is manufactured by any person or entity other than Smeal that is separately warranted in any manner by said person or entity.
6. This warranty is absolutely void if Smeal determines that the apparatus or any item has been misused, neglected, altered, overloaded, loaded to a state of excessive imbalance, or damaged. In addition this warranty is void if Smeal determines that the original purchaser has misrepresented or concealed any material fact in connection with this warranty claim or that the apparatus or item has been damaged in an accident or an act of God, or that the defect is attributable to any use by the original customer of the product which is contrary to the intended use for which the product was manufactured or designed by Smeal. Also, any disturbance of a painted surface due to mounting of any type of equipment by anyone other than Smeal shall be cause for void of warranty.
  7. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE FOR A PARTICULAR PURPOSE AND ALSO INCLUDES, BUT NOT LIMITED TO, WARRANTIES IS FURTHER IN LIEU OF ALL OTHER REPRESENTATIONS TO THE ORIGINAL PURCHASER AND ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, ANY OBLIGATION OR LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, SMEAL NEITHER GIVES, ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO GIVE OR ASSUME ANY OTHER WARRANTY, OBLIGATION OR LIABILITY ON SMEAL'S BEHALF, UNLESS EXPRESSLY GIVEN OR ASSUMED IN WRITING BY SMEAL.
  8. PERFORMANCE OF REPAIRS OR REPLACEMENT OF PARTS UNDER THE TERMS SET FORTH HEREIN ARE THE EXCLUSIVE REMEDIES AFFORDED TO THE BUYER AND NEITHER SMEAL NOR ANY OF ITS DISTRIBUTORS OR AGENTS SHALL BE LIABLE FOR ANY BREACH OF WARRANTY IN AN AMOUNT EXCEEDING THE PURCHASE PRICE OF THE DEFECTIVE APPARATUS EQUIPMENT OR ITEM. THIS WARRANTY SHALL NOT BE EXTENDED, ALTERED, OR VARIED EXCEPT BY WRITTEN AGREEMENT SIGNED BY SMEAL AND THE ORIGINAL PURCHASER.
  9. Smeal reserves the right to make changes in design of and/or improvements on its products or to change specifications on materials as it may deem desirable at any time without imposing any obligations on itself to make corresponding changes or improvements in or on its products theretofore manufactured. Only the Smeal apparatus and its components manufactured by Smeal are bound by this warranty. Components of other manufacturers are covered only by such warranties set forth by the component manufacturer.

Any surety bond, if required, shall apply only to the basic one (1) year warranty and not to any other extended warranty or warranties made by Smeal or any of Smeal's suppliers.



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## Standards and testing

- Tested at extremes of temperature -20° F (-29° C) to 120° F (49° C) for starting and operation
- Tested installed
- Tested with commercial loads
- Field test program
- This generator set was designed and manufactured in facilities certified to ISO 9001
- CSA Certified for CSA C22.2 std 100 and std 14 for operation up to 40°C only

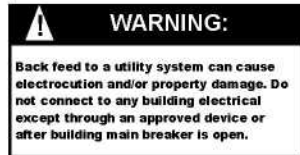
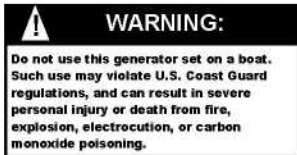


## Warranty policy

The Cummins Onan limited warranty covers virtually everything except routine maintenance for the first five years that you own your generator set, or the first 1,000 hours of operation, whichever comes first. In addition, it includes a free 90-day adjustment policy, which provides that Cummins Inc. will make minor adjustments to your new generator set during the first three months you own it - free of charge!

Warranty only applies if Cummins generator set is used with Cummins hydraulic pump.

Travel time repair allowance: In addition to the 5-year, 1000-hour warranty, a travel time repair allowance of 2.5 hours and mileage cost up to 100 miles included for the first 2 years.



## After sale support

### Largest distributor/dealer support network

Cummins Onan generator sets are supported by the largest and best trained worldwide certified distributor/dealer network in the industry. This network of knowledgeable Cummins Onan distributor/dealers will help you select and install the right generator set and accessories to meet the requirements of your specific application. This same network offers a complete selection of commonly used generator set maintenance parts, accessories and products plus manuals and specification sheets. Plus, they can answer your questions regarding proper operation, maintenance schedules and more.

**Manuals:** Operation and installation manuals ship with the generator set. To obtain additional copies or other manuals for this model, see your Cummins Onan distributor/dealer and request the following manual numbers: Operation (943-0103), Installation (943-0103), Parts (943-0204), Service (943-0503).

To easily locate the nearest Cummins Onan distributor/dealer in your area, or for more information, contact us at 1-800-888-6626 (or 763-574-5000), or visit [www.cumminsonan.com](http://www.cumminsonan.com).

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## Contact your distributor/dealer for more information

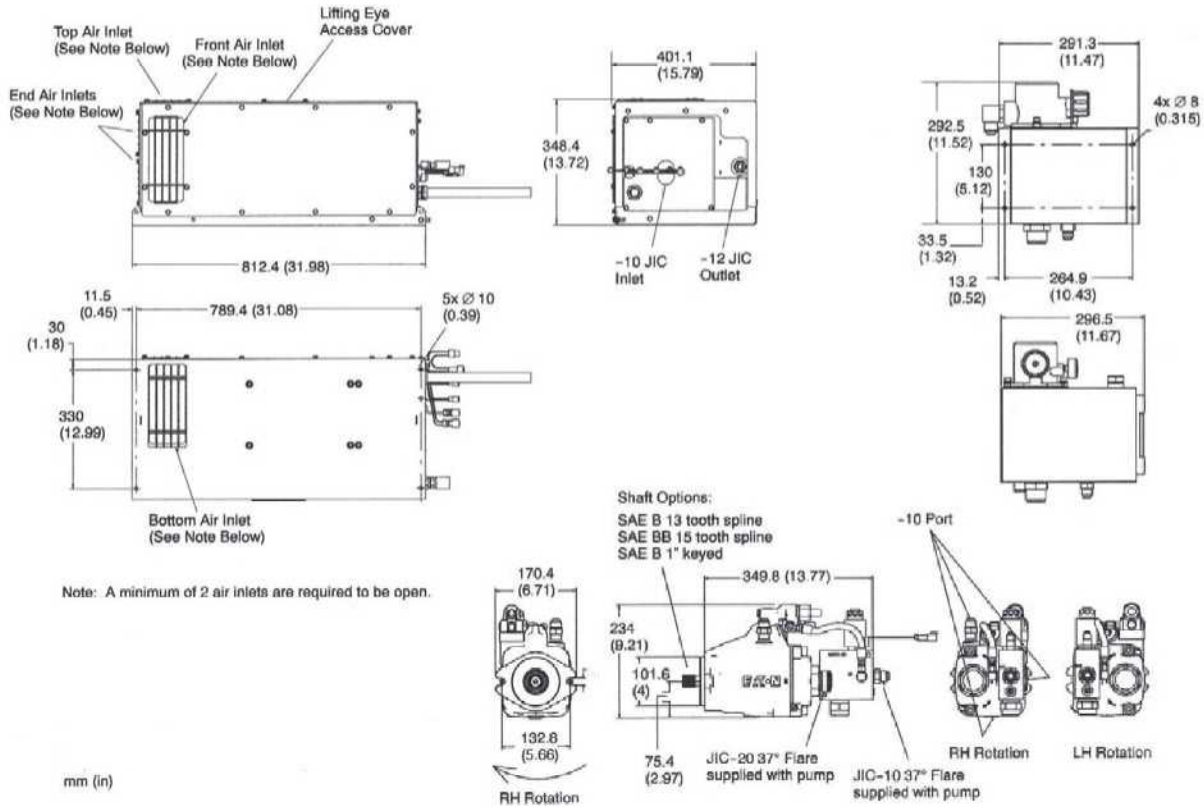
# Cummins Onan

### Cummins Power Generation

1400 73rd Ave. NE  
Minneapolis, MN 55432 USA  
Phone 1 763 574 5000  
Toll-free 1 800 888 6626  
Fax 1 763 574 5298  
Email [www.cumminsonan.com/contact](http://www.cumminsonan.com/contact)  
[www.cumminsonan.com](http://www.cumminsonan.com)

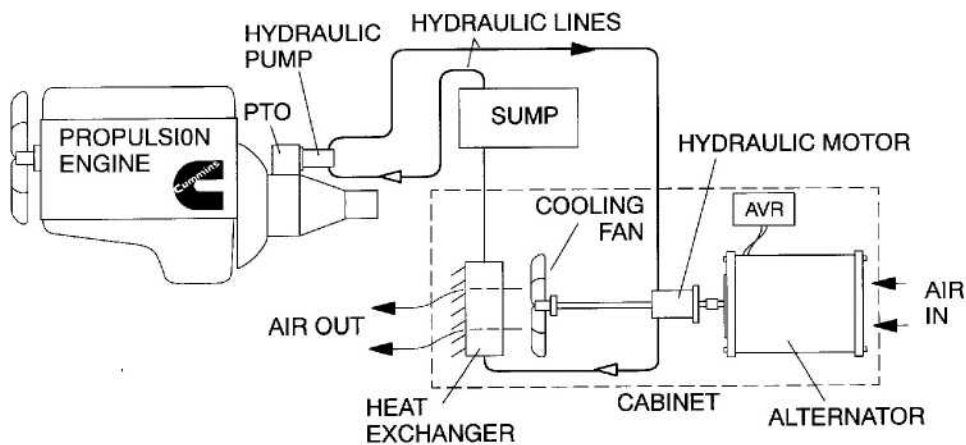


## Basic dimensions



**Note:** This outline drawing is provided for general reference only and is not intended for design or installation. For more information see Operation and Installation manuals or obtain drawing 500-4284 and wiring diagram from your distributor/dealer.

## Hydraulic operational schematic



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## Standard features

- Hydraulic components:
  - Variable displacement piston pump
  - Gear motor drive
  - Digital control maintains tight frequency control
  - Electronically controlled orifice stops fluid flow when system is off
  - Largest heat exchanger in the industry
- Generator set housing:
  - Powder and clear coated steel
  - Single side serviceability
  - Multiple air inlet locations (5)
  - Single side interface for all hook-ups
  - Installs without removing housing
  - Four-point vibration isolated mounting system
- Generator set output:
  - 120/240 single phase, 4-lead
  - 10 ft power leads in non-metallic conduit
  - Digital PWM control maintains stable frequency
  - Circuit breakers (OEM/distributor supplied)
  - Capped voltage regulator
  - Factory load tested
- Controls and displays:
  - Cummins Onan display by FRC with 15 ft harness; displays Hz, volt, amps, oil temperature and hours
  - Continuous on/off switch for generator set (customer supplied)
  - Solid state voltage regulation
- Reservoir:
  - 3 Gal hydraulic tank with integral filter
  - Filter with element condition indicator gauge, breather and fill port
  - Mounting tabs for universal mounting
- Accessories:
  - Side discharge duct kit (P/N 541-0873)
  - Extension harnesses (see Operation and Installation manual)

## Alternator details

**Design:** Cummins Onan AC, 2-pole self-excited revolving field, permanently aligned to hydraulic motor by a splined shaft

**Cooling:** Direct drive blower wheel

**Rotor:** Laminated electrical steel assembly press-fitted to shaft, balanced; heavy insulated, Class 200 copper wire windings, optimized air gap for improved wave form and motor starting

**Stator:** Laminated electrical steel assembly, skewed for improved waveform; heavy insulated, Class 200 copper wire windings

**DC brushes:** Electrographic; long life

**Bearing:** Double-sealed pre-lubricated ball bearing

**Exciter:** Power Scan<sup>®</sup> regulator and bridge rectifier supply field current through slip rings

## Hydraulic details

### Cooling:

- High efficiency forward-inclined blade, plug fan
- Pressurized box with distribution volutes for optimum air velocity across heat exchanger
- Welded blades, 4 brace rods and epoxy powder coated for best fan durability
- Heat exchanger sized relative to kW

### Hydraulic power:

- Operating flow and pressure range 14 Gal/min, 350-3000 psi
- Pump control is pressure compensated load sense system
- Solenoid PWM controls flow and closes fully when generator set is switched off
- Required pump speed 850-3200 r/min maximum
- Generator set requires 26.0 hp from drive engine at full load
- Generator set drive motor - fixed displacement gear
- Fluid Dexron III or 10 wt antiwear hydraulic oil ~5 Gal total

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## Generator set performance

	<u>No load - full load</u>	<u>Constant load</u>
<b>Voltage Regulation</b> (steady state conditions)	± 0.5%	± 0.5%
<b>Frequency Regulation</b> (steady state conditions)	60.5 to 59.5 Hz (± 0.75%)	± 1.6% or ± 0.5 Hz

# Commercial generator set Hydraulic Series HG 8000 60 Hz



## Cummins Onan

Performance you rely on.™



### Features and Benefits

- Cummins Onan custom engineered hydraulic generator set system
- High motor starting capability
- Meets NFPA 120° F (49° C) ambient\* standard
- Single side serviceability
- Powder coated steel housing/multiple air inlets (5)
- Four-point vibration isolated mounting system
- Digitally controlled pump flow for minimal voltage and frequency variation
- Hydraulic circuit has over speed and under speed protection
- Five year, 1000 hour limited warranty

### Weight, size and sound level

**Weight:** Total - 247 lb (112 kg)  
 - Generator set 179 lb (81 kg)  
 - Pump/manifold 55 lb (25 kg)  
 - Reservoir 13 lb (6 kg)

**Size:** Length 31.0 in (787 mm), width 16.0 in (405 mm), height 13.8 in (350 mm)



Digital display included

### Models and ratings

Model	Hz	Watts	Voltage	Amps	PF	Phase	Circuit breaker
8RBAB-2010C#	60	8000	120/240	67/33	1.0	1	Installer supplied

Pump Model	Description	Pump Rotation
A030X659	15 tooth	CW
A030X851	Keyed 1 in	CW
A030X854	13 tooth	CW
A030X855	15 tooth	CCW
A030X856	Keyed 1 in	CCW
A030X857	13 tooth	CCW

- All 60 Hz models operate at 3600 r/min.
- Required pump speed 850-3200 r/min.

\* Cummins Onan tested for operation with cooling air inlet temperature up to 120° F (49° C). Ambient is defined as the air temperature measured at the cooling air inlet to the set.

# Pumps are ordered separately from generator and are required for generator operation.

**Specifications for 2000 Series**

Foam Pump:	Hypro Triplex Plunger Pump
Foam Output:	2.6 gpm @ 150 psi - (9.84 L/min @ 10.3 BAR) 2001 5.0 gpm @ 150 psi - (18.9 L/min @ 10.3 BAR) 2002
Pump Motor:	1/2 hp (.40 Kw) 12 and 24 volt DC (2001) 3/4 hp (.56 Kw) 12 and 24 volt DC (2002)
Maximum Operating Pressure:	400 psi (27.6 BAR) (High pressure option available - up to 600 psi – 41.4 BAR)
Maximum Operating Temperature:	160°F (71°C)
Maximum Amp Draw:	40 amps (2001) @ 12 volt DC 56 amps (2002) @ 12 volt DC 21 amps (2001) @ 24 volt DC 30 amps (2002) @ 24 volt DC

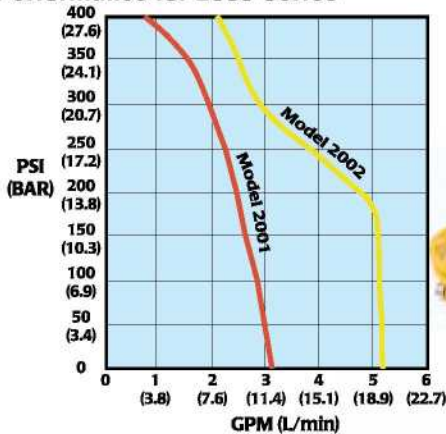
**System Capacity**

Foam Concentration	2001 Maximum Water Flow GPM (L/min)	2002 Maximum Water Flow GPM (L/min)
0.2%	1,300 (4,921)	2,500 (9,464)
0.5%	520 (1,968)	1,000 (3,785)
1.0%	260 (984)	500 (1,893)
3.0%	85 (322)	166 (628)

**2000 Series Attack Capability**

Class A Foam Concentration	2001 Maximum Coverage per Critical Application Rate (Iowa Formula)	2002 Maximum Coverage per Critical Application Rate (Iowa Formula)
0.2%	130,000 cu. ft.	250,000 cu. ft.
0.5%	52,000 cu. ft.	100,000 cu. ft.
1.0%	26,000 cu. ft.	50,000 cu. ft.
Class B Foam Concentration	<b>Hydrocarbon @ 0.10 gpm/sq. ft.</b>	
1.0%	2,600 sq. ft.	5,000 sq. ft.
3.0%	850 sq. ft.	1,660 sq. ft.
	<b>Polar Solvent @ 0.20 gpm/sq. ft.</b>	
3.0%	425 sq. ft.	830 sq. ft.

**Performance for 2000 Series**



Optional low-level sensor, flowmeter & check valve pictured.

2000



## 2000 Series (Class A and/or B Foam)

### Ideal for use on:

- Municipal pumpers
- Fast attack/wildland vehicles
- Marine and shipboard systems
- Compressed Air Foam Systems

Designed for Class A and Class B foam applications, the 2000 series of proportioners deliver greater flow capabilities than the 1600 series. In addition, the panel-mounted digital control module offers easy to use, push button control. Real time flow and proportioning performance information is displayed by ultra-bright LED readouts. The system features fully automatic foam proportioning, regardless of changes in flow or pressure, and delivers unmatched accuracy over the entire flow range. Proportioning is continuous with no need to stop for foam tank refill. Two models are available, differing only in concentrate capacity: the 2001 at 2.6 gpm and the 2002 at 5.0 gpm. Foam concentrate is delivered by a Hypro triplex plunger pump and motor (12 or 24 VDC) assembly. The optional advanced feature controller offers "auto-on" programming, which arms the proportioner when the fire pump is engaged.

### System features and benefits:

- Fully automatic-on demand
- Discharge side injection
- No in-line restrictions, greater flow
- Unmatched accuracy over the widest range of flow
- Smoothest proportioning available at ultra-low flow
- Leading the industry in proven reliability
- Proportions continuously, with no stopping to refill
- Delivers 0.01 to 5.0 gpm (0.04 - 18.9 L/min)
- Injection pressure to 400 psi (27.6 BAR)
- Achieves full pump capacity with all known Class A, Class B AFFF and most Class B AR-AFFF\*
- Installs easily in new or existing apparatus

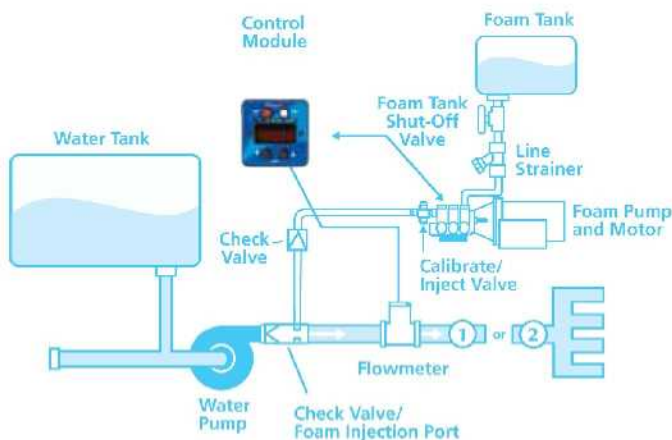
### Control module features:

- Ultra-bright LED digital readout
- Injection percentage from 0.1% to 10.0%
- Display following information:
  - Low concentrate/ No concentrate warning
  - Water flow rate
  - Total water used
  - Injection percentage
  - Total concentrate used
- Dual-tank capability and calibration
- Displays separate totals for each tank
- Calibrate for each concentrate

### Options:

- Concentrate Management Systems
- Advanced Feature Controller - Auto On
- MultiFlo
- Remote Start/Stop for pump and roll applications
- Dual-Injection Selector
- Solid State Contactor
- Flowmeters, check valves, manifolds
- Low-Level Sensors

System Diagram



## STANDARD FEATURES

### Poly-Tank® Water

Tank Sizes: 5 to 4,000 gallons



- T-type or rectangle
- One fill tower with removable screen and hinged cover
- One sump with anti-swirl plate and cleanout/drain fitting
- Schedule 40 vent overflow pipe 4" pipe standard tank fill fitting
- One tank fill fitting up to 3" N.P.T.
- One tank suction fitting up to 4" N.P.T.

### Poly-Tank® Water/Foam Combo

Tank Sizes: 5 to 4,000 gallons



- Same features as Poly-Tank shown above plus:
- One foam fill tower with removable hinged cover
- One anti-foaming fill stack and removable screen
- One vent fitting up to 3" N.P.T.
- One suction fitting up to 4" N.P.T.
- Optional thru-the-tank ladder tunnel shown

### ARFF Tank

Tank Sizes: 1000 to 4500 gallons



UPF ARFF tanks are standard equipment of the major ARFF manufacturers in the US.

- Typical Sizes: 1500 Gallon, 3000 Gallon, 4500 Gallon
- Field tested in locations in the US and worldwide
- Custom built with unique options and features for each ARFF manufacturer

## OPTIONS

- Cover, Access cut-out 8" x 6"
- Drain, additional
- Drill and tapping for level meters
- Dump distribution box (requires dump flanges)
- Dump flange backer plate
- Dump flange block-off plate
- Dump flange extension
- Dump valve flange block (1 1/2")
- Dump valve flange block (up to 1")
- Fill, subsurface/return line
- Fill tower, additional (no vent/overflow pipe)
- Fill tower, additional (4" vent/overflow pipe)
- Fill tower, additional (6" vent/overflow pipe)
- Fill, additional (up to 3")
- Fill, flanged fast fill with defuser pipe
- Fill, threaded fast fill up to 4" with defuser pipe
- Fill, victaulic with fast fill up to 4" with defuser pipe
- Foam tower expansion dome
- Jet line piping (1 1/2" inlet - 1" nozzle)
- Man way, removable
- Mounting/tank hold-down block (each)
- Mounting/tank hold-down kit (bracket and bolts)
- Notch minimum up to 10 ft<sup>3</sup> (allow for piping, suction, discharge line, fuel tank lines, etc)
- Notch custom over 10 ft<sup>3</sup> (allow for piping, suction, discharge line, fuel tank lines, etc)
- Sleeve, special pass-through up to 6" I.D. (minimum of 5ft charged)
- Sleeve, special pass-through 8" I.D. (minimum of 5ft charged)
- Sleeve, special pass-through 10" I.D. (minimum of 5ft charged)
- Sleeve through foam cell (in addition to sleeve charge)
- Suction, additional
- Sump, additional or special design
- Tunnels, through tank per cubic feet
- Tunnel insert
- Vent 2" Gitts pressure vacuum vent for foam cells
- Vent, auxiliary from rear of tank to fill tower (1" I.D.)
- Vent/overflow pipe 6"
- Vent/overflow pipe 8"



# The Poly-Tank®

## Water/Foam Tanks



### STANDARD FEATURES



T-Type



Rectangle

Tank Sizes: 5 to 4,000 gallons

- Original and only tank that can be called a "Poly-Tank®"
- Lifetime Warranty
- Over 50,000 tank in service in 85 countries
- Fusion Welding
- UPF's Full Floor™ Design
- Capacity Certification
  - Every tank is weighed empty and full for accuracy.
  - Exclusive certified tilting scales for precise weights
- Approved print with every order
- #1 choice of apparatus manufacturers
- U.V. stabilized ultra high impact PT2E™ polypropylene
- NFPA compliant
- 50% lighter than steel
- 10% lighter than fiberglass
- 20% stronger at 70° F, 90% stronger at 0° F than conventional copolymer polypropylene
- 3 manufacturing facilities MA - FL - WI
- Water/foam combinations
- Maintenance free design
- Custom designed to meet exact specifications
- Ideal for replacing older leaking metal or fiberglass tanks
- Dozens of options

Poly-Tank® is a registered trademark of United Plastic Fabricating, Inc.

The Poly-Tank® by UPF is the brand trusted by Fire Departments world-wide. The Poly-Tank® is the original and still the best tank in the fire service and is only available from UPF. Accept no substitutes, specify the Poly-Tank®!



United Plastic Fabricating, Inc. | 165 Flagship Drive | North Andover, MA 01845  
W: [www.unitedplastic.com](http://www.unitedplastic.com) | T: 1.800.638.8265 | F: 1.800.966.4520



# SPECIFICATIONS - ENDURANCE™: MODEL CS

## Pump Specifications

### Casing

Two-piece, horizontally-split, high-tensile, close grained gray iron or bronze (optional). All passageways are carefully matched to assure the very best hydraulic flow characteristics.

### Wear Rings

Bronze, reverse-flow, labyrinth-type replaceable wear rings increase pump life and keep maintenance costs to a minimum.

### Impellers

Bronze impeller, balanced both mechanically and hydraulically for vibration-free operation. Flame-plated impeller hubs are available optionally to assure longer life despite the presence of abrasives in the water supply.

### Impeller Shaft

Heat-treated stainless steel is ground at all critical areas, polished under packing. An exclusive two-piece impeller shaft allows separation of the transmission from the pump without disassembling either component. This simplifies repair procedures, resulting in less down time.

### Bearings

Three deep-groove, anti-friction ball bearings, located outside the pumping chamber, give support and proper alignment to the impeller shaft assembly. Bearings are oil or grease lubricated, completely separated from the water being pumped, and protected by seal housings, flinger rings and oil seals.

### Shaft Seal

Seal housings on packed pumps are equipped with braided flexible graphite (BFG) rings held in place by a split bronze gland which is fully removable and adjustable. BFG packing improves heat dissipation, reduces maintenance and minimizes shaft wear. Self-adjusting, spring-loaded mechanical seals are available which eliminate leakage and routine maintenance.

### Flinger Rings

Located on the impeller shaft between seal housings and bearing housings, flinger rings provide added protection and keep water and foreign matter out of the bearings.

### Oil Seals

Standard lip type for lubrication and additional bearing protection from dirt and water.

### Pump Characteristics

The Waterous CS pump meets or exceeds all requirements of NFPA standard

## Pump Transmissions

### C20 Series

**Housings:** High-strength aluminum, three-piece, horizontally-split.

**Drive Ratios:** 1.27, 1.41, 1.48, 1.58, 1.69, 1.79, 1.88, 1.97, 2.03, 2.27, 2.46 and 2.73.

**Shafts:** Drive line shafts made from alloy steel forgings, hardened and ground to size, 2.35 inch 46-tooth involute spline.

### Drive and Driven Sprockets

Made of steel. All sprockets are hardened and have ground bores.

### Drive Chain

Morse HV® high-strength involute form chain.

### Bearings

Deep-groove, anti-friction ball bearings give support and proper alignment to the impeller shaft assembly. Bearings are oil-splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seals.

### Lubrication System

An internal lubrication system delivers lubricant directly to the drive chain. This unique design eliminates the need for an external lubrication pump and auxiliary cooling.

### Shift Mechanism

Constant-mesh, two-position sliding collar that engages all teeth simultaneously. In-cab controlled pneumatic shift. An internal locking mechanism provides a positive lock in PUMP or ROAD position.

### P Series

**Housings:** Cast aluminum body

**Drive Ratios:** 1.71, 1.91, 2.05

### Drive & Driven Sprockets

Made of a steel. All sprockets are hardened and have ground bores.

### Drive Chain

Morse HV®\*\* high-strength involute form chain.

### Bearings

Anti friction ball bearings

### Optional Rear Facing Output Shaft

1-3/8-10 SAE spline for Spicer 1280 or 1310 series end yokes

## Accessories & Optional Equipment

The accessories below are available for Waterous CS pumps. For detailed information about these accessories, request each specification sheet by number.

### Pneumatic Shift

Air power allows the operator to shift to ROAD or PUMP position by actuating a simple valve. Illuminated LED's signal completion of shift from ROAD to PUMP. See Power Shift, F-1154.

### Total Protection Package (TPP-5)

The Total Protection Package is a comprehensive warranty that increases your standard warranty to include labor expenses to dismantle, remove and reinstall covered products or parts, F-2626.

### Primer

Select an electric rotary vane primer for fast, reliable priming, F-2418.

### Pressure Control Systems

#### Discharge Relief Valve

Simple ON-OFF control permits placing the system in or out of operation in seconds. See Relief Valve, F-897.

#### Intake Relief Valves

The Waterous intake relief valve is designed to dump excess pressure from the inlet side of the pump. See Intake Relief Valves, F-2192.

### Corrosion Protection

Waterous offers replaceable zinc intake screens and anodes to provide corrosion protection. These items are designed to sacrifice the zinc element to galvanic corrosion. Without this protection, galvanic corrosion may damage the iron pump body and fittings.

### Overheat Protection Manager

The OPM consists of an illuminated warning light on the operator's panel whenever the pump approaches an overheat condition, F-2422.

### Drain Valves

Drains all points of the pump simultaneously with the operation of a single control. F-1158

### Tank to Pump Valve

The tank to pump valve is a full-flow 3-1/2 in. diameter ball valve which is attached directly to the pump. The valve is operated by either a 90° spring detent remote control handle or an electric rotary actuator, F-2536.

### Discharge Valves

The following Waterous ball-type discharge valves are available: 2-1/2 inch, 3-1/2 inch, rack and sector push-pull, worm gear and electric. Chrome-plated brass ball and hydraulically-balanced seal assembly standard. See Discharge Valves, F-1161.



## **SPECIFICATIONS - ENDURANCE™: MODEL CS 750, 1000, 1250 GPM**

Our easy-to-operate ENDURANCE™ Model CS pump is designed specifically for departments that don't need the extra frills of a two-stage pump. Even though the ENDURANCE Model CS is 16% lighter than the old CS, it still delivers the same impressive performance with ratings of up to 1250 GPM. Equipped with a single impeller, the CS offers streamlined operations that only require the adjustment of the hand throttle to achieve normal performance requirements. With its no-nonsense design, CS equipped apparatus can be back in service faster than apparatus equipped with other brands of pumps. CS pumps come with a variety of transmissions to fit your needs, notably the new C20 transmission that is 40 lbs lighter than the C10 transmission and uses 5 less quarts of oil. The CS is also backed by a standard five-year warranty. An optional Total Protection Package (TPP-5) is available.



### **Design Features:**

The CS pump has a two-piece, horizontally-split body with intake and discharge passageways in a single casting and on the same level providing the lowest possible height, a lower center of gravity, and more room for hose reels, hose beds and other equipment. Diametrically opposed dual stripping edges and a double-intake impeller balance radial and axial forces, contributing to smooth operation and long life. Reverse-flow, labyrinth-type wear rings resist water by-pass and maintain high efficiency and lasting performance. These replaceable wear rings increase pump life and minimize maintenance costs. The two-piece, horizontally-split pump body design allows removal of the bottom pump cover without disturbing the main pump body mounting or any piping. After inspection or repair there is only a single hydraulic flange to seal, which gives you the shortest possible down time. Your Waterous CS

equipped apparatus can be back in service faster than apparatus equipped with other brands of pumps.

Braided flexible graphite (BFG) packing is standard on CS pumps. These graphite rings of packing are held in place by a split-bronze gland which is fully removable and adjustable. BFG packing improves heat dissipation, reduces maintenance and minimizes shaft wear. Self-adjusting, spring-loaded mechanical seals are available to eliminate leakage and routine maintenance.

An exclusive two-piece impeller shaft allows true separation of the pump and pump transmission without disassembling either unit. This greatly reduces labor time for repair work.

### **Simple to Operate:**

At the flip of a single switch or valve the proven power shift system engages the pump, an indicating light system confirms that the shift is complete, and the patented shift lock mechanism assures that the transmission remains in PUMP.

A single control activates the complete priming system, automatically opening the priming valve and starting the primer.

A single ON-OFF control will activate the automatic relief valve system.

### **Versatility:**

The Waterous CS pump was designed with versatility in mind. Waterous offers a complete selection of intake and discharge locations and sizes, and overall piping arrangements.

Discharge locations are available to meet any need, and sizes from 2-1/2 inches to 5 inches are available. The extra large discharge system assures you of the most efficient water delivery system available to the fire service.

The result of Waterous' advanced engineering capabilities is a quality product which has been thoroughly tested to meet NFPA and special contract provisions. Versatility combined with simple operation and exclusive design features have enabled us to continue providing the most reliable fire pumps in the industry for over 100 years

### **Industry-Leading Sales and Support**

When you purchase Waterous equipment, not only do you get quality products, you get quality service. Our expert service technicians are the best in the business and they are always happy to answer any service questions you might have.

**Sales/Applications Assistance**  
Phone: 651-450-5234 (Press 3)  
pumpsales@waterousco.com

**Service Assistance**  
Phone: 651-450-5200  
Fax: 800-488-1228  
service@waterousco.com



**Ask for an Allison.** See your dealer for a complete listing of vehicles featuring Allison fully automatic transmissions, or contact your Allison representative. For the representative close to you, visit [www.allisontransmission.com](http://www.allisontransmission.com).

P.O. Box 894, Speed Code PF3  
Indianapolis, Indiana 46206-0894

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 **Allison  
Transmission.**

DRIVING TRANSMISSION TECHNOLOGY™

**OPTIONAL RETARDER PROVISION**  
- INTEGRAL, HYDRAULIC TYPE

BASE MODEL	TORQUE CAPACITY lb-ft (N • m)	POWER CAPACITY hp (kW)
<b>3000 EVS</b>		
- High	1600 (2170)	600 (447)
- Medium	1300 (1760)	500 (373)
- Low	1100 (1490)	400 (298)
<b>4000 EVS<sup>1</sup></b>		
- High	2000 (2710)	600 (447)
- Medium	1600 (2170)	600 (447)
- Low	1300 (1760)	500 (373)

<sup>1</sup> Only medium-capacity available on 4700 EVS and 4800 EVS.

**TORQUE CONVERTER SPECIFICATIONS**

BASE MODEL	TORQUE CONVERTER	NOMINAL STALL TORQUE
<b>1000 EVS</b>	TC-210	2.05
	TC-211	1.91
	TC-221	1.73
	TC-222	1.58
<b>2000 EVS</b>	TC-210	2.05
	TC-211	1.91
	TC-221	1.73
	TC-222	1.58
<b>3000 EVS</b>	TC-411	2.71
	TC-413	2.44
	TC-415	2.35
	TC-417	2.20
	TC-418	1.98
	TC-419	2.02
<b>4000 EVS</b>	TC-521	2.42
	TC-531	2.34
	TC-541	1.90
	TC-551	1.79
	TC-561	1.58

**PHYSICAL DESCRIPTION**

BASE MODEL	LENGTH <sup>1</sup> in (mm)	DEPTH <sup>2</sup> w/DEEP OIL PAN/SUMP in (mm)	DEPTH <sup>2</sup> w/SHALLOW OIL PAN/SUMP in (mm)	DRY WEIGHT lbs (kg)
<b>1000 EVS</b>				
- SAE No. 3 mounting	28.01 (711.4)	11.22 (284.9)	10.71 (272.0)	330 (150)
- SAE No. 2 mounting	28.39 (721.1)	11.22 (284.9)	10.71 (272.0)	330 (150)
<b>2000 EVS</b>				
- SAE No. 3 mounting	28.01 (711.4)	11.22 (284.9)	-	330 (150)
- SAE No. 2 mounting	28.39 (721.1)	11.22 (284.9)	-	330 (150)
<b>3000 EVS</b>				
- Basic model	28.29 (718.6)	12.90 (327.8)	11.14 (283.1)	535 (243)
- With PTO only	32.49 (825.4)	12.90 (327.8)	11.14 (283.1)	575 (261)
- With retarder only	28.29 (718.6)	12.90 (327.8)	11.14 (283.1)	615 (279)
- With PTO & retarder	32.49 (825.4)	12.90 (327.8)	11.14 (283.1)	655 (298)
<b>4000/4500 EVS</b>				
- Basic model	30.54 (775.8)	14.75 (374.7)	13.17 (334.6)	831 (377)
- With PTO only	33.42 (848.8)	14.75 (374.7)	13.17 (334.6)	893 (405)
- With retarder only	30.54 (775.8)	14.75 (374.7)	13.17 (334.6)	906 (411)
- With PTO & retarder	33.42 (848.8)	14.75 (374.7)	13.17 (334.6)	968 (439)
<b>4700/4800 EVS</b>				
- Basic model	40.61 (1031.6)	14.88 (378.2)	-	1087 (493)
- With PTO only	43.48 (1104.6)	14.88 (378.2)	-	1149 (521)
- With retarder only	40.61 (1031.6)	14.88 (378.2)	-	1162 (527)
- With PTO & retarder	43.48 (1104.6)	14.88 (378.2)	-	1224 (555)

<sup>1</sup> Length measured from flywheel housing to end of output shaft. <sup>2</sup> Depth measured below transmission centerline.

**OIL SYSTEM**

BASE MODEL	CAPACITY <sup>1</sup> quarts (liters)	MAIN CIRCUIT FILTER	LUBE CIRCUIT FILTER	ELECTRONIC OIL LEVEL SENSOR (OLS)
<b>1000 EVS</b>				
		Spin-On Canister	-	-
- Deep Oil Pan	14.8 (14.0)			
- Shallow Oil Pan	12.7 (12.0)			
<b>2000 EVS</b>				
		Spin-On Canister	-	-
- Deep Oil Pan	14.8 (14.0)			
<b>3000 EVS</b>				
		Integral	Integral	Standard
- Deep Oil Sump w/o PTO	29 (27.4)			
- Shallow Oil Sump w/o PTO	26 (24.6)			
<b>4000 EVS</b>				
		Integral	Integral	Standard <sup>2</sup>
- Deep Oil Sump and PTO	51 (48)			
- Deep Oil Sump	48 (45)			
- Shallow Oil Sump and PTO	43 (41)			
- Shallow Oil Sump	40 (38)			

*Recommended oil type for all models is Allison Approved TES 295 transmission fluid.*

<sup>1</sup> Transmission only. Does not include cooler, hoses or fittings. Amount of oil necessary to fill a dry transmission.  
<sup>2</sup> 4700 EVS and 4800 EVS retarder models must use 4-inch sump without OLS.

# Ratings and Specifications

## RATINGS

MODEL	RATIO	PARK PAWL	MAX INPUT POWER <sup>1</sup>	MAX INPUT TORQUE <sup>1</sup>	MAX INPUT TORQUE w/SEM OR TORQUE LIMITING <sup>1,2</sup>	MAX TURBINE TORQUE <sup>3</sup>	MAX GVW	MAX GCW
			hp (kW)	lb-ft (N • m)	lb-ft (N • m)	lb-ft (N • m)	lbs (kg)	lbs (kg)
1000 EVS	Close Ratio	Yes	340 <sup>4,6</sup> (254) <sup>4,6</sup>	575 (780)	660 <sup>4,6</sup> (895) <sup>4,6</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	19,500 (8,845)	26,001 (11,800)
2100 EVS	Close Ratio	No	340 <sup>4,6</sup> (254) <sup>4,6</sup>	575 (780)	660 <sup>4,6</sup> (895) <sup>4,6</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	26,000 (11,800)	26,000 (11,800)
2200 EVS	Close Ratio	Yes	340 <sup>4,6</sup> (254) <sup>4,6</sup>	575 (780)	660 <sup>4,6</sup> (895) <sup>4,6</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	26,000 (11,800)	26,001 (11,800)
2350 EVS <sup>6</sup>	Close Ratio	Yes	340 <sup>4</sup> (254) <sup>4</sup>	575 (780)	660 <sup>4</sup> (895) <sup>4</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	30,000 (13,600)	30,000 (13,600)
2500 EVS	Wide Ratio	No	340 <sup>4,6</sup> (254) <sup>4,6</sup>	575 (780)	660 <sup>4,6</sup> (895) <sup>4,6</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	33,000 (15,000)	33,000 (15,000)
2550 EVS <sup>6</sup>	Wide Ratio	Yes	340 <sup>4</sup> (254) <sup>4</sup>	575 (780)	660 <sup>4</sup> (895) <sup>4</sup>	950 <sup>4</sup> (1288) <sup>4</sup>	30,000 (13,600)	30,000 (13,600)
3000 EVS	Close Ratio	n/a	450 (336)	1250 (1695)	n/a	1700 (2305)	—	—
3500 EVS	Wide Ratio	n/a	330 (246)	985 (1335)	n/a	1500 (2034)	—	—
4000 EVS								
- Emergency	Close Ratio	n/a	600 (447)	1850 (2508)	n/a	2600 (3525)	—	—
- ARFF <sup>7</sup>	Close Ratio	n/a	600 (447)	1675 (2271)	n/a	2600 (3525)	—	—
4500 EVS	Wide Ratio	n/a	600 (447)	1770 (2400)	1850 <sup>5</sup> (2508) <sup>5</sup>	2600 (3525)	—	—
4700 EVS								
- ARFF <sup>7</sup>	Widest Ratio	n/a	600 (447)	1850 (2508)	n/a	2800 (3795)	—	—
4800 EVS								
- ARFF <sup>7</sup>	Widest Ratio	n/a	680 (507)	1950 (2644)	n/a	2800 (3795)	—	—

<sup>1</sup> Gross ratings as defined by ISO 1585 or SAE J1995. <sup>2</sup> SEM = engine controls with Shift Energy Management. <sup>3</sup> Turbine torque limit based on ISCAAN standard deductions. <sup>4</sup> SEM and torque limiting are required to obtain this rating. <sup>5</sup> Available in gears two through six. <sup>6</sup> Check with your OEM to ensure offerings. <sup>7</sup> Aircraft Rescue and Fire-Fighting Vehicle.

## GEAR RATIOS - TORQUE CONVERTER MULTIPLICATION NOT INCLUDED

MODEL	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	REVERSE	2ND REVERSE <sup>1</sup>
1000/2100/2200/2350 EVS	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1 <sup>1</sup>	—	-4.49:1	—
2500/2550 EVS	3.51:1	1.90:1	1.44:1	1.00:1	0.74:1	0.64:1 <sup>1</sup>	—	-5.09:1	—
3000 EVS	3.49:1	1.86:1	1.41:1	1.00:1	0.75:1	0.65:1	—	-5.03:1	—
3500 EVS	4.59:1	2.25:1	1.54:1	1.00:1	0.75:1	0.65:1	—	-5.00:1	—
4000 EVS	3.51:1	1.91:1	1.43:1	1.00:1	0.74:1	0.64:1	—	-4.80:1	—
4500 EVS	4.70:1	2.21:1	1.53:1	1.00:1	0.76:1	0.67:1	—	-5.55:1	—
4700/4800 EVS	7.63:1 <sup>1</sup>	3.51:1	1.91:1	1.43:1	1.00:1	0.74:1	0.64:1	-4.80:1	-17:12.1

\* Manually selected first gear. <sup>1</sup> Check with your OEM to ensure offerings.

## ENGINE SPEEDS

MODEL	FULL LOAD GOVERNED SPEED	IDLE SPEED IN DRIVE	OUTPUT SHAFT SPEED
	Min-Max (rpm)	Min-Max (rpm)	rpm
1000/2100/2200/2350 EVS	2200-4600 <sup>1</sup>	500-820	5000
2500/2550 EVS	2200-3200	500-820	4500
3000/3500 EVS	2000-2800	500-800	3600 <sup>2</sup>
4000/4500/4700/4800 EVS	1700-2300	500-800	—

<sup>1</sup> Engines with full load governed speed greater than 3800 rpm require Application Engineering review. <sup>2</sup> Retarder-equipped models only.

## STANDARD POWER TAKEOFF PROVISION - CONTINUOUS OPERATION

BASE MODEL	MOUNTING PAD POSITIONS VIEWED FROM REAR	DRIVE GEAR RATING WITH ONE PTO	DRIVE GEAR RATING WITH TWO PTOS	DRIVE
		lb-ft (N • m)	lb-ft (N • m)	
1000/2000 EVS	3 and 9 o'clock	250 (339)	200 <sup>2</sup> (271) <sup>2</sup>	Turbine
3000 EVS <sup>1</sup>	Side/Side 4 and 8 o'clock	670 (910)	685 <sup>3,4</sup> (930) <sup>3,4</sup>	Engine
	Top/Side 1 and 8 o'clock	670 (910)	685 <sup>3,4</sup> (930) <sup>3,4</sup>	Engine
4000 EVS <sup>1</sup>	1 and 8 o'clock	685 (930)	1175 <sup>3,4</sup> (1595) <sup>3,4</sup>	Engine

<sup>1</sup> PTO-delete option available. <sup>2</sup> Rating per PTO. <sup>3</sup> Total on the drive gear. <sup>4</sup> Minimum 600 rpm idle speed required when dual PTOs are used simultaneously.

**Maintenance made easy.** Routine oil and filter changes are the only regular preventive maintenance required with an Allison Automatic. Easily accessible integral and spin-on oil filters reduce labor costs and valuable downtime. TranSynd® TES 295 transmission fluid greatly extends oil change intervals for most applications.



**Torque converter.** Increased shifting performance, faster acceleration, greater operating flexibility and minimal rollback are all advantages attributed to the patented heavy-duty Allison torque converter. The torque converter's cushion effect reduces shock and strain on all driveline components.



**Allison gets you there faster and safer.**

4800 EVS Meets ARFF Acceleration Standards	
0-50 MPH	TANK CAPACITY (gal)
30 sec.	60-528
25 sec.	528-1585
35 sec.	1585 or greater



PERCENTAGE FASTER THAN AN AMT or MANUAL					
	SPEED	3000 SERIES		4000 SERIES	
		AMT	MANUAL	AMT	MANUAL
ECONOMY MODE	0-20 mph	30%	22%	28%	19%
	0-30 mph	31%	14%	25%	25%
	0-40 mph	30%	15%	23%	30%
PERFORMANCE MODE	0-20 mph	38%	13%	33%	25%
	0-30 mph	39%	24%	29%	29%
	0-40 mph	36%	22%	26%	32%

**Calibrated for emergencies.** All Allison Emergency Vehicle Series models feature emergency calibrations with special pattern logic inhibits tailored to the unique demands of emergency vehicles. For example, general truck calibrations prevent shifts from Neutral to a range if engine speed is above 900 rpm; however, emergency calibrations will tolerate a higher engine speed of 1260 rpm before preventing the shift.

**Comprehensive coverage.** All Allison Emergency Vehicle Series automatic transmission models offer five-year comprehensive Standard Warranty with 100% parts and labor. Contact your Allison representative for details.

Our extensive network of over 1,200 authorized Allison Distributors and Dealers in North America, along with over 1,500 worldwide, means convenient, factory-quality Allison Transmission service is always close at hand.



**Information Highway**

Visit [www.allisontransmission.com](http://www.allisontransmission.com) for a comprehensive library of informational brochures, including Mechanic's Tips, Operator's Manuals, Parts Catalogs, Troubleshooting Flyers and Service Manuals.

**Startability.** Startability is a vehicle's capability to launch and pull a load. Simply put, it's the 'grunt' or 'get-up-and-go' of a truck. Often only the 1st gear ratio is used to judge a vehicle's startability. The truth is, one has to consider the engine torque at the required launch rpm and torque multiplication of the Allison torque converter. Manual and automated manual transmissions have to launch at very low engine rpm in order to prevent damage to the clutch. This means less torque, which is why they have very deep 1st gear ratios to help them overcome their clutch limitations. An Allison Automatic uses the full torque from the engine and multiplies it with the torque converter. Then, when the 1st gear ratio and rear axle ratio are factored in, the Allison provides greater startability.



**Braking news.** Brake life, brake fade, brake wear – it's all about heat, the enemy of brake performance and lifespan. Every time the brake pedal goes down, brake temperature goes up. The only sure way to keep brakes cool is to stay off them. An Allison Automatic can help you do just that.

Independent testing has shown when drivers pre-selected downshifts, vehicles equipped with Allison Automatics exhibited significantly lower brake temperatures than manual- or automated manual-equipped vehicles. Lower brake temperature leads to longer brake life, less downtime and less bottom-line costs.

An Allison Automatic with a hydraulic retarder can handle virtually the entire braking demand in most situations. The Allison retarder is an integral part of the transmission and is cooled by the vehicle cooling system. It's also ABS compatible. In traffic, operators can use the retarder to slow the vehicle from the moment the accelerator is released.

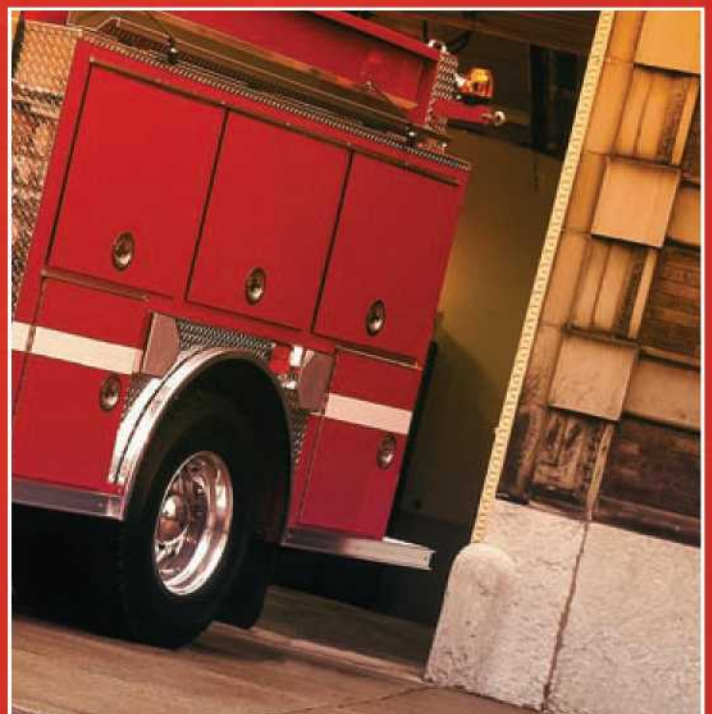
**Life cycle value.** When you factor in all life cycle costs – vehicle purchase price, insurance, fuel, tires, preventive maintenance, component repair, driver wages, taxes, license, permits and retail resale value – along with the increased productivity, an Allison Automatic-equipped vehicle costs less per mile\* to operate than a comparable competitively equipped vehicle.



\*Results may vary depending on your operating conditions.

**2nd Reverse.** This new feature offers a second "deep reverse" in addition to the standard reverse to provide greater control and engine braking during operation on steep grades. 2nd Reverse also enables more maneuverability when operating in confined spaces. When a vehicle is in 2nd Reverse, it has a slow creep capability with high engine speeds. With a mechanical ratio of -17.12:1, it has an effective torque converter multiplied ratio up to 32.5:1. 2nd Reverse provides overall better performance and enhanced applicability.

**Raising the bar.** Allison Emergency Vehicle Series automatic transmissions are specially designed for the critical demands of emergency vehicles, from ambulances to heavy-duty crash/fire vehicles. They raise driver and vehicle to new levels of performance. Allison's fully automatic shifts provide faster acceleration, which translates to quicker run times. On scene, precise vehicle positioning is accomplished with just subtle pressure on the accelerator. No other transmission contributes so much to getting the job done.





## Smart controls.

**Our experience in this vocation has given us the knowledge and insight to design optional features into our transmissions to get the job done quickly and safely. Allison Emergency Vehicle Series transmissions are available with customized electronic control packages that meet the specific needs of a wide variety of emergency vehicles.**

### **Prognostics**

Calibrated to the vehicle's particular operating requirements, Allison prognostics monitor various operating parameters – oil level, oil life, filter life and transmission health – to determine and alert when service is due. This eliminates unnecessary oil and filter changes and provides maximum transmission protection.

### **Dual Input Auxiliary Function Range Inhibit**

Provides an added level of safety and confidence by integrating two separate signals from different specialized vehicle equipment. It keeps the transmission in Neutral when both inputs are active and notifies the operator when one is active and the other is not.

### **Fire Truck Pump Mode**

The transmission controls command an immediate shift to fourth range once the PTO engages and Drive is selected. One-to-one direct drive for split-shaft PTOs.

### **Retarder Enable**

Get the best braking possible through total transmission retarder/vehicle integration. Electronic controls precisely blend the transmission, retarder and service brakes for peak efficiency.

### **Output Speed Indicator**

Exceed a preset output speed and the transmission electronic controls produce a usable electronic signal for warning devices and other auxiliary vehicle equipment.





**In emergency situations, time is critical. Allison Emergency Vehicle Series fully automatic transmissions are engineered to handle higher horsepower engines and deliver more torque to the wheels. That means emergency vehicles and their personnel get on scene faster and safer.**

**First on scene.** Allison offers a complete family of automatic transmissions to meet the special needs of fire and emergency vehicles. Any vehicle equipped with emergency signaling — siren, light bar, grill signal, porter light, etc. — that allows the vehicle to ignore general traffic laws in emergency situations should be equipped with an Allison Emergency Vehicle Series fully automatic transmission.

ENGINE	hp (kW)	TORQUE	lb-ft (N • m)
	165–680 (123–507)		420–1950 (569–2644)
GVW	lbs (kg)		
	14,000–unlimited (6,350–unlimited)		



1000 EVS, 2100 EVS,  
2200 EVS, 2350 EVS,  
2500 EVS, 2550 EVS

3000 EVS, 3500 EVS

4000 EVS, 4500 EVS,  
4700 EVS, 4800 EVS

**Safe driving intelligence.** Allison Emergency Vehicle Series vocational models provide customized performance at your fingertips. The transmission automatically selects gears based on engine rpm, throttle position, vehicle load and road speed. However, you can manually control the upshifts and downshifts when it is necessary for safe driving in traffic or particular road conditions. The transmission will not allow you to select a range that will over-speed the engine.

**Proven reliability and durability.** Allison Transmission has built a reputation on our ability to build transmissions that last just about forever. That is why Allison Emergency Vehicle Series transmissions are the preferred choice for all types of emergency vehicles.

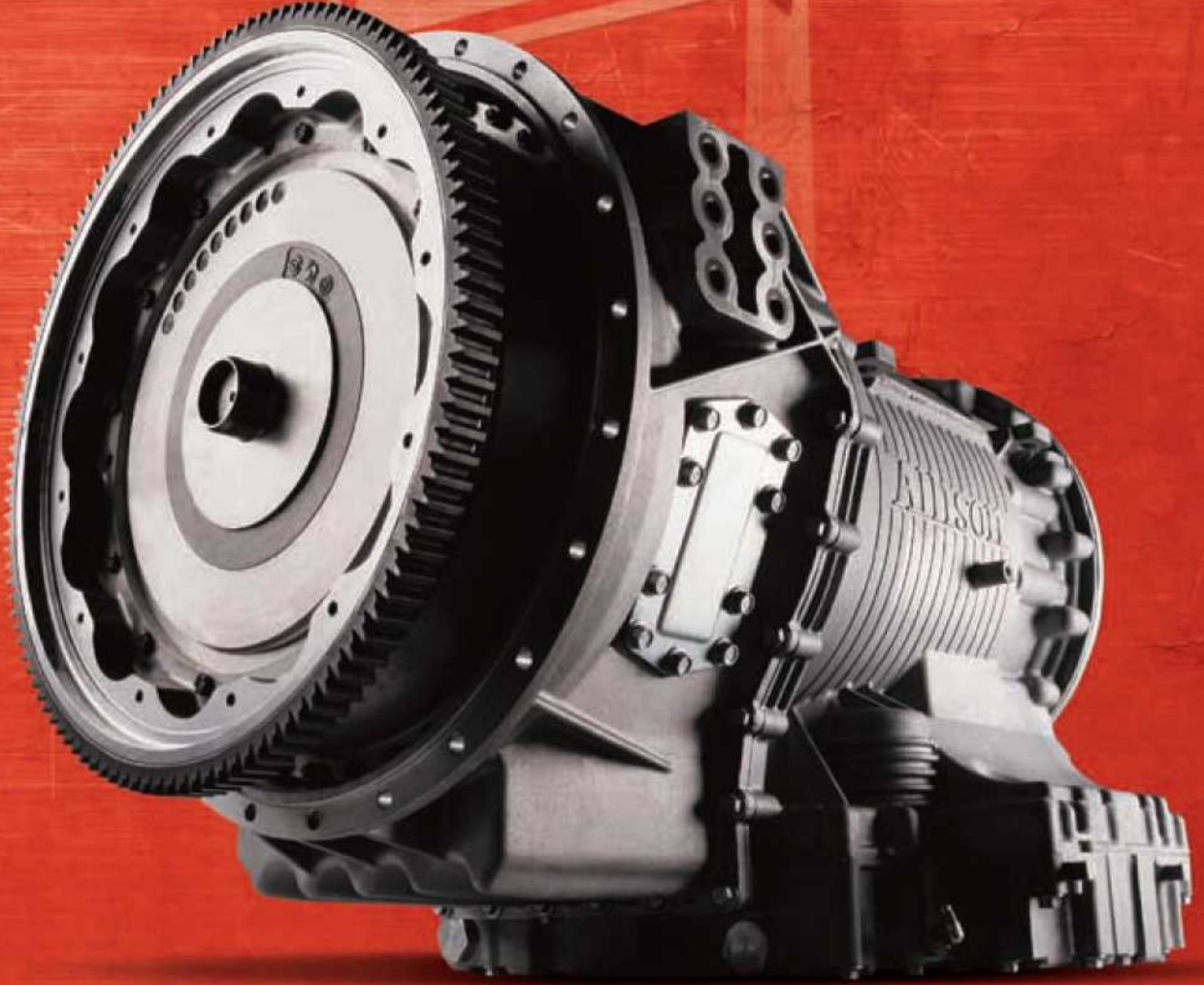




DRIVING TRANSMISSION TECHNOLOGY®

NO PARKING  
FIRE LANE

EMERGENCY VEHICLE SERIES



JULY 2010

# Ready To Respond. Every™ Call. ISL9 For EPA 2010.

More of a good thing. That's what you get with the Cummins ISL9 EPA 2010 engine. You can expect the same high level of performance and reliability that ISL owners currently get, keeping you ready to respond, every call.

The ISL9 has one of the highest power-to-weight ratios in its class, with heavy-duty features like replaceable wet liners. It features the XPI fuel system – the same technology that's used on the ISX15. This, combined with an improved Electronic Control Module (ECM) and improved airflow, allows the ISL9 to run stronger and with greater responsiveness than ever before.

Adding proven Selective Catalytic Reduction (SCR) technology to our aftertreatment system with cooled EGR and the Cummins Particulate Filter results in an engine that delivers near-zero emissions without compromising the performance of your mid-size fire apparatus.

**XPI Fuel System** – The proven technology of the XPI common-rail fuel system delivers a precise quantity of fuel at ultra-high pressures. This, together with more robust electronic engine controls, enables multiple injection events per cycle. Flexibility in injection timing maximizes fuel economy and performance while decreasing exhaust emissions.

**Heavy-Duty Design** – Rugged features include replaceable wet liners, roller followers, by-pass oil filtration and targeted piston cooling for longer service in the toughest work environments.

**VGT™ Turbocharger** – The Cummins VGT Turbocharger is both simple and precise. Electric actuation allows infinite adjustment, providing the exact amount of boost necessary for superior response. The proven sliding-nozzle design has best-in-class reliability and durability.

**Cooled EGR** – This next-generation system lowers combustion temperatures for reduced emissions and optimized fuel economy.

**Fully Integrated Electronic Controls** – A single higher-capacity ECM controls everything from air intake to exhaust aftertreatment for peak performance and near-zero emissions.

**Cummins Aftertreatment System** – The proven Cummins Particulate Filter reduces particulate matter by over 90%. In 2010 it is combined with Cummins SCR to meet emissions standards while maintaining best-in-class performance, reliability and durability. Cummins SCR technology has been proven in over 300,000 European vehicles and uses Diesel Exhaust Fluid (DEF) to achieve NOx emissions at near-zero levels. DEF is readily available; reference Cummins Filtration flyer LT15618 for more information.



## ISL9 Specifications

Advertised Horsepower	345-450 HP	257-336 kW
Peak Torque	1150-1250 LB-FT	1561-1696 N•M
Governed Speed	2100 RPM (2200 RPM for 400-HP and 450-HP ratings)	
Clutch Engagement Torque	550 LB-FT	746 N•M
Number of Cylinders	6	
Oil System Capacity	6.3 U.S. GALLONS	23.85 LITERS
System Weight	1,895 LB	859 KG
Engine (Dry)	1,695 LB	769 KG
Aftertreatment System*	200 LB	90 KG

\*Increase over standard muffler and does not include chassis OEM-supplied components.

## ISL9 Maintenance Intervals

Maintenance Item	Miles/Kilometers	Hours	Months
Oil and Filter*	9,000 MI	500	6
	14,500 KM		
Primary Fuel Filter**	9,000 MI	500	6
	14,500 KM		
Secondary Fuel Filter	18,000 MI	1,000	12
	29,000 KM		
Coolant Filter	None***	None***	None***
Overhead Adjustment	150,000 MI	5,000	48
	241,500 KM		
Standard Coolant Change****	80,000 MI	2,000	24
	128,000 KM		
Coalescing Filter	Every 3rd to 4th Oil Change Interval		
DEF Filter	200,000 MI (320,000 KM) or 6,500 Hours		
Particulate Filter Cleaning	200,000 MI (320,000 KM) or 6,500 Hours		

\*Assuming severe duty cycle for fire/emergency vehicle applications.

\*\*OEM-supplied; intervals may vary.

\*\*\*If engine is equipped with an optional coolant filter, it will need to be replaced at the same intervals as the oil filter. Regardless if the engine is or is not equipped with a coolant filter, SCA/DCA additive levels must be checked according to the interval listed in the Owners Manual.

\*\*\*\*Extended coolant and drain/flush/fill intervals may be followed when certain requirements are met. For more information on these requirements, refer to the Cummins Coolant Requirements and Maintenance Service, Bulletin 3666132.



Cummins Inc.  
Box 3005  
Columbus, IN 47202-3005  
U.S.A.

Phone: 1-800-DIESELS (1-800-343-7357)  
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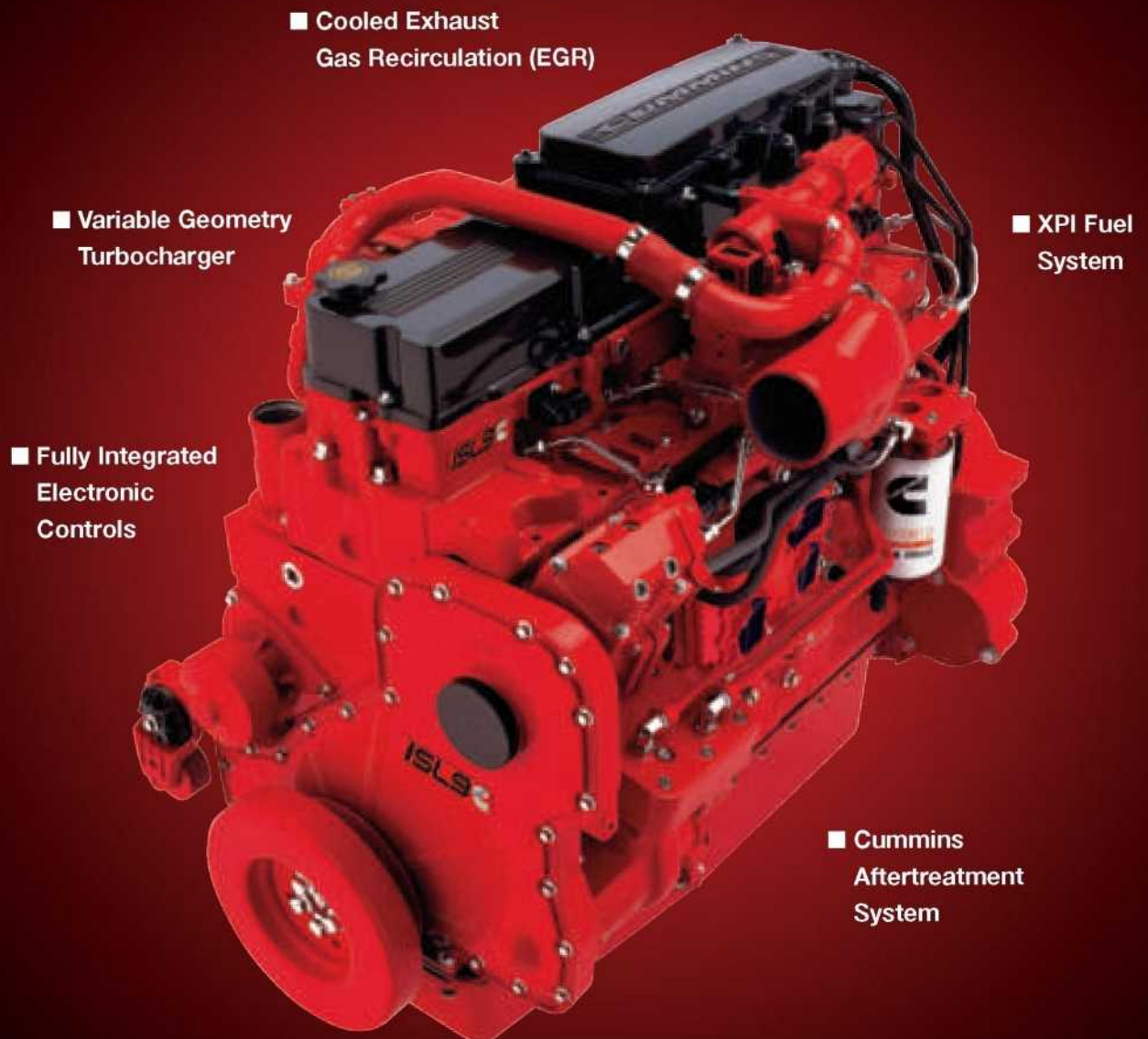
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# Better Every™ Call.

ISL9 For EPA 2010.

For Fire And Emergency Vehicle Applications.





**SPARTAN CHASSIS, INC.**  
A SPARTAN MOTORS COMPANY

**METRO STAR<sup>®</sup>**



**NEW FEATURES**

- Improved Standards for Design & Testing
- Added Room for Driver, Officer & Crew
- Redesigned Cooling System with Water to Oil Transmission Cooler
- SmartWheel Steering System with Wiper, Air Horn & Secondary Brake Functions
- Gauge Package (Driver) with Backlighting, DEF Indication & Descriptive Diagnostic Code
- Aluminum Instrument Panel (Driver)
- DEF Tank in Rear Step Well (Driver's Side)
- Updated Horizontal Wiper Design
- Laptop Docking Station (Officer)
- Multiple Exhaust Configurations
- 24" Exterior Grab Handles
- Door-Mounted LED Safety Marker Lights (Interior) **PATENT PENDING**

**ENGINE & TRANSMISSION**

- Cummins Diesel ISC 8.3L or ISL 9L
- Engine Horsepower: 330-450
- Transmission: Allison GEN IV-E 3000 (Retarder Available)

**FEATURES & SPECIFICATIONS**

- 94" Wide Aluminum Cab
- Classic Front-End Styling & Grille
- Apparatus Type: Rescue, Pumper, Mid Mount Aerial, Mid Mount Quint, Rear Mount Aerial, Rear Mount Quint, Tanker
- Front GAWR: 14,600, 17,000, 18,000, 20,000, 21,500, 22,000, 22,800, 23,000, or 24,000 lb.
- Rear GAWR: 22,000, 24,000, 27,000, 31,000, 31,500, 40,000, 44,000 or 48,000lb.
- Cab Styles: ER / SMFD / MFD / EMFD / LTD / LFD / ELFD
- Cab Roof Style: Flat or Raised Roof (10", 20", or 24"), Trench Roofs (3", 6" 10", 13", or 16")
- Axle Configurations: 4x2 or 6x4
- Front Axle: Beam, IFS or Tube
- Front Suspension: IFS or Spring
- Steering Column/Wheel: 18" Tilt/Telescopic (2 or 4-Spoke, Smart Wheel Visibility Available)
- Front Axle Turning Angle Range: 42°, 43°, 48°, 48°L/44°R, 50°, 53° or 55°
- Rear Axle: Single or Tandem
- Rear Suspension: Air, Rubber or Spring
- Brakes: Disc or Drum
- Brake Systems: ABS / ATC / RSC / ESC
- Wheelbase: 136" – 303.5" ( 1/2 inch increments)
- Bumper Extensions: 6", 8", 12.5", 14", 16", 18", 21", 24" or 28"
- Batteries: (3) Group 31 or (6) Group 31
- Alternator: 270 or 320 Amp
- Cab Tilt System
- Keyless Start & Anti Theft

**WARRANTIES & SERVICE**

- Lifetime Frame & Cross Member
- 10 Year / 100,000 Mile Cab Structural
- 1 Year / 24,000 Mile Cab & Chassis General Limited
  - \* 2 Year / 36,000 Mile Cab & Chassis General Limited
  - \* 3 Year / 50,000 Mile Cab & Chassis General Limited
  - \* 5 Year / 75,000 Mile Cab & Chassis General Limited
  - \* 1 Year Parts (Export)
- 5 Year / 100,000 Mile / 3,000 Hours Cummins Engine
- 5 Year Allison EVS Transmission
- 7 Year / 70,000 Mile Cab Paint (DuPont & Sikkens)
- 10 Year / 100,000 Mile Cab Paint (PPG)
- 24/7 Technical Support
- Spartan Factory Service Center
- Authorized Nationwide Service Network

**SPARTAN PRODUCT HIGHLIGHTS**

**Spacious Cab Design**

The Metro Star's 94" wide, flat floor cab design, seating configurations and raised roof options provide up to 10 crew members with extended leg and headroom, improved visibility and additional space for storage.

**Wide Cab Steps & Doorways**

Spartan offers the industry's tallest and widest cab doors, providing safe entry and egress. Our cab step design—the widest steps and the lowest step heights in the industry—increases the ease of entering and exiting the cab.

**Driver Controls**

All driver controls are ergonomically engineered for safe operation & high-precision steering capabilities. SmartWheel increases safe vehicle operation by allowing the driver to operate key functions, such as windshield wipers, air horn and secondary brake functions, at the touch of a finger.

**Vehicle Data Recorder**

The Vehicle Data Recorder (VDR) is a tool for use in promoting safe driving and riding procedures to and from the scene. The VDR records the following at least once per second: vehicle speed, acceleration and deceleration (from speedometer), engine speed, engine throttle position, time, seat occupied status, seat belt status, master optical warning device switch, ABS event, and date.

**Electronic Fluid Level Indicators**

Electronic fluid checks allow for the levels of critical fluids to be monitored through the truck's instrumentation package. Levels monitored include: engine oil, power steering fluid, transmission oil, windshield washer fluid and engine coolant.

**Seat Belt Warning System**

The seat belt warning system provides audible and visual confirmation of seat belt status. Both components of the warning system will activate any time the parking brake is released. The audible warning device is designed to be heard at all seating positions intended to be occupied while the vehicle is in motion.

**V-Mux Touchscreen Vista Display**

Spartan's V-Mux Touchscreen Vista Display is a user-friendly alternative to a traditional instrument panel. With all of the electrical commands condensed into a high-definition, touchscreen display that allows the monitoring and control of vehicle systems. The easily maintained system can undergo troubleshooting in the field and self-assists the technician with vehicle maintenance.

(\* Available Options)

Technical specifications and descriptions are subject to change without notice. Content is limited and does not cover all available features. For additional information please contact a Spartan Regional Sales Manager.



**SPARTAN CHASSIS, INC.**  
A SPARTAN MOTORS COMPANY  
Everything's Riding On It.™

The included images of the Spartan Chassis Metro Star do not represent all available options. For additional information, please contact a Spartan Regional Sales Manager.







# METRO STAR<sup>®</sup> METRO STAR

[spartanchassis.com/metrostar](http://spartanchassis.com/metrostar)



Everything's Riding On It.<sup>®</sup>





*There are a lot of fire apparatus manufacturers in this industry and, to be honest, most of them build a pretty good truck. We don't worry about other companies, though, because leaders don't look back. They are focused on the task at hand. Everyday, they push themselves to be the best. And for it, they are respected. Just like you, there is a sense of honor in what we do. We work to make the perfect fire apparatus because we believe the bravest of the brave deserve the best of the best. **We are Smeal. We build respect.***



Fire Pumps, Aerials, and  
Line-Voltage generators are  
tested by UL in accordance  
with NFPA 1901

## SMEAL FIRE APPARATUS CO.

P.O. BOX 8  
610 WEST 4TH STREET  
SNYDER, NEBRASKA 68664

PH: 402-568-2224  
FX: 402-568-2346  
SALES@SMEAL.COM

SMEAL.COM 

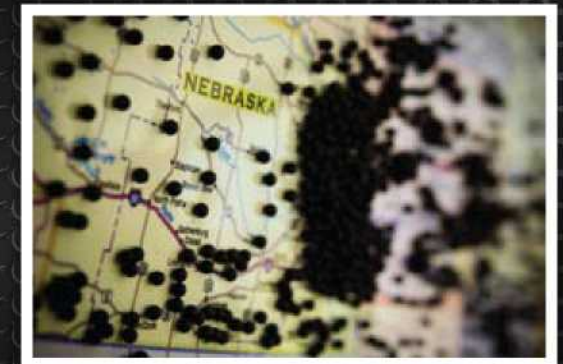
# CUSTOM SERIES

The Smeal Custom Series is exactly that—custom. Our knowledgeable, experienced sales force and engineering staff will work diligently with your department to achieve an engine designed to your exact specifications. Our goal is to earn the respect and loyalty of all our customers and to provide today's firefighters with the best custom apparatus available.



## HOW TO FIND A DEALER

TO BEST SERVE YOU, SMEAL HAS A NUMBER OF DEALER LOCATIONS ACROSS NORTH AMERICA. OUR DEALER NETWORK INCLUDES SOME OF THE MOST KNOWLEDGEABLE, EXPERIENCED DEALERS IN THE INDUSTRY. TO FIND THE ONE NEAREST YOU, VISIT [SMEAL.COM](http://SMEAL.COM) AND CLICK ON THE "DEALERS" BUTTON.



# SPECIALTY PUMPER

→ **Pumper Tanker:** Smeal pumper tankers offer top mount and side mount controls; tank sizes up to 3,500 gallons; dump valves positioned ahead of or behind the rear axles and at the rear that can be electric, manual, or air-operated in round or square configurations; and available pond rack storage on either side of the apparatus through high side compartments or on hydraulic or electrically-operated storage racks. We also offer many chassis options, both custom and commercial.



→ **Stainless Steel Pumper:** Our stainless steel pumpers are designed with a laser cut bolt together construction. This design allows for ease of repair in the unfortunate event of a crash instead of expensive repairs compared with welded stainless construction.



↗ **Rear Mount Pumper:** Our rear mount pumpers provide added compartment space and transverse storage at the front of the apparatus. Additionally, we offer a custom-designed rear mount pump for your applications.



↑ **CAFS Pumper:** With the increased use of Compressed Air Foam, Smeal can offer you Hale and Waterous CAFS options on both top and side mount custom designed apparatus.

→ **EHL Pumper:** This pumper offers you the same great feature available on an aerial ladder to simplify the loading of large diameter hose with the Ergonomic Hose Load (EHL) system. And you can still get up to 900 gallons of water and excellent compartment configuration.



↑ **Enclosed Top Mount Pumper:** For cold weather applications, the enclosed top mount is the ideal solution.

# FREEDOM SERIES

Our research and development team—consisting of engineering, production and sales personnel—designed the Freedom Series to be production efficient while maximizing the capabilities of the apparatus and maintaining a competitive price. The Freedom is available in two distinct models—the 1,000-gallon rescue/pumper application and the 1,250/1,500 tanker/pumper versions, which have dump valve options.



Freedom 1000



Freedom 1000



Freedom 1250



Freedom 1250

## QUALITY ASSURED

IN THIS INDUSTRY, YOU'LL NEVER HEAR OF ANYTHING BEING "TOO SAFE" OR "TOO EFFECTIVE." SO, WHEN WE BUILD OUR APPARATUS, QUALITY IS ALWAYS OUR TOP PRIORITY. IT STARTS WITH THE BEST MATERIALS—LIKE OUR STEEL SUBSTRUCTURES—TO BUILD THE STURDIEST APPARATUS AVAILABLE.

WE ALSO INDIVIDUALLY PAINT EACH PIECE OF OUR APPARATUS PRIOR TO FINAL ASSEMBLY TO ENSURE TOTAL COVERAGE. THIS GIVES OUR ENGINES THEIR EXCEPTIONAL LOOK AND IS CRITICAL IN EFFECTIVELY PROTECTING AGAINST CORROSION.

OUR PUMPERS ARE DESIGNED FOR CUSTOMIZATION. PROVIDING THE HIGHEST QUALITY OPTIONS, SMEAL LETS YOU CHOOSE YOUR CHASSIS, TANKS AND PUMPS, AMONG OTHER OPTIONS. WE WANT YOU TO HAVE THE APPARATUS THAT'S RIGHT FOR YOU AND YOUR NEEDS.

BEFORE WE SEND ANY APPARATUS OUT THE DOOR, IT FIRST GOES THROUGH A NUMBER OF RIGOROUS TESTS TO ENSURE PERFORMANCE IS UP TO SMEAL QUALITY STANDARDS. ALL OF OUR EFFORTS TO ENSURE QUALITY MEAN YOU'LL GET THE SAFEST APPARATUS ON THE MARKET.

# VOLUNTEER SERIES

The Volunteer Series is designed for the "budget conscious" department that requires a solid apparatus at a competitive price. Starting with an economical base unit, the Volunteer Series has enough features and available options to create an engine that would be a welcome addition to any firehouse.



→ **V-Mux Multiplexed Bodies:** This electrical system maximizes flexibility and adaptability to meet even the most challenging needs.

→ **Stainless Steel Plumbing:** Our plumbing manifold features stainless steel construction to provide strength and corrosion resistance.



→ **GS-36 Substructure:** The substructure is a spring-damper system that allows the body to move independently of the frame, preventing undue stress on the body.



→ **Line-X Compartment Coating:** We coat the interior of storage compartments with Line-X for maximum durability and additional corrosion resistance.



↩ **Undercoating:** A full undercoating gives our apparatus the protection and corrosion resistance needed for even the toughest conditions.



↗ **Sweep Out Compartments:** We design our storage compartments for easy cleaning and removal of water, dust and other debris.

# PUMPER FEATURES



Smeal pumbers are all about choices. With our budget conscious Volunteer Series, mid-line Freedom Series and top-of-the-line Custom Series, Smeal offers a wide array of options for your pumper. Choose custom or commercial chassis; 500- to 3,500-gallon tanks; pumps from Waterous, Hale and Darley; CAFS and a number of other features and options to truly customize your apparatus. And only at Smeal can you get our Ergonomic Hose Load and Hydraulic Hose Bed Cover, designed for additional firefighter safety. At Smeal, we truly design for you.

→ **Body Options:** Our bodies are available in 1/8" aluminum, 3/16" aluminum, stainless steel and galvalneal steel.



→ **J-Channel Construction:** This unique construction technique reinforces the body and also serves as an integral drip rail.



↘ **Loaded Front Bumper:** Smeal offers a "loaded" front bumper to maximize storage on our pumbers.



➔ **QL-12 Electrical System:** This "plug n' play" system reduces the amount of non-plug connectors and makes it easy to add components and make repairs to the electrical system.

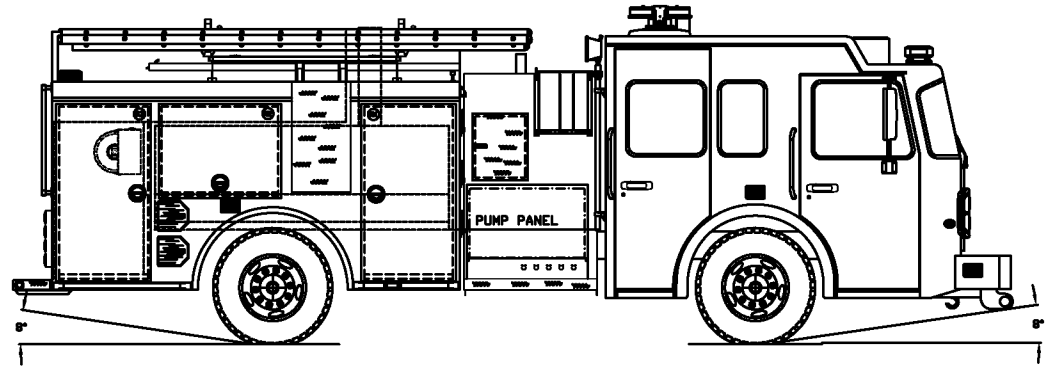
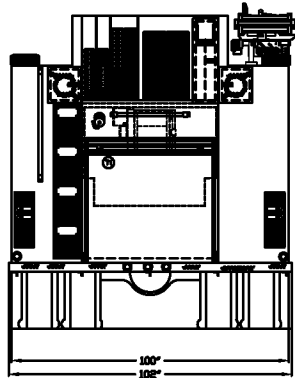
# PUMPERS



WE BUILD RESPECT.

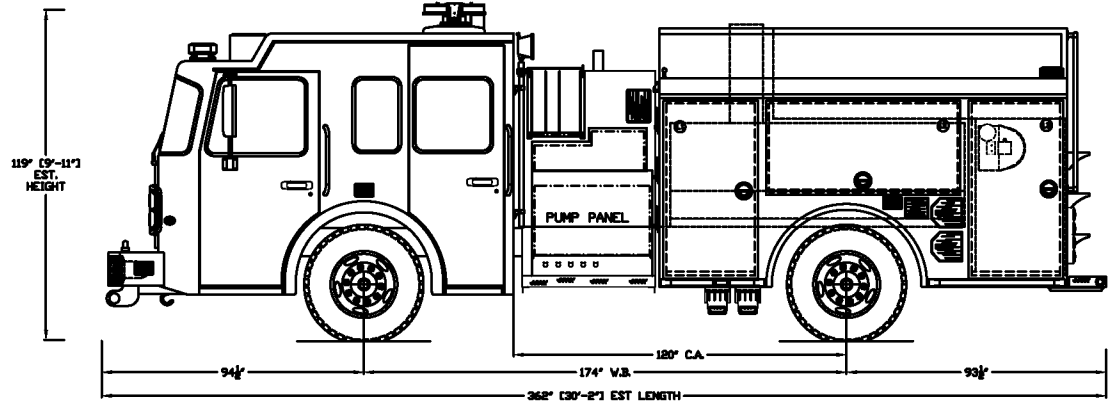
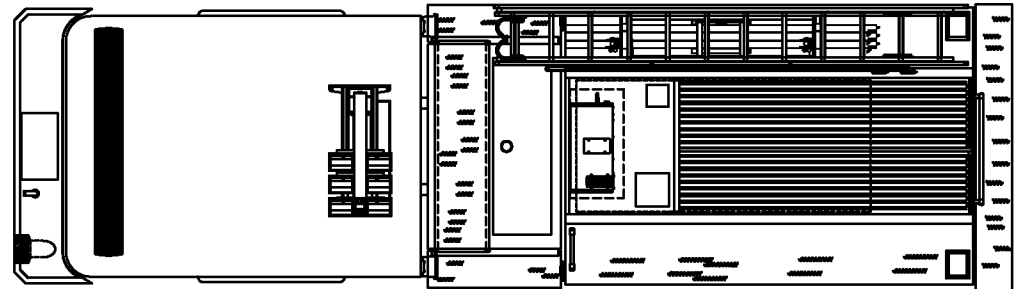






GROUND LADDERS & PIKE POLES			
ITEM	LADDER LENGTH	MODEL	QTY
A	24' 2 SEC	900A	1
B	14' ROOF	775A	1
C	10' ATTIC	585A	1
D	PIKE POLES		2
E			
F			
G			
H			
I			

COMPT.	OPENING	LOWER DEPTH	UPPER
L1	32V X 60.5H	23.5	23.5
L2	68W X 31H	23.5	N/A
L3	32V X 60.5H	23.5	TRAN
R1	32V X 60.5H	23.5	23.5
R2	42W X 31H	23.5H	N/A
R3	32V X 60.5H	23.5	TRANS
T1	46W X 38H	30	30
INTERMEDIATE DIVIDE HEIGHT			



**NOTE:**  
UNSPECIFIED DECKGUNS WILL NOT BE INCLUDED IN THE OVERALL HEIGHT OF THE VEHICLE. THE ADDITION OF A DECKGUN MAY INCREASE THE OVERALL HEIGHT OF THE VEHICLE.

**NOTE:**  
DIMENSIONS SHOWN ARE APPROXIMATE AND ARE SUBJECT TO CHANGE AS MAY BE FOUND NECESSARY DURING CONSTRUCTION. MINOR DETAILS MAY NOT BE SHOWN.

PUMP: WATEROUS 1250 GPM  
TANK: POLY 500 GAL  
FOAM: 30 GAL CE.  
BODY: ALUMINUM  
HOSE BED: 80 CUBIC FEET  
COMPARTMENTS: 240 CUBIC FEET  
CHASSIS: SPARTAN MFD METRO STAR

**PRELIMINARY  
DRAFT**

Date	Approval Signatures	Revisions
	DEALER	
	FIRE CHIEF	
	SALES J.C.	
	PRODUCTION	
	ENGINEERING	



Revisions	Revisions
	SMEAL FIRE APPARATUS SNYDER, NE 68664
	CITY OF GRAND JUNCTION GRAND JUNCTION, CO.
Drawn by JAW	Scale 3/8"=1'
Date 5/27/11	Revised No
18 x 24	BID 6463

THE DRAWING IS FOR REFERENCE PURPOSES ONLY. SOME ITEMS MAY OR MAY NOT APPEAR ON THE DRAWING THAT MAY OR MAY NOT BE INCLUDED IN THE SPECIFICATIONS. SPECIFICATIONS SHALL BE THE FINAL AUTHORITY TO BE DETERMINED WHAT IS SUPPLIED ON THE APPARATUS.

**ADDENDUM NO. 1**

**DATE:** May 5, 2011

**FROM:** City of Grand Junction  
Purchasing Division  
Susan J. Hyatt, C.P.M., CPPB

**TO:** All Offerors and Interested Parties

**RE:** Fire Engine Pumper Truck RFP-3312-11-SH

Firms responding to or interested in the above referenced Request for Proposal are hereby instructed that the proposal requirements have been clarified, modified, superseded and supplemented as to this date per the following questions and responses:

Question 1. “Section 10, Item 29, Page 25 calls for a Cummins engine but one sentence calls for a ISM which is the prior 2010 compliant big block engine and the lists a ISL9 engine. I assume you want the ISL9 engine but need clarification.”

Answer: The engine shall be ISL9.

Question 2. “Section 10, Item 113, Page 40 calls for a Whelen siren speaker and then Item 191, Page 57 calls for Code 3 siren control which to meet NFPA standards they need to be the same brand or you will need to take exception to NFPA 1901.”

Answer: Both the speaker and the control shall be Whelen.

Question 3. “Section 10, Item 183, Page 55 calls for a 72” lightbar and then Item 365 page 101 & 102 calls for a 82” lightbar. Need to know which length is required.”

Answer: The lightbar shall be 82” in length.

Question 4. “Section 10, Item 261, Page 75 need to know which outlets you want the foam system plumbed to.”

Answer: The foam shall be plumbed to all discharges.

Question 5. “Section 10, Item 324, Page 92 calls for (3) three roll out drawers and I need to know how tall of drawers are wanted. Each drawer can be a different height if desired.”

Answer: The drawers shall be three inches (3”), three inches (3”) and six inches (6”).

Question 6. **“Section 10, Item 361, Page 101 need to know what size of portable work lights are wanted.”**

Answer: **The portable work lights are 500 watt.**

Question 7. **“Section 10, Item 362, Page 101 calls for 20’ of cord on a electric reel which isn’t very much. Is it supposed to be 200’? What size of cord is required?”**

Answer: **The length of the cord is 200’. The size is 12 AGW minimum.**

Question 8. **“Item 261, page 75, calls for a Foam Pro 2001 foam proportioner capable of handling either Class A or Class B foam, however, in item 264 one (1) 30 gallon foam cell is required, not stating Class A or Class B and no mention of a selector valve. Also in any of the items referring to the foam system do I find mention of the desired discharges for foam solution discharge.”**

Answer: **Only one type of foam will be carried at a time. The foam cell shall be capable of both Class A or Class B foam. No selector valve is required. Discharges are addressed above in Question 4.**

Question 9. **“Items 295 – 296, Pages 84 and 85 Compartments. There is no approximate dimensions and it could help for the department to give some approximate dimensions if they have some special items to be placed in a specific compartment.”**

Answer: **The intent of this spec is to not limit or get too specific with sizes. We are confident that typical compartment sizes will suit our needs.**

Question 10. **“Attachment A. No manufacturers can furnish this product other than Front Range Fire Apparatus representing Pierce Manufacturing.”**

Answer: **Attachment A is to be quoted only as an option. Leave this section blank on the Response Form or mark it as “N/A” if you cannot provide the option.**

Question 11. **“Page 4 – Section 2.4 - Conflict of Interest – Will the City provide certification that no employees work part time for any fire equipment dealer in the state of Colorado?”**

Answer: **The City will work with the awarded contractor in ensure no public official or City employee shall have any interest in the resulting contract.**

Question 12. **“Page 5 – Section 2.10 – Employment Discrimination – As a Federal GSA schedule holder, do we need to provide proof or is this presumed?”**

Answer: **By signing the Response Form you are agreeing to this term and compliance is presumed unless written exception is provided.**

- Question 13. **“Page 5 – 2.11 – Immigration Reform and Control Act – What type of certification is required?”**
- Answer: **By signing the Response Form you are agreeing to this term and compliance is presumed unless written exception is provided.**
- Question 14. **“Page 6 – 2.20 – Performance Contract – Is the City requiring a Performance Bond?”**
- Answer: **No.**
- Question 15. **“Page 8 – 3.11 – Open Records – As this is an RFP, once the City awards, when will all bid pricing, evaluation notes, rating scale, and verbal discussions (transcribed) of the award committee be released?”**
- Answer: **The proposal price tabulation shall be provided upon award, but any other documents shall be obtained by an open records request to the City’s Records Manager.**
- Question 16. **“Page 8 – 3.16 – MSO shall be provided per the requirements of section 3.17 correct?”**
- Answer: **Yes.**
- Question 17. **“Page 8 – 3.18 – Operating/Maintenance Instruction – Operational Safety Video is one manufacturer’s proprietary specification. The manufacturer that provides this only provides a general video and is not specific to the as built apparatus in the contract.”**
- Answer: **Please note this as an exception in the “Comments” section when you submit your response.**
- Question 18. **“Page 10 – Section 4.4 – Product Brochures – Bidder Maintenance Policies and Associated costs – Is the city requesting this for City Fleet evaluation, or is the city requiring or being required to enter a service contract with certain bidders.”**
- Answer: **The information is required for evaluation purposes only.**
- Question 19. **“Page 11 – Section 6.1 – All evaluations, including meeting and discussion transcripts be provided to all manufacturers after award?”**
- Answer: **The proposal price tabulation shall be provided upon award, but any other documents shall be obtained by an open records request to the City’s Records Manager.**
- Question 20. **“Page 11 – 7.2 – Equivalent Product – If the City requires a demonstration of a similar unit, will the City provide reasonable time to coordinate this?”**
- Answer: **Yes, the time will be mutually agreed upon by the City and the vendor.**

- Question 21. **“Page 12 – 7.6 – Are CD manuals required or preferred.”**
- Answer: **Whenever possible our preference is to have one set in CD format. However, it is not required.**
- Question 22. **“Page 13 – Section 7.11 Item 1q – Aerial Device has not been requested.”**
- Answer: **Please disregard this item.**
- Question 23. **“Page 14 – 7.14 – NFPA Required Manuals – Will Printed Manuals be accepted”**
- Answer: **Yes, however CD is preferred.**
- Question 24. **“Page 15 – Insurance Requirements – Many items in this entire section is indicative to one manufacturer only, and is used to remove all other manufacturers from the bidding process.”**
- Answer: **This section is a standard clause the City uses for all solicitation documents. The dollar amount required is based on the projected cost of the individual project being solicited.**
- Question 25. **“Page 16 – Item 1 – ISO Compliance – This requirement is exclusively used by two manufacturers and one filed bankruptcy in recent years. This certification is used to prevent other manufacturers from bidding.”**
- Answer: **The intent is not to exclude one manufacturer over another. The intent of this requirement is to ensure manufacturers are using best practices. Please mark in the “Comments” section why you cannot comply with this item.**
- Question 26. **“Page 17 – Item 5 – Total Vehicle Assessment Certification – This is proprietary to one manufacturer. Again this is specifically written to prevent any other manufacturers from bidding.”**
- Answer: **Again, the intent is not to exclude one manufacturer over another. Please mark in the “Comments” section why you cannot comply with this item.**
- Question 27. **“Page 17 – Item 8 – Inspection Trips – Online interaction – Verbiage requires online interaction for Aerial apparatus; however an aerial has not been requested. Please clarify.”**
- Answer: **The verbiage has been changed to:  
“The bidder shall provide on-line access to assess the production of the apparatus and mutually agreed upon on-site inspection trips.”**
- Question 28. **“Page 19 – Item 5 and 6 – Warranty – Warranties are contradictory, does the purchaser want a full 1 year bumper to bumper warranty, or a 90 day component warranty. Please review all warranty requirements and clarify.”**

Answer: **At a minimum, the new vehicle shall have a standard one year bumper to bumper warranty. OEM repair parts purchased after the expiration of the standard warranty shall have a 90 day limited warranty.**

Question 29. **“Page 25 – Item 29 – Cummins Engine – The Cummins ISM is no longer available. The requirements requested appear to be a Cummins ISL9. Please clarify.”**

Answer: **Please see Question 1 above.**

Question 30. **“Page 25 – Item 29 – The CNG system requested may not provide enough fuel to meet NFPA requirements for performance. Additionally, final evaluations have not been completed with the ISL9 engine and CNG to meet UL pump testing.”**

Answer: **Please note this information in the “Comments” section of your response.**

Question 31. **“Page 37 – Item 88 – Rear Brakes – Does the city require Disc Brakes or Drum brakes, spec contradicts.”**

Answer: **Rear brakes shall be either Disc or Drum style. A cast iron shoe backing is required if offering a Drum type brake.**

Question 32. **“Page 55 – Item 183 – Lightbar – Specification state 72” and on page 101 Item 365, specifications state 82”. Please clarify lightbar design.”**

Answer: **Please see Question 3 above.**

Question 33. **“Page 67 – Item 236 – Pump Paint – Please clarify city wants both the pump and the exterior of the pump house painted.”**

Answer: **Yes.**

Question 34. **“Page 69 – Item 244 – Crosslay – Dura-Dek in crosslay floor bed. Are aluminum removable slats acceptable?”**

Answer: **Yes. Removable aluminum slats are acceptable. Please note the information in the “Comments” section.**

Question 35. **“Page 81 – Item 291 – The aluminum body construction calls out specific building design proprietary to one manufacturer.”**

Answer: **Please note that information in your response. Explain in the “Comments” section how your building design is fabricated.**

Question 36. **“Page 82 – Item 292 – Body Subframe – The specifications provided by the City are proprietary to one manufacturer. Again this is designed to prevent all other manufacturers for meeting the specifications. Additionally, hot dip galvanized is**

**not considered environmentally friendly and is not recommended in applications that require foam.”**

Answer: Please note this information in your response and provide in the “Comments” section how your subframe is constructed and how you will protect against corrosion.

Question 37. **“Page 83 – Item 293 – Spring mounting a body is common, however the design requirements provided by the City is proprietary to one manufacturer. This verbiage prevents other manufacturers from using their engineered and proven designs.”**

Answer: Please note in the “Comments” section how your design is engineered and the reason why it is recommended.

Question 38. **“Page 88 – Item 314 cont’d on page 89 – Tread Brite Overlays – The design and installation requirements are specifically geared to one manufacturer’s proprietary design.”**

Answer: Please note in the “Comments” section what you will use in place of Tread Brite and how it will be installed.

Question 39. **“Page 92 – Item 327 – Hose Bed Flooring – Poly hose bed flooring is proprietary to one manufacturer. More common is the use of aluminum extrusion removable hosebed flooring. Will aluminum be acceptable? ”**

Answer: Yes, aluminum will be acceptable. Please mark in the “Comments” section your flooring details.

Question 40. **“Page 93 – 328 – Hosebed dividers – Again the requirement of Hot Dip Galvanized pieces is proprietary to one manufacturer. The use of galvanized steel and aluminum is not recommended due to dissimilar metals along with the reasons provided above.”**

Answer: Please note that information in your response and explain how you will protect against corrosion in the “Comments” section.

Question 41. **“Page 94 – Item 331 – Electrical Outputs – The entire electrical section of the body is designed around one manufacturers design and specs. We respectfully request a change electrical verbiage that meets NFPA, DOT and FMVSS, as all manufacturers must meet these requirements equally.”**

Answer: The intent of the description is not to give any one manufacturer a competitive advantage over another. We realize that various manufacturers utilize different systems. Therefore, all electrical requirements must meet NFPA, DOT and FMVSS standards regardless of the design.

Question 42. **“Page 97 – Item 344 – Ground Lighting – you require LED lighting for all chassis ground lights, however the body portion only requires halogen. Please clarify?”**

Answer: **LED lighting is not required for body portion ground lights, but is acceptable.**

Question 43. **“Page 101 – Item 361 – Please clarify type of lights required.”**

Answer: **Please see Question 6 above.**

Question 44. **“Page 107 – Item 390 – Pre-Paint Inspection – Does customer want chassis pre-paint and body pre-paint? As both pieces are painted at separate times, please clarify.”**

Answer: **Only one pre-paint inspection is needed. This is sometimes referred to as mid-construction inspection.**

Question 45. **“Page 110 – Submittal Check List – Includes items that were discussed above (ISO 9001, etc).”**

Answer: **Check the “No” box if items are not included.**

Question 46. **“Page 111 – Attachment A – The Compressed Air Foam System is a Pierce Manufacturing proprietary design and as such is not available to any other manufacturer.”**

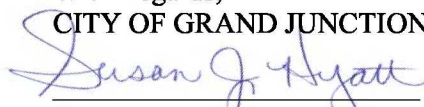
Answer: **Please see Question 10 above.**

Question 47. **“The specification is not clear if the bidder should supply the two suction hoses or will they supplied by the fire department? Also, the spec (Item 298) calls out 5” suction hoses; this size pump requires 6” suction hoses.”**

Answer: **The intent is for the vendor to supply the suction hoses. The size should be 6”, not 5” as written in the specs.**

All other conditions of subject RFP remain the same. If you have any questions, please call the undersigned at (970) 244-1513.

With Regards,  
CITY OF GRAND JUNCTION, COLORADO



Susan J. Hyatt, C.P.M., CPPB  
Senior Buyer



**ADDENDUM NO. 2**

**DATE: June 7, 2011**

**FROM: City of Grand Junction  
Purchasing Division  
Susan J. Hyatt, C.P.M., CPPB**

**TO: All Offerors and Interested Parties**

**RE: Fire Engine Pumper Truck RFP-3312-11-SH**

Firms responding to or interested in the above referenced Request for Proposal are hereby instructed that the proposal requirements have been clarified, modified, superseded and supplemented as to this date per the following questions and responses:

Question 1. **On page 110 of the specification you request a value for a trade-in of Unit 1124. In order to properly assess its value, would it be possible to get some digital photos of the truck so that we can send them to our used apparatus broker?**

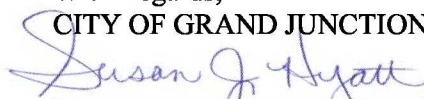
Answer: **See Attached Photos.**

Question 2. **Other information such as actual miles, has it passed the most recent pump test and any equipment that would come with the truck would help.**

Answer: **We will be keeping the removable equipment. The Fire Com goes with the truck and it did pass the pump test. Truck mileage in the photo is original, hour meter has been replaced. Actual hours is 6670.**

All other conditions of subject RFP remain the same. If you have any questions, please call the undersigned at (970) 244-1513.

With Regards,  
CITY OF GRAND JUNCTION, COLORADO



Susan J. Hyatt, C.P.M., CPPB  
Senior Buyer









## **Request for Proposal**

**RFP-3312-11-SH**

# **FIRE ENGINE PUMPER TRUCK**

Responses due prior to:  
**2:30 p.m. June 14, 2011:**

**PURCHASING REPRESENTATIVE:**

Susan Hyatt, C.P.M., CPPB

Phone: 970/244-1513

Fax: 970/256-4022

Email: [susanh@gjcity.org](mailto:susanh@gjcity.org)

This solicitation has been developed specifically for requesting proposals for one Pumper Truck. All vendors are urged to thoroughly review this RFP prior to submitting a response. Submittal by FAX OR EMAIL IS NOT ACCEPTABLE for this solicitation.

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## SECTION 1: INTRODUCTION

**1.1 Background:** The City of Grand Junction Purchasing Division on behalf of the Grand Junction Fire Department seeks proposals for one (1) Fire Engine Pumper Truck. It is the intent of these specifications to cover the construction, furnishings and delivery to the Grand Junction Fleet Division a complete apparatus equipped as hereinafter specified. The objective of this RFP is to obtain the best results and most acceptable apparatus for service in our community. These specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment, and appliances with which the successful offeror must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor who shall be solely responsible for the design and construction of all features. Unless otherwise stated in this bid specification, the apparatus supplied shall be a new, current year model. However, proposed "demonstrator" apparatus will be considered.

The City Fire Department provides education, enforcement and emergency services to the over 84,000 residents living within the City of Grand Junction and the Grand Junction Rural Fire Protection District (GJRFPD). Altogether, a total of 77 square miles is served by 120 full-time employees working from five locations. The department also provides ambulance services to the Glade Park Fire District (452 square miles) and Hazardous Materials response for Mesa County and Bureau of Land Management (BLM) lands on the Western Slope of Colorado

The City of Grand Junction is located in Mesa County, Colorado on the western slope of the Rockies, midway between Denver, Colorado and Salt Lake City, Utah. Grand Junction is a full service City operating under a Council-City Manager structure. It is the County Seat and is the largest city on the western slope of Colorado with a population of approximately 55,000 people.

**1.2 Quality and Workmanship:** The design of the apparatus shall embody the latest approved automotive engineering practices. The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points: accessibility of the various units, which require periodic maintenance operations, ease of operation, and symmetrical proportions.

Construction must be rugged and ample safety factors must be provided to carry loads as specified and to meet both on and off road requirements and speed conditions as set forth under traditional Fire Department conditions.

## **SECTION 2: GENERAL CONTRACT TERMS AND CONDITIONS**

**2.1 Amendment/Oral Statements:** No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract will be made in writing by the City Purchasing Agent.

**2.2 Assignment:** The offeror shall not sell, assign, transfer or convey any contract resulting from this RFP, in whole or in part, without the prior written approval from the City.

**2.3 Compliance with Laws:** Proposals must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements.

**2.4 Conflict of Interest:** No public official and/or City employee shall have interest in any contract resulting from this RFP.

**2.5 Contract Documents:** This Request for Proposal, Offeror's Proposal, and any Addenda to the Contract Documents, as finally negotiated compose the Contract Documents, all of which are incorporated herein by this reference as if fully set forth.

**2.6 Modification or Withdrawal of Proposals:** A proposal that is in the possession of the Purchasing Division may be altered by facsimile, email or letter bearing the signature of name of the legal agent for the offeror, provided it is received prior to the time and date of the opening. Alterations should not reveal the price but should indicate the addition, subtraction or other change in the Proposal. A proposal that is in the possession of the Purchasing Division may be withdrawn by the vendor up to the time of the opening. Proposals may not be withdrawn after the opening. Failure of the successful offeror to furnish the equipment awarded from this proposal may eliminate the offeror from the active vendors list.

**2.7 Contract Negotiations:** The City may negotiate a contract with the selected offeror(s). Any and all verbal communications and/or commitments made during the negotiation process that are deemed agreeable to both the City and selected offeror shall be submitted in written form and made part of any resulting contract.

**2.8 Cooperative Purchasing:** Purchases as a result of this solicitation are primarily for the City of Grand Junction. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Proposal. The quantities furnished in this proposal document are for only the City of Grand Junction. It does not include quantities for any other jurisdiction. The City of Grand Junction will be responsible only for the award for our jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The City of Grand Junction accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.



**2.9 Default:** The City reserves the right to terminate the contract immediately in the event the Offeror fails to meet delivery or completion schedules, or otherwise perform in accordance with the accepted proposal. Breach of contract or default authorizes the City to purchase like services elsewhere and charge the full increase in cost to the defaulting Offeror.

**2.10 Employment Discrimination:** During the performance of the contract, the Consultant agrees to the following:

The Offeror shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a bonafide occupational qualification reasonably necessary for the normal operations of the Offeror. The Offeror agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

The Offeror, in all solicitations or advertisements for employees placed by or on behalf of the Offeror, shall state that such Offeror is an Equal Opportunity Employer.

Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

**2.11 Immigration Reform and Control Act of 1986:** The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986.

**2.12 Additional Information:** For information concerning the bid process, please contact the City's Purchasing Department at (970) 244-1533 or check the City of Grand Junction web page at [www.gjcity.org](http://www.gjcity.org).

Solicitation documents are available by accessing [www.RockyMountainBidSystem.com](http://www.RockyMountainBidSystem.com) and selecting Rocky Mountain E-Procurement System; by accessing the City of Grand Junction website, [www.gjcity.org](http://www.gjcity.org) and selecting on "City Invitations to Bid and Bid Schedules"; by contacting the Purchasing Division, 250 North 5<sup>th</sup> Street, Grand Junction CO 81501; or by calling telephone (970) 244-1533. The City reserves the right to accept or reject any or all offers received in response to this solicitation and to waive any irregularities as may be in the best interest of the City.

**2.13 Ethics:** The Offeror shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official or agent of the City.

**2.14 Non-collusion:** Neither the said Offeror nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other offeror, firm or person to submit a collusive or sham proposal in connection with the contract for which the attached proposal has been submitted. The price or prices quoted in offeror's response are fair and proper and are not tainted by a collusion, conspiracy, connivance, or unlawful agreement on the part of the vendor or any of its agents, representatives, owners, employees, or parties in interest.

**2.15 Failure to Enforce:** Failure by the City at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the City to enforce any provision at any time in accordance with its terms.

**2.16 Force Majeure:** The Offeror shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Offeror, unless otherwise specified in the contract.

**2.17 Indemnification:** The Offeror shall defend, indemnify and save harmless the City of Grand Junction, State of Colorado, and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Offeror, or of any Offeror's agent, employee, Sub-consultant or supplier in the execution of, or performance under, any contract which may result from proposal award. Offeror shall pay any judgment with cost which may be obtained against the City growing out of such injury or damages.

**2.18 Benefit Claims:** The City shall not provide to the Offeror any insurance coverage or other benefits, including Workers' Compensation, normally provided by the City for its employees.

**2.19 Nonconforming Terms and Conditions:** A proposal that includes terms and conditions that do not conform to the terms and conditions of this Request for Proposal is subject to rejection as non-responsive. The City reserves the right to permit the Offeror to withdraw nonconforming terms and conditions from its proposal prior to a determination by the City of non-responsiveness based on the submission of nonconforming terms and conditions.

**2.20 Performance of the Contract:** The City reserves the right to enforce the performance of the contract in any manner prescribed by law or deemed to be in the best interest of the City in the event of breach or default of resulting contract award. A Purchase Order issued by the City's Purchasing Division shall suffice as the contract.

**2.21 Remedies:** The Offeror and City agree that both parties have all right, duties, and remedies available as stated in the Uniform Commercial Code.

**2.22 Safety Warranty:** Offeror also warrants that the services performed shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970.

## **SECTION 3: INSTRUCTIONS AND CONDITIONS FOR SUBMITTAL**

**3.1 Compliance:** All participating offerors shall agree to comply with all conditions, requirements, and instructions of this Request for Proposal (RFP) as stated or implied herein. Should the City of Grand Junction, State of Colorado, hereinafter referred to as "City," omit anything from this packet which is necessary to the clear understanding of the requirements, or should it appear that various instructions are in conflict, then the offeror shall secure instructions from Susan Hyatt, Senior Buyer, Purchasing Division, [susanh@gjcity.org](mailto:susanh@gjcity.org), (970) 244-1513, prior to last day for questions found in Section 5.

**3.2 Award:** The RFP shall be awarded to the most responsible offeror which will be determined by criteria deemed essential to the City in Section 6. The criteria are not limited to the lowest fee. The City reserves the right to reject any or all proposals, reject portions of any proposal, or accept the proposal or proposals deemed most advantageous to the City.

**3.3 Submission:** Proposals shall include a description of equipment offered, indicate if new or used, brochures and all additional documents required and/or submitted. Each proposal **(one (1) original and one (1) additional electronic copy (CD or flash drive) of all documents** shall be placed in a sealed envelope and marked clearly on the outside: "RFP-3312-11-SH:" and delivered to the City Clerk prior to 2:30 p.m., Tuesday June 14, 2011. Sealed proposals must be received at the following location before the deadline to be eligible for contract award.

**City of Grand Junction  
City Clerk  
250 North 5<sup>th</sup> Street, Room 111  
Grand Junction, CO 81501**

All offers must be made upon the Response Form attached hereto and should give the amounts both in words and in figures, and must be signed and acknowledged by the supplier. Each proposal, **one (1) original and one (1) additional electronic copy** of all documents, shall be enclosed in a sealed envelope marked as indicated above. **THE ELECTRONIC COPY (CD OR FLASH DRIVE) SHALL BE AN EXACT REPRODUCITON OF THE ORIGINAL DOCUMENT(S) PROVIDED. ALL SECTIONS SHALL BE COMBINED INTO A SINGLE ELECTRONIC FILE.** Faxed or emailed bids are not acceptable.

**3.4 Late Proposals:** Late proposals will not be accepted or considered. It is the responsibility of the Offeror to insure the Proposal(s) arrives in the City Clerk office prior to the submission deadline.

**3.5 Altering Proposals:** Any alterations made prior to the opening date and time must be initialed by the signer of the proposal, guaranteeing authenticity. Proposals cannot be altered or amended after submission deadline.

**3.6 Withdrawal of Proposal:** A proposal may not be withdrawn or canceled by the offeror prior to the sixty-first (61st) day following the submittal deadline date and only prior to award. The Offeror so agrees upon submittal of their proposal. After award this statement is not applicable.

**3.7 Exclusion:** No oral, E-mail, telephonic or facsimile proposals will be considered.

- 3.8 Sales Tax:** The City is by statute exempt from the State Sales Tax and Federal Excise Tax; therefore, the final negotiated fees shall not include taxes.
- 3.9 Addenda:** Any interpretations, corrections and changes to this RFP or extensions to the opening/receipt date will be made by a written Addenda to the RFP by the City Purchasing Agent. Sole authority to authorize addenda shall be vested in the City Purchasing Agent as entrusted by the City of Grand Junction City Council. Addenda will be posted to the Bidnet web site at [www.RockyMountainBidSystem.com](http://www.RockyMountainBidSystem.com) and on the City website [www.gjcity.org](http://www.gjcity.org). Offerors shall acknowledge receipt of all addenda in their proposal.
- 3.10 Incurring Costs:** The City shall not be obligated or be liable for any cost incurred by the offeror prior to the issuance of a contract. All costs to prepare and submit a response to this solicitation shall be borne by the proposer.
- 3.11 Open Records:** All proposals shall be open for public inspection after the contract is awarded. Trade secrets and confidential information contained in the proposal so identified by offer as such will be treated as confidential by the City to the extent allowable in the Open Records Act.
- 3.12 Confidential Material:** All materials submitted in response to this RFP will become public record and will be subject to inspection after contract award. “Proprietary or Confidential Information” is defined as any information that is not generally known to competitors and which provides a competitive advantage. Unrestricted disclosure of proprietary information places it in the public domain. Only submittal information clearly identified with the words “Confidential Disclosure” and placed in a separate envelope shall establish a confidential, proprietary relationship. Any material to be treated as confidential or proprietary in nature must include a justification for the request. The request will be reviewed and either approved or denied by the City Purchasing Agent. If denied, the offeror will have the opportunity to withdraw its entire proposal, or to remove the confidential or proprietary restrictions. Neither cost nor pricing information nor the total proposal will be considered confidential or proprietary.
- 3.13 Response Material Ownership:** All proposals become the property of the City of Grand Junction upon receipt and will only be returned to the offeror at the City’s option. Selection or rejection of the proposal will not affect this right. The City shall have the right to use all ideas or adaptations of the ideas contained in any proposal received in response to this RFP, subject to limitations outlined in the section entitled Confidential Material. Disqualification of a proposal does not eliminate this right.
- 3.14 Public Funds/Non-appropriation:** Funds for payment have been provided through the City of Grand Junction budget approved by the City Council for this fiscal year only. State of Colorado statutes prohibit the obligation and expenditure of public funds beyond the fiscal year for which a budget has been approved. Therefore, anticipated orders or other obligations that may arise past the end of the current City of Grand Junction fiscal year shall be subject to budget approval.
- 3.15 Information Requests:** Requests for information regarding the contents and requirements of this RFP shall be directed to Susan Hyatt, Senior Buyer at (970) 244-1513 or [susanh@gjcity.org](mailto:susanh@gjcity.org).

**3.16 Manufacturer's Statement of Origin:** The new Unit shall be delivered with the Manufacturers Statement of Origin (MSO). Failure to provide MSO shall be grounds to refuse to accept vehicle.

**3.17 Title:** The awarded supplier shall provide Title work for the new vehicle within 10 days after the receipt of payment from the City of Grand Junction. Mail or deliver the Title to: Fleet Services, 333 West Avenue, Bldg C, Grand Junction, CO 81501. If a problem arises in obtaining the Title within the 10 day window contact Tim Barker in Fleet Services at (970)-244-1532, or via E-mail [timba@gjcity.org](mailto:timba@gjcity.org).

**3.18 Operating/Maintenance Instruction:** The proposer/supplier will instruct a given number of City employees in the operation and maintenance of the proposed apparatus. In order accommodate the various Fire Department Shifts the training shall be done three consecutive days. The instructions shall be of the scope and length to orient personnel in: operating techniques, safety precautions, frequent inspection and servicing requirements, mechanical adjustments and repairs unique to the equipment or vehicle. Instructions will be required at the City site specified and provided on a schedule arranged after delivery of the equipment. The manufacturer shall provide an operational safety video for specialty equipment. Instruction schedules will be agreed to prior to invoice payment.

## SECTION 4: PROPOSAL DOCUMENTS AND FORMAT

4.1 Proposals submitted shall contain all information as requested herein, and any additional information necessary to summarize the overall benefit of the proposal to the City.

4.2 Proposals shall include Section 9, Section 10 and the Response Form found in Section 11, and must bear the signature of the person having the authority to make the proposal for the firm.

4.3 Propose equipment that will adequately fulfill the specification requirements. **The City will award to the proposer that offers a Fire Engine Pumper Truck that will perform as specified (in this document) at best value to the City.**

4.4 Product brochures shall be provided, along with warranty information.

Copies of the following documents must accompany the RFP proposals for all items being bid:

- Manufacturer's warranties and/or guarantees.
- Bidder's maintenance policies and associated costs.

As a minimum requirement of the City, the proposer shall guarantee in writing that any defective components discovered within a one (1) year period after the date of acceptance shall be replaced at no expense to the City. Replacement parts of defective components shall be shipped at no cost to the City. Shipping costs for defective parts required to be returned to the awarded supplier shall be paid by the supplier.

4.5 Submittal of a proposal shall be taken as prime facie evidence that the Offeror has full knowledge of the scope, nature, quality and quantity of the work to be performed and the detailed requirements and conditions under which the work is to be performed.

4.6 Company References: All firms shall furnish a list of three (3) current customers using a current model fire engine pumper truck similar to the proposed model. Each reference must include a contact name, title, address, telephone number, fax number, and e-mail address. Include a list of Colorado customers.

## SECTION 5: TIMETABLE

**5.1.** The following projected timetable should be used as a working guide for planning. The City reserves the right to adjust this timetable as required during the course of the RFP solicitation process.

- |  |                               |
|--|-------------------------------|
| • Request for Proposals Available          | April 27, 2011                |
| • Last Day of Questions Accepted           | June 06, 2011                 |
| • Last Day to Submit Proposals (2:30 p.m.) | June 14, 2011                 |
| • Ranking and Selection of Supplier        | June 15 through June 30, 2011 |
| • City Council Approval                    | July 18, 2011                 |

## SECTION 6. PROPOSAL EVALUATION AND SELECTION

**6.0 Intent:** Only respondents who meet the qualification criteria will be considered.

**6.1 Evaluation:** Based on the following evaluation criteria, the City of Grand Junction will award in the best interest of the City. (Not necessarily in this order).

1. Delivery time
2. Net cost
3. Responsiveness of RFP
4. Compliance with specifications
5. Ease of operation
6. Vendor performance history
7. Service/parts availability
8. Warranty

## SECTION 7: SPECIAL INSTRUCTION TO VENDORS

**7.1 Intent:** It is the intent of this specification to provide for the purchase of a fire engine pumper truck. When comparing proposals, consideration will not be confined to price only. The successful vendor will be one whose product is judged to best serve the interests of the City of Grand Junction.

**7.2 Equivalent Product:** Proposals will be accepted for consideration on any make or model that is equal to the product utilized in the Specifications. Decisions of equivalency will be at the sole interpretation of the City of Grand Junction. A blanket statement that equipment proposed will meet all requirements will not be sufficient to establish equivalence. Original manufacturer's brochures of the proposed unit are to be submitted with the proposal. Vendor must be prepared to demonstrate a unit similar to the one proposed, if requested.

**7.3 Brand Names or Equal:** Whenever in this solicitation any particular materials, process, mechanism, and/or equipment are indicated, described or specified by patent, proprietary, or brand name, or by name of manufacturer, such wording will be deemed to be

used for the purpose of facilitating minimum acceptable requirements and will be deemed to be followed by the words, “or equivalent”. Proof satisfactory to the City must be provided by offeror to show that the alternative product/equipment/vehicle is in fact, equal to specification requirements.

Quotes for similar manufactured items of like quality will be considered if the quote is fully noted with the manufacturer’s brand name and model. The City of Grand Junction reserves the right to determine products of equal value. Vendors will not be allowed to make unauthorized substitutions after award is made.

**7.4 Delivery:** Delivery Date: All Proposals must be submitted with a delivery date.

**Pre-delivery:** Prior to delivery, new equipment/vehicle must be completely serviced in accordance with standard new vehicle “Make Ready” and to the manufacturer’s specifications.

**Delivery:** All costs for delivery of the new unit will be assumed by the vendor and included in the net price. Unless stated elsewhere in this Proposal document, all deliveries will be made to City of Grand Junction, Fleet Division, 333 West Avenue, Bldg C, Grand Junction, CO 81501.

**7.5 Taxes & Final Payment:** Prices quoted shall exclude Federal Excise and State taxes. Prices quoted shall be F.O.B. City of Grand Junction, CO 81501. Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt #98-903544. Final payment for equipment and vehicles delivered under these specifications will not be made until all terms and conditions have been satisfied.

**7.6 Repair & Parts Manuals:** An Operators, Repair, Emissions, Electrical and Parts Manual will be supplied with each new unit. Manuals must be received prior to payment. Whenever available, the City prefers one manual in a CD format and one manual in a three ring binder.

**7.7 Statement of Exceptions:** The proposed apparatus as described in this specification document and all related material with the bid package shall meet or exceed all applicable sections for the category of apparatus as defined by NFPA 1901, newest edition, unless specifically noted within this specification or other official documents associated with this bid. Should any area, section or portion of the apparatus not meet the intent and applicable requirements, a clearly defined listing or explanation of what and why compliance was not achieved shall be provided to the purchaser at the time of delivery.

**7.8 Vehicle Stability:** The apparatus shall comply with the requirements of NFPA 1901, newest edition, as it applies to vehicle stability. The particular apparatus as described in the specification provided within the bid package shall be classified into one of the following categories:

- The apparatus shall go through actual tilt table testing. This shall be determined by the apparatus manufacturer.
- The apparatus shall be equipped with rollover stability control systems as defined in Section 4.13.1.2 of NFPA 101, newest edition.
- The apparatus shall be deemed a similar apparatus and meeting the intent of Section 4.13.1.1.2 of NFPA 1901, newest edition.

**7.9 Roadability:** The apparatus, when fully equipped and loaded, shall be capable of the following performance while on dry paved roads that are in good condition:



- From a standing start, the apparatus shall be able to attain a speed of 35 mph within 25 seconds on a level road.
- The apparatus shall be able to attain a minimum top speed of 50 mph on a level road.
- The apparatus shall be able to maintain a speed of at least 20 mph on any grade up to and including 6 percent.

**7.10 Failure to meet tests:** In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the bidder within 30 days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes as required to conform to any clause of the specifications within 30 days after notice is given to the bidder of such changes, shall be cause for rejection of the apparatus.

**7.11 Construction Documentation:** The contractor shall supply, at the time of delivery, at least one copy of the following documents:

1. The manufacturer's record of apparatus construction details, include the following information:
  - a. Owners name and address
  - b. Apparatus manufacturer, model, and serial number
  - c. Chassis make, model, and serial number
  - d. GAWR of front and rear axles
  - e. Front tire size and total rated capacity in pounds
  - f. Rear tire size and total rated capacity in pounds
  - g. Chassis weight distribution in pounds with water and manufacturer mounted equipment (front and rear)
  - h. Engine make, model, serial number, rated horsepower and related speed, and governed speed
  - i. Type of fuel and fuel tank capacity
  - j. Electrical system voltage and alternator output in amps
  - k. Battery make, model, and capacity in cold cranking amps (CCA)
  - l. Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
  - m. Pump make, model, rated capacity in gallons per minute and serial number
  - n. Pump transmission make, model, serial number, and gear ratio
  - o. Auxiliary pump make, model, rated capacity in gallons per minute and serial number
  - p. Water tank certified capacity in gallons
  - q. Aerial device type, rated vertical height in feet, rated horizontal reach in feet, and rated capacity in pounds
  - r. Paint manufacturer and paint number(s)
  - s. Company name and signature of responsible company representative
2. Certification of slip resistance of all stepping, standing, and walking surfaces
3. If the apparatus has a fire pump, a copy of the following shall be provided: pump manufacturers certification of suction capability, apparatus manufacturer's approval for stationary pumping applications, engine manufacturers certified brake horsepower curve showing the maximum governed speed, pump manufacturer's certification of the hydrostatic test, and the certification of inspection and test for the fire pump
4. If the apparatus has an aerial device, the certification of inspection and test for the aerial device, and all the technical information required for inspections to comply with NFPA 1914, Standard for Testing Fire Department Aerial Devices

5. If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source
6. If the apparatus is equipped with an air system, test results of the air quality, the SCBA fill station, and the air system installation
7. Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
8. Written load analysis and results of the electrical system performance tests
9. When the apparatus is equipped with a water tank, the certification of water tank capacity

**7.12 Operation and Service Documentation:** The contractor shall supply, at time of delivery, at least two sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operation of the fire apparatus and all major components thereof. The contractor shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

1. Manufacturers name and address
2. Country of manufacture
3. Source of service and technical information
4. Parts and replacement information
5. Descriptions, specifications, and ratings of the chassis, pump, and aerial device
6. Wiring diagrams for low voltage and line voltage systems to include the following information: representations of circuit logic for all electrical components and wiring, circuit identification, connector pin identification, zone location of electrical components, safety interlocks, alternator-battery power distribution circuits, and input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
7. Lubrication charts
8. Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
9. Precautions related to multiple configurations of aerial devices, if applicable
10. Instructions regarding the frequency and procedure for recommended maintenance
11. Overall apparatus operating instructions
12. Safety considerations
13. Limitations of use
14. Inspection procedures
15. Recommended service procedures
16. Troubleshooting guide
17. Apparatus body, chassis, and other component manufacturers warranties
18. Special data required by this standard
19. Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
20. A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

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

**7.14 NFPA Required Manuals:** The construction, operation and serviced documentation shall be provided on a CD-ROM. These manuals shall be written in a "step by step" format for

ease of reference. There shall be two (2) copies of the CD provided with the apparatus as standard.

## **SECTION 8: INSURANCE REQUIREMENTS**

**8.1 Insurance Requirements:** The successful Contractor will be required to provide, at their own expense, without cost to the City the following minimum insurance:

Commercial General Liability Insurance policy with minimum combined single limits of **(\$1,000,000.00** per occurrence and **\$1,000,000.00** general aggregate) for bodily injury and property damage, which coverage shall include products/completed operations, independent contractors and contractual liability each at **\$1,000,000.00** per occurrence. Coverage must be written on an occurrence form.

**8.2** Comprehensive Automobile Liability Insurance, which includes coverage of all, owned, non-owned and rented vehicles with a minimum of **\$1,000,000.00** combined single limit for each occurrence.

**8.3** The required limits may be satisfied by any combination of primary, excess or umbrella liability insurances, provided the primary policy complies with the above requirements and the excess umbrella is following form. The Consultant may maintain reasonable and customary deductibles, subject to approval by the City Risk Manager, (970) 244-1592.

**8.4** All insurance shall be purchased from an insurance company licensed to do business in Colorado that has a financial rating of B+ VII or better as assigned by the BEST Rating Company or equivalent.

**8.5** The policies shall be endorsed to include the City and the City's officers and employees as additional insured's. Every policy required above shall be primary insurance, and any insurance carried by the City, its officers, or its employees, or carried by or provided through any insurance pool of the City, shall be excess and not contributory insurance to that provided by the Contractor. No additional insured endorsement to any required policy shall contain any exclusion for bodily injury or property damage arising from completed operations. The Contractor shall be solely responsible for any deductible losses under any policy required above. The contractor shall provide a certificate of insurance to the City as evidence that policies providing the required coverage, conditions, and minimum limits are in full force and effect prior to commencement of the Contract.

**8.6** Worker Compensation and Employer's Liability Insurance shall cover the obligations of the Contractor in accordance with the provisions of the Workers Compensation Act, as amended, by the State of Colorado.

## SECTION 9: VERIFICATION & CERTIFICATION INFORMATION FORM

*Failure to submit this form filled out in its entirety could be grounds to find you non-responsive.*

	Verification and Certification Information	Comply	Does Not Comply	Comments
1	<p><b>ISO Compliance:</b> The manufacturer shall operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the "International Organization for Standardization (ISO)" specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance shall be included with the bid.</p>			
2	<p><b>NFPA 1901-2009:</b> The National Fire Protection Association "Standard for Automotive Fire Apparatus, 2009 edition, is hereby adopted and made a part of these specifications, the same as if it were written out in full detail, with the exception of the section dealing with "Equipment Recommended for Various Types of Apparatus". Offerors shall provide the equipment requested herein. It is the intent of the City to purchase an apparatus that meets 100% of the minimum standards defined and outlined in NFPA 1901, newest edition. There are to be no exceptions to this requirement</p>			
3	<p><b>NFPA 2009 Standards:</b> This unit shall comply with the NFPA standards effective January 1, 2009, except for fire department specifications that differ from NFPA specifications. These exceptions shall be set forth in the Statement of Exceptions.</p> <p>Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.</p> <p>A plate that is highly visible to the driver while seated shall be provided. This plate shall show the overall height, length, and gross vehicle weight rating.</p> <p>The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.</p> <p>An official of the company shall designate, in writing, who is qualified to witness and certify test results.</p>			
4	<p><b>NFPA Compliancy:</b> Apparatus proposed by the</p>			

	bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications shall be indicated in the proposal as "non-NFPA"			
5	<b>Total Vehicle Assessment Certification:</b> The apparatus shall be third party, independent, audit certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 standards. The certification includes all design, production, operational and performance testing of the apparatus. (no exception)			
6	<b>Generator Test:</b> If the unit has a generator, the generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to the Fire Department at the time of delivery.			
7	<b>Breathing Air Test:</b> If the unit has breathing air, Underwriters Laboratories shall draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, <i>Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection.</i>			
8	<b>Inspection Trip(s):</b> The bidder shall provide on-line access to assess the production of the aerial truck and mutually agreed upon on-site inspection trips.			
9	<b>Approval Drawing:</b> A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.  A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.			
10	<b>Drawing, Preliminary Layout, Pump Operator's Panel:</b> A detailed drawing, to scale, of the pump operator's panel shall be provided for the purpose of illustrating the standard location(s) of controls and discharges on the pump operator's panel. The drawing shall not be meant as an approval, or final construction drawing, rather it shall be used as an illustration drawing of a standard panel layout. This drawing shall include all of the gauges and controls located on the pump			

	operator's panel.			
11	<p><b>Warranty:</b> Each piece of new fire or rescue apparatus shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, as a part of their bid package, a copy of the warranty or warranties that they propose to provide, and in no case shall it be less than one (1) year on the entire apparatus.</p> <p>All other warranties, as outlined in these specifications shall be provided in writing as a part of the bid package.</p> <p>Failure to provide the warranties as outlined throughout these specifications shall be cause for rejection of the bid package.</p>			
12	<p><b>Crossmembers Warranty:</b> A Lifetime parts and labor warranty shall be provided on all chassis frame crossmembers</p>			
13	<p><b>Warranty 3-Year Custom Chassis:</b> Each new custom chassis shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, on company letterhead as part of their bid package, a copy of the detailed warranty or warranties that they propose to provide and in no case shall the custom chassis warranty be less than <b>three (3) years</b>. (Indicate the number of years the chassis warranty shall be in effect _____). It shall include as the minimum the A/C, defroster and heater systems, spring suspension components, independent suspension components, steering gears on the independent suspension, gauge instrumentation, seats, instrument consoles, and a \$10,000 collateral damage warranty on the transmission cooler. The electrical system, cab structural, engine, transmission, frame and crossmembers are to be covered under separate warranties throughout these specifications.</p>			
14	<p><b>Additional Trucks:</b> The City of Grand Junction includes a provision in its Purchasing Policy to extend a solicitation for an additional year if mutual agreement exists between the City and the vendor. The City anticipates purchasing another apparatus in 2012, however there is no guarantee with this statement. If the City does purchase an additional apparatus next year, will you (vendor) hold the price quoted on this solicitation? The City will not award this portion until January 2012.</p>			<p><b>Hold price for 2012?</b></p> <p><b>YES or NO</b></p>

## SECTION 10: SPECIFICATION FORM

*Failure to submit this form filled out in its entirety could be grounds to find you non-responsive.*

**SPECIFICATIONS:** One (1) Current Year or Demonstration Model Fire Engine Pumper Truck. Offeror must meet or exceed the following specifications or the proposal shall be considered non-responsive.

**EXCEPTIONS TO SPECIFICATIONS:** Proposer shall mark corresponding box below and list on a separate sheet of paper variations from, or exceptions to the conditions and specifications of this solicitation. This sheet shall be labeled “Exception(s) to Bid Conditions and Specifications” and shall be the last page attached to the bid.

	SPECIFICATION	Meets	Does Not Meet	Comments
1	<b>Body Structural Integrity Ten (10) Year Warranty:</b> The body shall be free of structural or design failure or workmanship for a period of ten (10) years or 100,000 miles starting thirty (30) days after the original invoice date.			
2	<b>Paint Limited Warranty:</b> The apparatus body and pump house shall be free of blistering, peeling and any other adhesion defect cause by defective manufacturing methods or paint material selection for exterior surfaces for a period of three (3) years starting thirty (30) days after the original invoice date. Paint on the undercarriage, body interior (line-x coating included) or aerial structure related paint, if applicable, is covered only under the Standard One Year Limited Warranty.			
3	<b>Corrosion Limited Warranty:</b> The body exterior paint shall be warranted against corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.			
4	<b>Stainless Steel Ten (10) Year Limited Plumbing Warranty:</b> The stainless steel plumbing shall be free from corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.			
5	<b>Basic Ninety (90) Day Limited Warranty on OEM Purchased Parts:</b> The apparatus shall be free of defects in material and workmanship for a period of ninety (90) days starting thirty (30) days after the original invoice date.			
6	<b>Standard One (1) Year Warranty:</b> The apparatus shall be free of defects in material and workmanship for a period of one (1) year starting thirty (30) days after the original invoice date.			
7	<b>Overall Height:</b> Specify overall height of vehicle			

	SPECIFICATION	Meets	Does Not Meet	Comments
	measuring with tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus. <b>Measurement shall be noted on Response Form</b>			
8	<b>Vehicle Top Speed:</b> The vehicle's top speed shall be _____ mph. <b>Speed shall be noted on Response Form.</b>			
9	<b>Overall Length:</b> The overall length of the vehicle shall be noted on <b>Response Form</b>			
10	<b>Miscellaneous Equipment, Pumps:</b> Miscellaneous equipment, as defined in the newest edition of NFPA 1901, Sections 5.8.2 and 5.8.3, shall be the responsibility of the City. The apparatus shall be designed and manufactured in such a manner as to provide ample enclosed space for which to store such equipment.			
11	<p><b>Cab Style:</b> The cab shall be custom, fully enclosed. <b>(An optional 10" extended cab will be quoted separately in #150 below).</b> The cab shall have a 10" raised roof over crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to six (6) seating positions.</p> <p>The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.</p> <p>The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.</p> <p>All interior and exterior seams shall be sealed for</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.</p> <p>The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 &amp; 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the “A” pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.</p> <p>The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.</p> <p>The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The cab shall also include a crew area with two (2) cab doors, also large enough for personnel in full firefighting gear.</p> <p>The cab shall incorporate a two (2) step configuration from the ground to the cab floor at each door opening (Or equivalent). The steps will allow personnel in full firefighting gear to enter and exit the cab easily and safely.</p>			
12	<b>Cab Undercoat:</b> There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.			
13	<b>Cab Side Drip Rail:</b> There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.			
14	<p><b>Cab Paint Exterior:</b> The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.</p> <p>All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.</p> <p>The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.</p> <p>The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.</p> <p>The cab shall be painted with PPG Industries paint.</p>			
15	<p><b>Cab Paint Warranty:</b> The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.</p>			
16	<p><b>Cab Paint Interior:</b> The visible cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish, or equivalent.</p>			
17	<p><b>Cab Engine Tunnel:</b> The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an in thick aluminum.</p>			
18	<p><b>Cab Entry Doors:</b> The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The exterior skins shall be constructed of 0.13 inch aluminum plate.</p> <p>The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	weather tight fit.			
19	<b>Cab Entry Door Type:</b> All cab entry doors shall be full length in design to fully enclose the lower cab steps.			
20	<b>Cab Structural Warranty:</b> The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles, whichever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.			
21	<p><b>Cab Test Information:</b> The cab shall have successfully achieved survival of the International crash test ECE-R29, Addendum 28, Revision 1 standards as indicated below. It shall also meet SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks and SAE J2422 Cab Roof Strength Quasi-Static Roof Load test requirements.</p> <p>As part of testing, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward imparting 32,600 lbs/ft of force to the cab front face.</p> <p>The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse.</p> <p>The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.</p>			
22	<b>Electrical System:</b> The chassis shall include a single starting electrical system which shall include a 12 volt direct current Weldon brand of multiplexing system, suppressed per SAE J551 or equivalent. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by			

	SPECIFICATION	Meets	Does Not Meet	Comments
	275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and seal Deutsch connectors shall be waterproof.			
23	<b>Apparatus Wiring Provision:</b> An apparatus wiring panel shall be installed which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp three (3) 10 amp, and one (1) 15 amp circuit with relays and breakers with trigger wires which shall be routed to the rocker switch panel.			
24	<p><b>Data Recording System:</b> The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed or equivalent. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:</p> <ul style="list-style-type: none"> <li>• Vehicle speed</li> <li>• Acceleration</li> <li>• Deceleration</li> <li>• Engine speed</li> <li>• Engine throttle position</li> <li>• ABS Event</li> <li>• Seat Occupied Status</li> <li>• Seat Belt Status</li> <li>• Master Optical Warning Device Switch Position</li> <li>• Time</li> <li>• Date</li> </ul> <p>Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.</p>			
25	<b>Power &amp; Ground Stud:</b> The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud that shall be 0.38 inch diameter.			
26	<b>Power &amp; Ground Studs – Master Power:</b> Power and grounding studs shall be provided and installed behind the electrical center cover with a breaker. The studs shall be #10 and capable of			

	SPECIFICATION	Meets	Does Not Meet	Comments
	carrying up to a 40 amp load through the master power switch.			
27	<b>Additional Power &amp; Ground Stud:</b> An additional set of power and grounding studs shall be provided and installed behind the rocker switch panel. The power and ground stud shall be circuit protected with a 40 amp breaker. The studs shall be .375 inch diameter and capable of carrying up to a 40 amp ignition switched load.			
28	<b>Exterior Electrical Terminal Coating:</b> All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.			
29	<p><b>Engine:</b> The chassis engine shall be a Cummins ISM engine. <b>(NOTE: A CNG ENGINE WITH A 60 DGE TANK SHALL BE QUOTED AS AN OPTION ON THE RESPONSE FORM).</b> The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a minimum rating of 400 horse power.</p> <p>The ISM engine shall feature a VGT™ Turbo-charger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.</p> <p>The engine shall include an engine mounted combination full flow-by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.</p> <p>A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.</p>			
30	<b>Engine Programming High Idle Speed:</b> The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.			
31	<b>Engine High Idle Control:</b> The vehicle shall be			

	SPECIFICATION	Meets	Does Not Meet	Comments
	equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the Vista screen for the high idle speed control.			
32	<b>Engine Programming Road Speed Governor:</b> The engine programming which governs the top speed of the vehicle shall not be disabled.			
33	<b>Auxiliary Engine Brake:</b> A compression brake, for the six (6) cylinder engine shall also be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.  The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.			
34	<b>Auxiliary Engine Brake Control:</b> An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all the following conditions are simultaneously detected: <ul style="list-style-type: none"> <li>• A valid gear ratio is detected.</li> <li>• The driver has requested or enabled engine compression brake operation.</li> <li>• The throttle is at a minimum engine speed position.</li> <li>• The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.</li> </ul> The compression brake shall be controlled via on off/low/medium/high button. The multiplex system shall remember and default to the last			

	SPECIFICATION	Meets	Does Not Meet	Comments
	engine brake control setting when the vehicle is shut off and re-started.			
35	<b>Fluid Fills:</b> The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible without the need for raising the cab.			
36	<b>Electronic Engine Oil Level Indicator:</b> The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.			
37	<b>Engine Warranty:</b> The engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.			
38	<b>Engine Programming Idle Speed:</b> The engine low idle speed will be programmed at 700 rpm.			
39	<b>Engine Fan Drive:</b> The engine cooling system fan shall be direct drive belt driven on the engine.			
40	<p><b>Engine Cooling System:</b> There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.</p> <p>The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.</p> <p>The radiator shall be a down-flow design constructed with aluminum cores plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>The cooling system shall include a one piece injected molded polymer eleven (11) blade fan with a fiberglass fan shroud.</p> <p>The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant to a separate tank.</p> <p>All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.</p> <p>The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.</p>			
41	<p><b>Engine Cooling System Protection:</b> The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.</p>			
42	<p><b>Engine Coolant:</b> The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.</p> <p>Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.</p>			
43	<p><b>Engine coolant Filter:</b> An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The locations of the filter shall allow for easy maintenance.</p> <p>Proposals offering engines equipped with coolant</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	filters shall be supplied with standard non-chemical type particulate filters.			
44	<b>Electronic Coolant Level Indicator:</b> The instrument panel shall feature a low engine coolant indicator light which shall be located in the center for the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.			
45	<b>Engine Pump Heat Exchanger:</b> A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.			
46	<b>Coolant Hoses:</b> The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.			
47	<p><b>Engine Air Intake:</b> The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.</p> <p>The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab behind the right hand side. The dry type filter shall ensure dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.</p> <p>The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the right</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.			
48	<p><b>Engine Exhaust System:</b> The exhaust system shall include a diesel particulate filter (DPE), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.</p> <p>The system shall utilize 0.065 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.</p> <p>The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.</p> <p>The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF.</p>			
49	<p><b>Diesel Exhaust Fluid Tank:</b> The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.</p> <p>The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.</p> <p>The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.</p>			
50	<b>Engine Exhaust Accessories:</b> An exhaust			

	SPECIFICATION	Meets	Does Not Meet	Comments
	temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.			
51	<b>Engine Exhaust Wrap:</b> The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.			
52	<p><b>Transmission:</b> The drive train shall include and Allison Gen IV-E model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads, located on the converter housing.</p> <p>The transmission shall include two (2) internal oil filters and Castrol TransSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.</p> <p>The Gen IV-E transmission shall include prognostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.</p> <p>The transmission gear ratios shall be:</p> <ul style="list-style-type: none"> <li>• 1<sup>st</sup> 3.49:1</li> <li>• 2<sup>nd</sup> 1.86:1</li> <li>• 3<sup>rd</sup> 1.41:1</li> <li>• 4<sup>th</sup> 1.00:1</li> <li>• 5<sup>th</sup> 0.75:1</li> <li>• Rev 5.03:1</li> </ul>			
53	<b>Transmission Mode Programming:</b> The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.			
54	<b>Electronic Transmission Oil Level Indicator:</b> The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
55	<b>Transmission Shift Selector:</b> An Allison pressure sensitive range selector touch pad, or equivalent, shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall provide a prognostic indicator (wrench symbol) on the digital display between the selected and attained indicators. The prognostics monitor various operating parameters to determine and shall send an alert when a specific maintenance function is required.			
56	<b>Transmission Pre-Select With Auxiliary Brake:</b> When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.			
57	<b>Transmission Cooling System:</b> The transmission shall include a water-to-oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.			
58	<b>Transmission Warranty:</b> The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.			
59	<b>Driveline:</b> All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.			
60	<b>Fuel Filter/Water Separator:</b> The fuel system shall have a fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.  A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.  A secondary fuel filter shall be included as approved by the engine manufacturer.			
61	<b>Fuel Lines:</b> The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
	fuel (or CNG, as required). The fuel lines shall be connected with brass fittings.			
62	<b>Fuel Tank:</b> The fuel tank shall have a capacity of fifty (50) gallons minimum.			
63	<b>Fuel Tank Fill Port:</b> The fuel tank fill ports shall be offset with the right fill port located in the middle position and the left fill port located in the rearward position on the fuel tank.			
64	<b>Front Axle:</b> The front axle shall be a Non drive front axle, model.			
65	<b>Front Axle Warranty:</b> The front axle shall be warranted two (2) years with unlimited miles under the general service application.			
66	<b>Front Wheel Bearing Lubrication:</b> The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.			
67	<b>Front Shock Absorbers:</b> Two (2) Bilstein inert, nitrogen gas filled shock absorbers, or equivalent, shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.  The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort.			
68	<b>Front Suspension:</b> The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54 inches long and 4 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with great fitting. The spring capacity shall be 21,500 pounds.			
69	<b>Steering Column/Wheel:</b> The cab shall include a Douglas Autotech steering column, or equivalent, which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18 inch, two (2) spoke wheel located at the driver's position. The steering wheel shall be covered with black			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>polyurethane foam padding.</p> <p>The steering column shall contain a horn button, self-cancelling turn signal switch, four-way hazard switch and headlamp dimmer switch.</p>			
70	<b>Power Steering Pump:</b> The hydraulic power steering pump shall be a TRW PS, or equivalent, which shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.			
71	<b>Electronic Power Steering Fluid Level Indicator:</b> The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.			
72	<b>Front Axle Cramp Angle:</b> The chassis shall have a front axle cramp angle of 48 degrees to the left and 44 degrees to the right.			
73	<b>Power Steering Gear:</b> The power steering gear shall be a TRW model TAS 65 with an assist cylinder, or equivalent.			
74	<b>Rear Axle:</b> The rear axle shall be single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.			
75	<b>Rear Axle Differential Lubrication:</b> The rear axle differential shall be lubricated with oil.			
76	<b>Rear Axle Warranty:</b> The rear axle shall be warranted for two (2) years with unlimited miles under the general service application.			
77	<b>Rear Wheel Bearing Lubrication:</b> The rear axle wheel bearing shall be lubricated with oil.			
78	<b>Vehicle Top Speed:</b> The top speed of the vehicle shall be approximately 65 MPH +/- 2 MPH at governed engine RPM.			
79	<b>Rear Suspension:</b> The single rear axle shall feature a Reyco 79KB vari-rate, or equivalent, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.5 inch x 3 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided. The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.			
80	<b>Front Tire:</b> The front tires shall be Michelin 385/65R-22.5 18PR "J" tubeless radial XZY3 mixed service tread. The front tire US Fire Service Intermittent Usage load capacity shall be 20,000			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
	pounds per axle with a speed rating of 65 MPH when properly inflated to 120 lb/sq in.			
81	<b>Rear Tire:</b> The rear tires shall be Michelin 315/80R-22.5 “L” tubeless radial XDY3 mixed service tread. The rear tire US Fire Service Intermittent Usage load capacity shall be 33,080 pounds per axle with a speed capacity of 65 MPH when properly inflated to 130 lb/sq in.			
82	<b>Tire Pressure Indicator:</b> There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front and rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire. The tire pressure indicators shall be redeemed upon the vehicle manufacturer’s receipt of the voucher for installation by the City.			
83	<b>Front Wheels:</b> The front wheels shall be Accuride hub piloted, or equivalent, 22.5 inch x 12.25 inch polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall be forged from a single piece of aluminum, designed to be corrosion resistant and are engineered for a long life.			
84	<b>Rear Wheels:</b> The rear wheels shall be Accuride hub piloted, or equivalent, heavy duty, 22.5 inch x 9 inch aluminum wheels. Each outer wheel shall have a polished aluminum finish on the exterior surface and each inner wheel shall have a machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.			
85	<b>Wheel Trim:</b> The front and rear wheels shall include stainless steel lug nut covers. The lug nut covers shall be Real Wheels® brand, or equivalent, constructed of 304L grade, non-corrosive stainless steel. Each wheel trim component shall meet D.O.T. certification.			
86	<b>Brake System:</b> A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inches of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss.  The rear axle spring brakes shall automatically			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.</p> <p>A four (4) sensor, four (4) modulator anti-lock braking system (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/ SID and FMI standards.</p> <p>Automatic traction control (ATC) shall be installed on the single rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels lose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.</p> <p>System shall include roll stability control which shall monitor the vehicle's rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABC and ATC systems.</p> <p>A switch shall be provided and properly labeled "mud/snow". When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.</p> <p>An electronic stability control unit (ESC) shall be a functional extension of the electronic braking system. It shall detect any skidding of the vehicle</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	on the vertical axis as well as any rollover tendency. The control unit shall have an angular-speed sensor that measures the vehicle's motion on the vertical axis. An acceleration sensor shall measure the vehicle's lateral acceleration. The system shall provide information on the lateral acceleration and steering angle to calculate a theoretical angular speed for the stable vehicle condition.			
87	<b>Front Brakes:</b> The front brakes shall be Disc Plus disc brakes, or equivalent, with 17 inch vented rotors.			
88	<b>Rear Brakes:</b> The rear brakes shall be disc type and shall include a cast iron shoe.			
89	<b>Park Brake:</b> Upon application of the push-pull valve in the cab, the rear brakes shall engage via mechanical spring force by dual chamber rear brakes to satisfy the FMVSS parking brake requirements.			
90	<b>Park Brake Control:</b> A Meritor-Wabco, or equivalent, manual hand control push-pull style valve shall operate the parking brake system. The parking brake actuation valve shall be mounted on the left hand dash to the right of the steering column within easy reach of the driver.			
91	<b>Rear Brake Slack Adjusters:</b> The rear brakes shall include Meritor, or equivalent, automatic slack adjusters installed on the axle designed to offer reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.			
92	<b>Air Dryer:</b> The brake system shall include a Wabco System Saver 1200, or equivalent, air dryer with an integral 100 watt heater with a Metri-Pack, or equivalent, sealed connector. The air dryer shall incorporate an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve shall allow purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.			
93	<b>Front Brake Chambers:</b> The front brakes shall be provided with MGM, or equivalent, type 24 long stroke brake chambers.			

	SPECIFICATION	Meets	Does Not Meet	Comments
94	<b>Rear Brake Chambers:</b> The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE 30/36 brake chamber shall have a 36 inch effective area.			
95	<b>Air Compressor:</b> The air compressor shall be a Wabco SS318, or equivalent, single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Piston and bore finishing technology shall reduce oil consumption and increase the system component life.			
96	<b>Air Governor:</b> An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.			
97	<b>Moisture Ejectors:</b> An automatic moisture ejector with a manual drain provision shall be installed on the wet tank of the air supply system. Manual pet-cock type drain valves shall be installed on all remaining reservoirs of the air supply system.			
98	<b>Air Supply Lines:</b> A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) shall be blue. Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.			
99	<b>Air Inlet Connection:</b> An air connection for the shoreline air inlet shall be supplied and installed in the left hand side lower front step in the forward position. The air inlet connector shall be plumbed to the air system with a check valve to prevent air from escaping through the inlet connector. The air connector supplied shall be a			

	SPECIFICATION	Meets	Does Not Meet	Comments
	0.25 inch size Tru-Flate Interchange, or equivalent, style manual connection compatible with Milton 'T' style, Myers 0.25 inch Automotive style and Parker 0.25 inch 10 Series connectors.			
100	<b>Vehicle Towed Air Supply Package:</b> The chassis shall include a vehicle towing air supply package. The air service brake connection shall be accomplished via trailer glad hands located under the left side of the front bumper. The mating surface of the glad hand connections shall be rotated horizontal. The glad hand connections shall be located in the forward position and shall protrude beyond the face of the front bumper when connected. The glad hands shall allow a service tow truck to tie into the disabled vehicle's air system and unlock the rear brakes.			
101	<b>Rear Air Tank Mounting:</b> If a combination of wheel base, air tank quantity, or other requirements necessitate the location of the one or more air tanks to be mounted rear of the fuel tank, these tank(s) shall be mounted perpendicular to frame.			
102	<b>Frame Warranty:</b> The frame and cross members shall carry a limited lifetime warranty. The detailed warranty document shall be provided upon request.			
103	<b>Frame Paint:</b> The frame shall be powder coated black prior to any attachment of components. All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120 inches per pound at 2 mils.  Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.			
104	<b>Front Bumper:</b> The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be .38 thick ASTM A36 steel which shall measure			

	SPECIFICATION	Meets	Does Not Meet	Comments
	12 inches high with a 3.05 inch flange and shall be 104.5 inches wide with angled front corners.			
105	<b>Front Bumper Paint:</b> The front bumper shall be painted the same as the lower cab color.			
106	<b>Front Bumper Extension Length:</b> The front bumper shall be extended approximately 18 inches ahead of the cab.			
107	<b>Front Bumper Apron:</b> The 18 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.  The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.			
108	<b>Front Bumper Compartment Center:</b> The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well for 100 feet of 1 ¾" fire hose and 1 ½" discharge. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall include a cover constructed of 0.19 inch thick bright embossed aluminum tread plate.			
109	<b>Front Bumper Compartment Cover Hardware:</b> The front bumper compartment cover shall include gas cylinder stays which shall hold the cover open. The cover shall be held in the closed position via a flush push button style latch.			
110	<b>Mechanical Siren:</b> The front bumper shall include an electro mechanical Federal Q2B™ siren, or equivalent, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10 feet.  LOCATION: The siren shall be bumper mounted in a hidden position. An angled sound deflector shall direct the sound from the siren through a stainless grille mounted to the face of the bumper.			
111	<b>Air Horns:</b> The front bumper shall include two (2) Hadley brand E-Tone air horns, or equivalent, which shall measure 21 inches long with 6 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.  The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the			

	SPECIFICATION	Meets	Does Not Meet	Comments
	bumper in the inboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left hand frame rail.			
112	<b>Air Horn Reservoir:</b> One (1) air tank, with a 1200 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air brake system.			
113	<b>Electronic Siren Speaker:</b> The bumper shall include one (1) Whelen Engineering Inc. model SA122FMP, or equivalent, cast aluminum speaker with a polished aluminum grille recess mounted within the bumper fascia. The speaker shall feature 100 watts of power. The electronic siren speaker shall be located on the front bumper face.			
114	<b>Front Bumper Tow Hooks:</b> Two (2) heavy duty chrome plated tow hooks shall be installed in a rearward position out of the approach angle area, bolted directly to the outside of each chassis frame rail with grade 8 bolts.			
115	<b>Tow Fork Provision:</b> A tow bar provision shall be installed on the front of the chassis and attached to the frame rails which shall allow the vehicle to be picked up from the front and towed.			
116	<p><b>Cab Tilt System:</b> The entire cab shall be capable of tilting approximately 45 degrees to allow for easy maintenance of the engine and transmission.</p> <p>The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the “Down” button to indicate safe road operation.</p> <p>It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.</p> <p>Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once hold down hooks are in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.</p> <p>Two (2) cab tilt cylinders shall be provided with</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>velocity fuses in each cylinder port. The cab tilt pivots shall be 1.9 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.</p> <p>A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.</p>			
117	<p><b>Cab Tilt Control Receptacle:</b> The cab tilt control cable shall include a receptacle. The tilt pump shall include 8 feet of cable with a six (6) pin Deutsch receptacle with a cap.</p>			
118	<p><b>Cab Windshield:</b> The cab windshield shall have a surface area of at least 2825 square inches and be of a two (2) piece wraparound design for maximum visibility. The glass shall include standard automotive tint. The left and right windshield shall be fully interchangeable. Each windshield shall be installed using black self-locking window rubber.</p>			
119	<p><b>Glass Front Doors:</b> The front cab doors shall include a window. These windows shall have the capability to roll down completely into the door housing with a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.</p> <p>The shall be an irregular shaped fixed window, more commonly known as “cozy glass” ahead of the front door roll down windows.</p> <p>The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.</p>			
120	<p><b>Glass Tint:</b> The windows located in the cab shall have a standard dark automotive tint.</p>			
121	<p><b>Glass – Rear Doors:</b> The rear right hand side door shall include a window. This window shall roll up and down manually with a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.</p> <p>The rear left hand side door shall include a window. This window shall roll up and down manually with a crank style handle on the inside of the door. A reinforced window regulator assembly</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	shall be provided for severe duty use.			
122	<p><b>Glass – Side Mid:</b> The cab shall include a window on the officer’s side behind the front and ahead of the crew doors. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber.</p> <p>The cab shall include a window on the driver’s side behind the front door and ahead of the crew door and above the wheel well. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber.</p>			
123	<p><b>Climate Control:</b> The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster.</p> <p>The cab shall also include a combination heater air conditioning unit. This unit shall offer a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.</p> <p>The air conditioning system shall perform as follows:</p> <ul style="list-style-type: none"> <li>- In 100 degree F ambient temperature, with 50% relative humidity and at 1200 engine RPM, the crew area will cool down to 72 degree F within 30 minutes.</li> <li>- Roof mounted condenser with adequate BTU to meet the performance specification.</li> <li>- The evaporator units will have an adequate BTU rating to meet the performance specifications.</li> </ul> <p>All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.</p> <p>The air conditioner lines shall be a mixture of custom bend zinc coated steel fittings and Aero-quip GH 134 flexible hose, or equivalent, with Aero-quip EZ clip fittings, or equivalent.</p> <p>The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.</p> <p>The air conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.</p>			
124	<p><b>Front Underseat Heaters:</b> Two (2) 13,500 BTU heaters shall be provided and installed in the face of the seat riser storage area for the left and right front seats, one (1) each side. The fan controls shall be located on the Vista display and control screen(s).</p> <p>The auxiliary heater system hoses shall be silicone with stainless steel constant torque clamps approved for use with silicone hose. The auxiliary heater system shall include one (1) seasonal shut-off valve. The valve shall be supplied at the front of the right hand corner of the cab. The cab must be tilted to access the shut-off valve.</p>			
125	<p><b>Cab Insulation:</b> The cab ceiling and walls shall include 1 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.</p>			
126	<p><b>Under Cab Insulation:</b> The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments (or CNG, as needed). The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations.</p> <p>Then engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The insulation shall meet or exceed FMVSS 302 flammability test.</p> <p>The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	3 mils of acrylic pressure sensitive adhesive and aluminum pins			
127	<b>Interior Trim Floor:</b> The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish, or equivalent. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.			
128	<b>Sun Visors:</b> The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield.			
129	<b>Dash Trim:</b> The entire dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate with appropriate ventilation.			
130	<b>Engine Tunnel Trim:</b> The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish, or equivalent. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim.			
131	<b>Auxiliary Power Point Engine Tunnel:</b> The cab interior shall include two (2) 12 volt cigarette lighter type receptacles and shall be connected directly to the batteries.			
132	<b>Under Cab Access Door:</b> The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.			
133	<b>Interior Door Trim:</b> The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall then be painted to match.			
134	<b>Cab Door Reflective Trim:</b> The interior of each door shall include high visibility reflective tape. A white reflective tape that measures 1 inch in width shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes measuring 6 inches in height.			
135	<b>Interior Grab Handle "A" Pillar:</b> There shall be two (2) handles installed inside the cab, one on each "A" post at the left and right door openings.			

	SPECIFICATION	Meets	Does Not Meet	Comments
136	<p><b>Interior Grab Handles:</b> Each front door shall include one (1) 9 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish.</p> <p>A black powder coated cast aluminum handle shall be installed on the inside of each rear crew door. A 30 inch long handle shall extend horizontally the width of the window just above the window sill.</p>			
137	<p><b>Interior Trim Color:</b> The cab interior vinyl trim surfaces shall be gray in color. The cab interior vacuum formed ABS composite trim surfaces shall be gray in color. The cab interior floor mat shall be gray in color.</p> <p>The following surfaces shall be painted with Zolatone #20-72 silver gray texture finish, or equivalent:</p> <ul style="list-style-type: none"> <li>• Inner door panel</li> <li>• Entire center dash</li> <li>• Any accessory pods attached to the dash</li> <li>• Left hand dash</li> <li>• Right hand dash</li> </ul>			
138	<p><b>Dash Panel Group:</b> The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.</p>			
139	<p><b>Center Panel:</b> The center dash panel shall include six (6) switch positions in the upper left portion of the panel. A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. All switch legends shall have backlighting provided.</p>			
140	<p><b>Left Panel:</b> The left dash panel shall include one (1) windshield wiper/washer control switch located in the left hand side of the panel. The switch shall have backlighting provided.</p>			
141	<p><b>Right Panel:</b> The right dash panel shall include rocker switches to control electric siren, mechanical siren and air horn.</p>			
142	<p><b>Seat Belt Warning:</b> A Weldon, or equivalent, seat belt warning system, integrated with the</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator and indicator light in the instrument panel, and an audible alarm.</p> <p>The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt is fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.</p>			
143	<b>Seat Material:</b> The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to protect from UV rays and block contaminated fluids.			
144	<b>Seat Color:</b> All seats shall be gray in color.			
145	<b>Seat Driver:</b> The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat, or equivalent. The seat shall be equipped with air ride and feature eight-way electric positioning.			
146	<p><b>Seat Officer:</b> The officer's seat shall be an H.O. Bostrom Firefighter model seat, or equivalent. The seat shall be equipped with air ride and feature two-way manual adjustment and shall include a tapered and padded seat cushion.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. The testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seat shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The officer's seat shall feature a SecureAll™, or equivalent, SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths, without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.</p>			
147	<p><b>Rear Facing Outer Seats:</b> The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series, or equivalent. The seat shall feature a tapered and padded seat and cushion. The seat shall be mounted in a fixed position.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. <b>In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95<sup>th</sup> percentile hybrid III male weighing 225 pounds rather than the 50<sup>th</sup> percentile male dummy weighing 165 pounds as referenced in FMVSS 208.</b> The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The rear facing outboard seat shall feature a Bostrom SecureAll™, or equivalent, self-</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>contained breathing apparatus (SCBA) locking system which shall store all U.S. and International SCBA brands and bottle sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.</p> <p>The rear facing outer seats shall offer special mounting positions which shall be 2 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.</p> <p>The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.</p>			
148	<p><b>Forward Facing Center Seats:</b> The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall. The seats shall be a H.O. Bostrom Firefighter series, or equivalent. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.</p> <p>This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. <b>In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95<sup>th</sup> percentile hybrid III male weighing 225 pounds rather than the 50<sup>th</sup> percentile male dummy weighing 165 pounds as referenced in FMVSS 208.</b> The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302.</p> <p>The forward facing center seat shall feature a SecureAll™, or equivalent, self-contained breathing apparatus (SCBA) locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.</p> <p>The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.</p> <p>The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The bracket system shall be an auto-locking device where the SCBA is pushed against the pivot arm to lock securely in place in all directions.</p> <p>The SecureAll™, or equivalent, shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.</p> <p>The forward facing center seats shall be installed facing the front of the cab.</p> <p>The forward facing center seating positions shall include an enclosed seat frame which is located</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>and installed on the rear wall. The seat frame shall be constructed of 5052-H32 Marine Grade 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.</p> <p>There shall be one (1) access points to the seat frame storage area to the front. The access point shall be covered by a hinged door.</p>			
149	<b>Cab Front Underseat Storage Access:</b> The left and right under seat storage areas shall have a vented aluminum hinged door with non-locking latch.			
150	<p><b><u>TO BE QUOTED AS AN OPTION AS REFERENCED IN #11 ABOVE:</u></b></p> <p><b>10 (Ten) Inch Extended Cab and In Cab Roll Up Storage Cabinets:</b> The cab shall be extended by 10 inches and there shall be two (2) roll up compartments in the crew area of the cab located to the outside of the forward facing seats. One (1) will be located on each side of the forward facing seats. The cabinets will be as large as space allows but the dimensions will be approximately 22"x50"x15".</p> <p><b>Price for adding this option shall be noted on the Response Form.</b></p>			
151	<b>Seat Compartment Door Finish:</b> All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture, or equivalent.			
152	<b>Windshield Wiper System:</b> The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.			
153	<b>Electronic Windshield Fluid Level Indicator:</b> The windshield washer fluid level shall be monitored electronically. There shall be an indicator light or warning message when fluid level is low.			
154	<b>Cab Door Hardware:</b> The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. All cab entry doors shall include locks which are keyed			

	SPECIFICATION	Meets	Does Not Meet	Comments
	alike. The door locks shall be designed to prevent accidental lockout.			
155	<b>Door Locks:</b> Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab.			
156	<b>Grab Handles:</b> The cab shall include one (1) 18 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304 stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.			
157	<p><b>Rearview Mirrors:</b> Ramco model CRM-310-1750-CHCHR bus style mirrors, or equivalent, shall be provided. The mirror heads shall be injection molded chrome plated ABS plastic and shall measure 9.50 inches wide X 17.50 inches high. The mirrors shall be mounted one (1) on each the driver and officer doors of the cab with polished die-cast aluminum arms.</p> <p>The mirrors shall feature an upper heated remote controlled flat glass and a lower heated manually adjustable convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting to reduce vibration. The mirrors shall be corrosion free under all weather conditions.</p> <p>The heat for the rearview mirrors shall be controlled through a virtual button on the multiplex display.</p>			
158	<b>Exterior Trim Rear Corner:</b> There shall be mirror finish stainless steel scuff plates on the outside corners at the back of the cab. The stainless steel plate shall be affixed to the cab using two sided adhesive tape.			
159	<b>Cab Fenders:</b> Full width wheel well liners shall be installed on the extruded cab. Each two-piece liner shall consist of an inner liner 16 inches wide made of vacuum formed ABS composite and an outer fenderette 3.5 inches wide made of 14 gauge 304 polished stainless steel.			
160	<b>Mud Flaps Front:</b> The front wheel wells shall have mud flaps installed on them.			
161	<b>Ignition:</b> A master battery system with a keyless tart ignition system shall be provided.			
162	<b>Battery:</b> The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries			



	SPECIFICATION	Meets	Does Not Meet	Comments
	with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541., The cables shall have encapsulated ends with heat shrink and sealant.			
163	<p><b>Battery Tray:</b> The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.</p> <p>The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek, or equivalent, shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.</p>			
164	<b>Battery Box Cover:</b> Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle.			
165	<b>Battery Cable:</b> The starting system shall include cables which shall be protected by 275 degree F minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.			
166	<b>Battery Jumper Stud:</b> The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.			
167	<b>Alternator:</b> The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.			
168	<b>Battery Conditioner:</b> A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab behind the driver's seat.			
169	<b>Battery Conditioner Display:</b> A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.			
170	<b>Electrical Inlet:</b> A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shall automatically eject the plug when the starter button is depressed.</p> <p>A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.</p> <p>An electrical inlet shall be installed on the left hand side of cab over the wheel well.</p> <p>The electrical inlet shall be connected to the battery conditioner.</p> <p>The Kussmaul electrical inlet connection shall include a red cover.</p>			
171	<b>Headlights:</b> The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.			
172	<b>Front Turn Signals:</b> The front fascia shall include two (2) Whelen model 600, or equivalent, 4 inch x 6 inch programmable LED amber turn signals which shall be installed in a polished aluminum housing above and outboard of the front warning and head lamps.			
173	<b>Headlight Location:</b> The headlights shall be located on the front fascia of the cab directly below the front warning lights.			
174	<b>Side Turn/Marker Lights:</b> The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.			
175	<b>Marker and ICC Lights:</b> In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.			
176	<b>Ground Lights:</b> Each door shall include LED NFPA compliant ground lights mounted to the underside of the cab step below each door. Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.			
177	<b>Step Lights:</b> The middle step located at each door shall include a recess mounted 4 inch round LED light which shall activate with the opening of the respective door.			
178	<b>Engine Compartment Light:</b> There shall be an LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a			

	SPECIFICATION	Meets	Does Not Meet	Comments
	housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.			
179	<p><b>Interior Overhead Lights:</b> The cab shall include a two-section Whelen, or equivalent, LED dome lamp with a red and clear lens located over each door.</p> <p>An additional two-section Whelen, or equivalent, LED dome lamp with a red and clear lens shall be provided over the engine tunnel which can be activated by individual switches on the lamp.</p>			
180	<p><b>Do Not Move Apparatus Light:</b> The front headliner of the cab shall include a red Whelen 500 Series, or equivalent, 5mm LED light located in the center for greatest visibility. The light shall be clearly labeled “Do Not Move Apparatus”. In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.</p> <p>The light and alarm shall be interlocked for activation when a cab door is not firmly closed, an apparatus cabinet door is not closed and the parking brake is released.</p>			
181	<p><b>Master Warning Switch:</b> A master switch shall be included. The switch shall feature control over all devices wired through it. Any warning device switches left in “ON” position when the master switch is activated shall automatically power up.</p>			
182	<p><b>Headlight Flasher:</b> An alternating high beam headlamp flashing system shall be installed into the high beam headlamp circuit which shall allow the high beams to flash alternately from left to right. Deliberate operator selection of high beams shall override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights shall also be disabled “On Scene” when the park brake is applied.</p>			
183	<p><b>Light Bar:</b> There shall be one (1) 72 inch LED light bar mounted on the cab with opticom capabilities.</p>			
184	<p><b>Inboard Front Warning Lights:</b> The cab front fascia shall include dual Whelen series 600 Super, or equivalent, LED warning lights which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>the inboard position.</p> <p>The front warning lights mounted on the fascia in the inboard positions shall be red.</p>			
185	<p><b>Outboard Front Warning Lights:</b> The cab front fascia shall include dual Whelen series 600 Super, or equivalent, LED warning lights which shall offer 14 flash patterns plus a steady burn for solid colors and 20 flash patterns plus a steady burn for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the outboard position.</p> <p>The front warning lights mounted on the fascia for the outboard position shall be red.</p>			
186	<p><b>Front Warning Switch:</b> The front warning lights shall be controlled. This switch shall be clearly labeled for identification.</p>			
187	<p><b>Intersection Warning Lights:</b> The chassis shall include two (2) Whelen series 600 Super, or equivalent, LED 4 inch x 6 inch intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.</p> <p>The intersection lights shall be red and mounted in the rear position on the side of the bumper.</p>			
188	<p><b>Side Warning Lights:</b> The cab sides shall include a Whelen series 600 Super, or equivalent, LED 4 inch x 6 inch warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.</p> <p>The warning lights located on the side of the cab shall be red and mounted over the front wheel directly over the center of the front axle.</p>			
189	<p><b>Cab Mounted Search Lights:</b> There shall be two (2) Golight model 2020, or equivalent, permanent mount search lights installed on the front corners of the apparatus cab. The light shall provide 400,000 candle power of light output from a weather resistant halogen bulb. The Golight, or equivalent, shall be capable of 370 degree rotation and 120 degree tilt. Each light shall be equipped with two hard wired remote controls located in the chassis cab.</p>			
190	<p><b>Cab Mounted Command Light:</b> There shall be a Command Light model KL450 mounted on the roof of the cab.</p>			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
191	<b>Siren Control Head:</b> A code 3 Micro Com, or equivalent, 200 watt remote dual amplifier control head shall be provided and mounted on the dash in the switch panel in a location specific to the City's needs. Location to be determined after award.			
192	<b>Air Horn Activation:</b> The air horn activation shall be accomplished by one (1) Linemaster model SP491-S81, or equivalent, foot switch on the driver's side and one (1) rocker switch on the right side dash panel accessible to the officer.			
193	<b>Mechanical Siren Activation:</b> The mechanical siren shall be actuated by one (1) rocker switch on the right side dash panel for use by the officer. One (1) momentary siren brake rocker switch shall be provided in the right side dash panel.			
194	<b>Back-up Alarm:</b> A Preco-Matic model 1059, or equivalent, dual function, dual sound back-up alarm shall be installed at the rear of the chassis with an auto-adjusting output level of 87 dB to 112 dBa. The alarm shall automatically activate without delay when the transmission is placed in reverse.			
195	<p><b>Instrumentation:</b> An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine and transmission information over the J1939 data bus to reduce redundant sensors and wiring.</p> <p>The instrument panel shall contain the following gauges:</p> <ul style="list-style-type: none"> <li>• One (1) electronic speedometer</li> <li>• One (1) electronic tachometer. The scale on the tachometer shall read from 0 to 3000 RPM.</li> <li>• One (1) two-movement gauge displaying primary system and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degree Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.</li> </ul>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<ul style="list-style-type: none"> <li>• One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included.</li> </ul> <p>The instrument panel shall include a light bar that will contain the flowing LED indicator lights:</p> <p><b>A. Red Lamps:</b></p> <ul style="list-style-type: none"> <li>• Low primary Air Pressure, located in gauge</li> <li>• Low Secondary Air Pressure, located in gauge</li> <li>• Stop Engine, indicates critical engine fault</li> <li>• Air Filter Restricted, indicates excessive engine air intake restriction</li> <li>• Park Brake, indicates parking brake set</li> <li>• Seat Belt Indicator, indicates when a seat is occupied and corresponding seat belt remains unfastened</li> <li>• Volts, indicates high or low system voltage, located in gauge</li> <li>• Low Oil Pressure, indicates low engine oil pressure, located in gauge</li> <li>• High Coolant Temperature, indicates excessive engine coolant temperature, located in gauge</li> <li>• DEF level Bar, DEF level is critically low, located in gauge</li> </ul> <p><b>B. Amber Lamps:</b></p> <ul style="list-style-type: none"> <li>• MIL, indicates an engine emission control system fault</li> <li>• Check Engine, indicates engine fault</li> <li>• Check Trans, indicates transmission fault</li> <li>• High Transmission Temperature, indicates excessive transmission oil temperature</li> <li>• ABS, indicated anti-lock brake system fault</li> <li>• Wait to Start, indicates active engine air preheat cycle</li> <li>• HEST, indicates a high exhaust system temperature</li> <li>• Water in Fuel, indicates presence of water in fuel filter</li> <li>• DPF, indicates a restriction of the diesel particulate filter</li> <li>• Regen Inhibit, indicates regeneration has been postponed due to user interaction</li> <li>• Range Inhibit, indicates a transmission</li> </ul>			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
	<p>operation is prevented and requested shift request may not occur</p> <ul style="list-style-type: none"> <li>• Low Fuel, located in gauge</li> <li>• DEF, indicates low DEF fluid, located in gauge</li> <li>• DEF Level Bar, DEF level is low, located in gauge</li> </ul> <p><b>C. Green Lamps:</b></p> <ul style="list-style-type: none"> <li>• Left and Right turn signal indicators</li> <li>• ATC, indicates low wheel traction for automatic traction control, also indicates mud/snow mode is active for ATC system</li> <li>• High Idle, indicates high idle is active</li> <li>• Cruise Control, indicates cruise control is active</li> <li>• OK to Pump, indicates the pump engage conditions have been met</li> <li>• Pump Engaged, indicates pump is in use</li> <li>• Auxiliary Brake, indicates secondary braking device is active</li> <li>• DEF Level Bar, indicates usable levels of DEF: 25%, 50%, 75%, 100%, located in gauge</li> </ul> <p><b>D. Blue Lamps:</b></p> <ul style="list-style-type: none"> <li>• High Beam indicator</li> </ul>			
196	<p><b>Constant Audible Alarms From Gauge Package:</b></p> <ul style="list-style-type: none"> <li>• High Trans Temp</li> <li>• High or Low Voltage</li> <li>• Seatbelt</li> <li>• Check Engine</li> <li>• Check Transmission</li> <li>• Stop Engine</li> <li>• Low Air Pressure</li> <li>• Fuel Low</li> <li>• Water in Fuel</li> <li>• ESC</li> <li>• High Coolant Temperature</li> <li>• Low Engine Oil Pressure</li> <li>• Low Coolant Level</li> </ul>			
197	<p><b>Oscillating Audible Alarms From Gauge Package:</b></p> <ul style="list-style-type: none"> <li>• Air Filter</li> <li>• Extended Left &amp; Right Turn remaining on</li> <li>• Cab Ajar</li> <li>• Door Ajar</li> </ul>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<ul style="list-style-type: none"> <li>• Low Oil Level</li> </ul>			
198	<b>Backlighting Color:</b> The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting			
199	<p><b>Communication Antenna:</b> An antenna base, for use with an NMO type antenna, shall be mounted on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment. The antenna base shall be an Antenex model MABVT8, or equivalent, made for either a 0.38 inch or 0.75 inch receiving hole in the antenna and shall include 17 feet of RG58 A/U cable with no connector at the radio end of the cable. The antenna base shall be provided by manufacturer.</p> <p>The antenna cable shall be routed from the antenna base mounted on the roof to the area underneath the right hand front seat.</p>			
200	<b>Cab Exterior Protection:</b> The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.			
201	<b>Fire Extinguisher:</b> A 2.5 pound D.O.T. approved fire extinguisher with BC rating shall be shipped loose with the cab.			
202	<b>Road Safety Kit:</b> The cab and chassis shall include one (1) emergency road side triangle kit.			
203	<b>Door Keys:</b> The cab and chassis shall include a total of four (4) door keys for the manual door locks.			
204	<b>Operation Manuals:</b> There shall be two (2) complete sets of chassis operation manuals provided with the chassis. One (1) set shall be a printed hard copy and one (1) set shall be an electronic copy on CD or flash drive. Each manual shall include a parts list specific to the chassis model.			
205	<b>Engine and Transmission Operation Manuals:</b> There shall be two (2) printed hard copy sets of the engine operation manual and two (2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.			
206	<b>Engine Service Manuals:</b> There shall be one (1) printed hard copy set of Cummins ISC/ISL (or CNG as required) engine service reference manuals which shall be provided with the chassis.			



	SPECIFICATION	Meets	Does Not Meet	Comments
207	<b>Transmission Service Manuals:</b> There shall be one (1) printed hard copy set of Allison 3000 transmission service manuals included with the chassis.			
208	<b>As Built Wiring Diagrams:</b> The cab and chassis shall include two (2) complete sets of wiring schematics and option wiring diagrams. One (1) set shall be a printed hard copy, one (1) set shall be and electronic copy on CD or flash drive.			
209	<b>Fire Pump Mounting:</b> The fire pump shall be mounted within a separate body module that is not directly connected to the apparatus body. The pump shall be frame mounted to minimize the likelihood of the pump casing cracking should the apparatus be involved in a collision. The pump module shall be mounted to the frame in four (4) locations and shall be reinforced appropriately in order to carry the expected load for the life of the apparatus.			
210	<b>Midship Mount Fire Pump:</b> The fire pump shall be a Waterous CSC20, 1250 GPM midship mount pump, or equivalent.			
211	<b>Single Stage Fire Pump:</b> The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for fire service.			
212	<p><b>Independent Third Party Pump Certification:</b> The fire pump shall be tested and certified by Underwriter's Labs, a nationally recognized independent third party testing company. Tests shall be conducted so that the pump performs as listed below:</p> <ul style="list-style-type: none"> <li>• 100% of rated capacity at 150 pounds net pressure</li> <li>• 70% of rated capacity at 200 pounds net pressure</li> <li>• 50% of rated capacity at 250 pounds net pressure</li> <li>• 100% of rated capacity at 165 pounds net pressure</li> </ul> <p>The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA pamphlet number 1901. The pump shall be free from objectionable pulsation and vibration.</p>			
213	<b>Pump Anodes:</b> There shall be two (2) Waterous, or equivalent, zinc anodes provided with the fire			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>pump. The anodes shall aid in preventing galvanic corrosion within the water pump. The anodes shall be installed in the left and right steamer inlets and shall be easily replaceable.</p> <p>There shall be two (2) Waterous, or equivalent, zinc anodes installed in the discharge manifold of the pump and shall be easily replaceable.</p>			
214	<p><b>Impellers:</b> The pump impellers shall be bronze, specifically designed for fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection. The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.</p>			
215	<p><b>Mechanical Seals:</b> The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.</p>			
216	<p><b>Impeller Wear Rings:</b> The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.</p>			
217	<p><b>Pump Casing:</b> The pump casing shall be cast as two (2) horizontally split pieces. The casing shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.</p>			
218	<p><b>Pump Transmission:</b> The pump shall have a Waterous model C20 series transmission, or equivalent. The housing of the transmission shall be constructed of high strength, three piece, horizontally split aluminum. The drive line shafts shall be made from alloy steel forgings, hardened and ground to a size 2.350 inch 46 tooth involute spline.</p> <p>The drive and driven sprockets shall be made of</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>steel and shall be hardened and have ground bores. The drive chain shall be a Morse HV™, or equivalent, high strength involute form chain.</p> <p>Bearings shall be deep groove, anti-friction ball bearings and shall give support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seal.</p> <p>An internal lubrication system shall deliver lubricant directly to the drive chain and shall eliminate the need for an external lubrication pump and auxiliary cooling.</p> <p>The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission.</p> <p>All drive line components shall have a torque rating equal to or greater than the final net engine torque.</p>			
219	<p><b>Air Operated Pump Shift:</b> The pump shift actuating mechanism shall be air operated from a valve in the cab identified as “PUMP SHIFT”. Full instructions for shifting the pump shall be inscribed on the valve plate.</p>			
220	<p><b>Pump Shift Indicating Lights:</b> There shall be two (2) pump system shift indicator lights in the chassis cab. The first light shall become energized when the chassis parking brake has been set and the pump has completed its shift into pump gear and shall be labeled “Pump Engaged”. The second light shall become energized and when the pump and the chassis transmissions have been shifted completely into the correct gears for pumping, this light shall be labeled “OK To Pump”.</p> <p>There shall be one (1) pump system shift indicator light located on the operator’s panel. This light shall only become engaged when the chassis parking brake has been set, and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled “Throttle Ready”.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
221	<p><b>Primer:</b> The priming pump, model VPO/VPOS, or equivalent, shall be included in the pump assembly. The priming pump shall be an electrically driven rotary vane pump mounted firmly within the pump area. The pump shall be controlled from the pump operator's panel. An indicator light on the pump panel shall show when the primer motor is engaged. The pump shall be capable of creating suction and discharging water from a lift of 10 feet through 20 feet of suction hose of the appropriate size, in not more than 30 seconds starting with the pump dry. It shall be capable of developing a vacuum of 22 inches at an altitude of up to 1000 feet.</p>			
222	<p><b>Priming Valve:</b> There shall be a Waterous model VPA, or equivalent, vacuum activated priming valve supplied with the pump. The valve shall open automatically when the priming system is activated. The valve shall be installed on the pump or mounted remotely.</p>			
223	<p><b>Pressure Governor/Monitory Display:</b> A Fire Research Pump Boss, or equivalent, pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 ¾ inches high by 4 5/8 inches wide by 1 ½ inches deep. The control knob shall be 2 inches in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 ¾ inches from the front of the control module. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring. Inputs to the control module from the pump discharge and intake pressure sensors shall be electrical.</p> <p>The following continuous displays shall be provided:</p> <ul style="list-style-type: none"> <li>· Engine RPM; shown with four daylight bright LED digits more than ½ inch high</li> <li>· Check engine and stop engine warning LEDs</li> <li>· Oil pressure; shown on a dual color (green/red) LED bar graph display</li> </ul>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<ul style="list-style-type: none"> <li>· Engine coolant temperature; shown on a dual color (green/red) LED bar graph display</li> <li>· Transmission Temperature: shown on a dual color (green/red) LED bar graph display</li> <li>· Battery voltage; shown on a dual color (green/red) LED bar graph display</li> <li>· Pressure and RPM operating mode LEDs</li> <li>· Pressure / RPM setting; shown on a dot matrix message display</li> <li>· Throttle ready LED</li> </ul> <p>The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.</p> <p>The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:</p> <ul style="list-style-type: none"> <li>· High Battery Voltage</li> <li>· Low Battery Voltage (Engine Off)</li> <li>· Low Battery Voltage (Engine Running)</li> <li>· High Transmission Temperature</li> <li>· Low Engine Oil Pressure</li> <li>· High Engine Coolant Temperature</li> <li>· Out of Water (visual alarm only)</li> <li>· No Engine Response (visual alarm only)</li> </ul> <p>The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.</p> <p>The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.</p> <p>The pressure governor and monitoring pressure display shall be programmed to interface with the specific engine installed.</p>			
224	<p><b>Intake Relief Valve:</b> There shall be an Elkhart 40-41, or equivalent, intake relief valve installed on the suction side of the pump. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2 inches male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".</p>			
225	<p><b>Pump Drain Valve:</b> A Trident, or equivalent, manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by turning a single control. The valve assembly shall consist of a stainless steel plate and shaft in a bronze body with multiple ports. The drain valve control shall be mounted on the left side pump panel and identified as "Master Drain".</p>			
226	<p><b>Pump Lubrication System:</b> An internal lubrication system shall deliver lubricant directly to the drive chain and shall eliminate the need for an external lubrication pump and auxiliary cooling. Oil shall be supplied with the lubrication system.</p>			
227	<p><b>Pump Cooler Line:</b> There shall be a 1/2 inch line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during longer periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on operator's panel, and shall be clearly labeled "Pump Cooler".</p>			
228	<p><b>Pump Cooler Check Valve:</b> There shall be a check valve installed in the pump cooler line to</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	prevent tank water from back flowing into the pump when it is not in use.			
229	<b>Pump Manuals:</b> Two (2) Pump Operation & Maintenance manuals in CD format shall be supplied at the time of delivery.			
230	<b>Pump Operation Video:</b> There shall be one (1) pump operation and maintenance video(s) supplied at the time of delivery.			
231	<b>Five Year Pump Warranty:</b> The fire pump shall be warranted for a period of five (5) years from the date of delivery to Grand Junction Fire Department of five and one-half (5-1/2) years from the shipment date.			
232	<b>Tank To Pump Check Valve:</b> There shall be check valve between the pump suction and booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.			
233	<b>Tank to Pump Valve:</b> There shall be one (1) 3 inch full flow ball valve connected with a flexible hose from the tank to the suction side of the pump.			
234	<b>Tank Fill Valve:</b> There shall be one (1) Akron 2 inch full-flow tank fill valve plumbed with 2 inch plumbing from the pump to the tank. Installation shall be completed with 2 inch Class 1 rubber hose and stainless steel hose couplings. The tank fill valve shall be controlled from the operator's control panel.			
235	<b>Direct Tank Fill:</b> There shall be one (1) 2 ½ inch direct tank fill valve located on the right side panel. It shall be furnished with a 2 ½ inch valve and 2 ½ inch plumbing. The intake shall terminate with a 2 ½ inch NST female chrome swivel.			
236	<b>Pump Paint:</b> The pump body shall be painted with PPG polyurethane enamel paint. The pump enclosure shall be painted the same color as the apparatus body.			
237	<b>Paint Steamer and Inlet Valves:</b> The steamer and partially recessed inlet valves shall be painted with PPG polyurethane enamel paint. The paint color shall be the same as the apparatus body.			
238	<b>Intake Drains:</b> Each gated intake shall be equipped with a Trident Emergency, or equivalent, ¾ inch quarter turn bleeder valve. The bleeder valve shall be equipped with a chrome plated rectangular handle to provide a positive grip while personnel are wearing gloves.			
239	<b>Intake Trim Plates:</b> Each gated intake shall have a chrome plated die cast zinc trim plate around the			

	SPECIFICATION	Meets	Does Not Meet	Comments
	intake valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.			
240	<b>Slow Close Mechanisms:</b> Gates intakes that are 3 inches or larger shall be equipped with a mechanism to prevent changing the position of the valve from full open to full close, or vice versa, in less than 3 seconds.			
241	<b>Intake Strainers:</b> Removable strainers shall be provided with each gated intake.			
242	<p><b>Gate Intake:</b> There shall be one (1) 2 ½ inch gated intake provided on the left side of the pump compartment. The intake shall be furnished with a 2 ½ inch valve and 2 ½ inch plumbing. The intake shall terminate with a 2 ½ inch NST female chrome swivel.</p> <p>The suction valve(s) shall be an Akron 8800 series brass quarter-turn, full flow, and swing-out type. The valve shall be designed in such a manner that the action of water against the regulating element shall not affect its position.</p> <p>Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum. The valves located in the pump compartment area shall be partially recessed behind the panel in order to keep the valve protected from the elements.</p> <p>There shall be a South Park model HPC3008AC, or equivalent, 2½ inch NST plug with chain supplied. The plug shall be manufactured from high quality brass and shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>			
243	<b>Inlets, Steamer:</b> There shall be one 6 inch steamer inlet supplied on the left side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion. To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the left side of the apparatus. There shall be one (1) 6 inch NST thread, South Park LHC26P14AC long handle cap, or equivalent, provided. The cap shall be			



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one 6 inch steamer inlet located on the right side of the pumper. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion. To accommodate an intake valve without exceeding the legal overall body width, a shorter steamer barrel shall be installed on the right side of the apparatus. There shall be one (1) 6" NST thread, South Park LHC26P14AC long handle cap, or equivalent, provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>			
244	<p><b>Crosslays:</b> There shall be two (2) 1½ inch and one (1) 3 inch crosslays above the side mount control panel. Two (2) crosslay shall be plumbed with a full-flow 2 inch Akron style 8820 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 1½ inch male swivel elbow. One (1) crosslay shall be plumbed with a full-flow 3 inch Akron style 8820 valve. Class 1 high pressure flex hose with stainless steel couplings shall be used in plumbing the discharge to a 3 inch male swivel elbow. The swivel for each crosslay hose bed shall be located outboard for ease of making connections while changing hose.</p> <p>The floor of the crosslay shall be covered with Dura-Dek, or equivalent, fiber reinforced material with adjustable dividers. Two (2) crosslay hose bed shall have a capacity of 200 feet of 1¾ inch double jacket fire hose. One (1) crossslay hose bed will have a capacity of 200 feet of 2½ inch double jacket fire hose.</p> <p>There shall be two (2) Thuemling, or equivalent, individual pressure gauge(s) installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation.</p> <p>Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	with each gauge.			
245	<b>Crosslay Cover:</b> The crosslays shall have a treadplate coated cover installed. There shall be a webbing restraint located on each end of the pre-connected crosslay/speedlay. The webbing shall be easily opened in the center with Velcro closures.			
246	<b>Crosslay Rollers:</b> Stainless steel rollers shall be provided at each end of the crosslay hose bed to facilitate deployment of hose. Vertical rollers shall be installed on each side of the hose bed opening, and a horizontal roller shall be installed under the opening.			
247	<b>Discharge Valves:</b> All discharge valves shall be quarter-turn, full flow, swing-out type. The flow regulating element of each valve shall not change its position under any condition of operation involving discharge pressures to the maximum pressure of the pump. The means to prevent a change in position shall be incorporated in the operating mechanism and shall be permitted to be manually controlled.			
248	<b>Location of Discharge Outlets:</b> No discharge outlets larger than 2½ inches shall be located on the pump operator's panel.			
249	<b>Stainless Steel Plumbing:</b> Each valve shall be individually attached to the manifold of the pump with stainless steel pipe. The plumbing to the valve shall contain a minimum of elbows to keep friction loss to a minimum and high pressure hose shall be used in as many places as practical.			
250	<b>Drain Valves:</b> Each discharge 2½ inches or larger, with the exception of the crosslays and hard to access plumbing, shall be equipped with a ¾ inch quarter turn Trident Emergency, or equivalent, drain between the valve and the discharge. There shall be a chrome plated rectangular handle provided on each drain valve to facilitate use with a gloved hand.  Drain valves shall be located in a row just above the running board and below the pump panel on each side of the apparatus pump compartment to reduce clutter in the pump panel area. Each drain valve shall have a color coded bezel to match the appropriate line it is connected to. The drain valves shall be connected to the individual valves with flexible hose that is routed in such a manner as to assure complete drainage. Discharge from			

	SPECIFICATION	Meets	Does Not Meet	Comments
	the drain valves shall be routed to below the apparatus.			
251	<b>Automatic Drains:</b> A Class 1 model 34AD, or equivalent, automatic drain shall be installed on all crosslay, deluge gun and discharge plumbing that flows in low routed areas that are located below the ¼ turn manual drain. The drains shall be located in areas where there is a possibility of back flow. These drains will open whenever pressure in the line drops below 6 PSI.			
252	<b>Discharge Elbows:</b> All discharges that are 2 inches or larger and are 42 inches or more above grade shall be equipped with a downward pointing elbow of 30 degrees or more.			
253	<b>Discharge Caps:</b> All discharges, except for those designated as preconnects, shall have a chrome cap. Caps for discharges 3½ inches and smaller shall be secured to the apparatus with suitable chains or cables.			
254	<b>Discharge Trim Plates:</b> Each gated discharge shall have a chrome plated die cast zinc trim plate around the discharge valve and fitting. The trim plate shall be easily removable without the need to disturb the valve.			
255	<b>Slow Close Mechanisms:</b> Discharges that are 3 inches or larger shall be equipped with a valve mechanism to prevent changing the position of the valve from full open to full close, or vice versa, in less than 3 seconds as required by NFPA.			
256	<p><b>Front Bumper 1½ Inch Discharge:</b> There shall be one (1) 1½ inch NST discharge installed in the bottom center of the hose tray located in the front bumper. The discharge shall be plumbed with a 2 inch Akron valve and 2 inch plumbing. Class 1 high pressure flex hose with stainless steel couplings shall be used in the plumbing of this discharge.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation.</p> <p>Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p>			
257	<b>Left Side Discharges:</b> There shall be two (2) 2½			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>inch NST discharges on the left side of the pump compartment. The discharges shall be plumbed with 2½ inch Akron valves and 2½ inch plumbing.</p> <p>The 2 ½ inch valves shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkages and universal yokes. Control rods shall be hard coated anodized aluminum ¾ inch rod and polished chrome plated zinc handles.</p> <p>There shall be two (2) Thuemling, or equivalent, individual pressure gauges installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be two (2) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapters provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be two (2) 2 ½ inch NST South Park HCC2808AC, or equivalent, caps with chains provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>			
258	<p><b>Right Side Discharge:</b> There shall be one (1) 2½ inch NST discharge on the right side of the pump compartment. The discharge shall be plumbed with a 2½ inch Akron valve and 2½ inch plumbing.</p> <p>The 2½ inch valve shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum ¾ inch rod with a polished chrome plated zinc handle.</p> <p>The centerline of the valve control shall be no</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>more than 72 inches vertically above the platform that serves as the pump operator's position.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapter provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one (1) 2½ inch NST South Park HCC2808AC, or equivalent, cap(s) with chain(s) provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>			
259	<p><b>Rear Discharge:</b> There shall be one (1) 2½ inch NST discharge on the left side rear under the hosebed. The discharge shall be plumbed with a 2½ inch Akron valve and 2½ inch plumbing.</p> <p>The 2 ½ inch valve shall be controlled by a Trident, or equivalent, quarter turn locking type push/pull control with direct linkage and a universal yoke. The control rod shall be hard coated anodized aluminum ¾ inch rod with a polished chrome plated zinc handle.</p> <p>The centerline of the valve control shall be no more than 72 inches vertically above the platform that serves as the pump operator's position.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) South Park model SE394505AC, or equivalent, 2½ inch NST swivel female x 2½ inch NST male 45 degree adapter provided. The adapter shall be manufactured from high quality brass and the swivel shall be attached using ball bearings. The adapter shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p> <p>There shall be one (1) 2 ½ inch NST South Park HCC2808AC, or equivalent, cap(s) with chain(s) provided. The cap shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.</p>			
260	<p><b>Large Diameter Discharge:</b> There shall be one (1) 4 inch NST discharge located on the right side pump panel. The discharge shall be plumbed with a 3½ inch Akron valve and 4 inch plumbing. The 4 inch discharge shall be controlled by an Akron handwheel. The handwheel worm gear shall be connected to the remote mounted valve via a rod assembly. The handwheel shall turn a gear sector mounted on the valve for smoother and easier operations under pressure.</p> <p>A position indicator shall show the position of the ball valve as per NFPA 1901. Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge(s) installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p> <p>There shall be one (1) Snap-Tite model AS50T40NER, or equivalent, 4 inch NST female rocker lug x 5 inch Storz, or equivalent, 30 degree elbow adapter(s) shall be supplied with the apparatus. There shall be one (1) Snap-Tite model BS50, or equivalent, 5 inch Storz, or equivalent, blind cap(s) with chain supplied with the</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	apparatus			
261	<p><b>Foam Pro 2001 Single Foam System:</b> The apparatus shall be equipped with a Hypro FoamPro 2001 electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates and most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. The system shall be capable of delivering accuracy to within 3% of calibrated settings. The system shall be equipped with a digital electronic control display, suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flow meter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.</p> <p><b>(NOTE: AN OPTIONAL COMPRESSED AIR FOAM SYSTEM [CAFS] SHALL BE QUOTED ON THE RESPONSE FORM. See Attachment A for specifications.)</b></p>			
262	<p><b>Foam Proportioning System Testing:</b> The foam proportioning system shall be tested and certified after final installation as per NFPA 1901, newest edition.</p>			
263	<p><b>Deluge Monitor Riser:</b> There shall be one (1) 3 inch riser for a deluge monitor installed above the pump on the apparatus. The riser pipe shall be installed with a 3 inch valve, controlled fro the pump operator's panel.</p> <p>The discharge valve shall be controlled by an Elkhart RC-10, or equivalent, slow-closing remote linear output screw-type actuator. The actuator housing and push-rod shall be constructed of light weight extruded aluminum. A precision needle thrust bearing and hardened thrust washers shall assure smooth, efficient operation and accurate flow and pressure control capability. A 5 inch cast aluminum handwheel shall allow for compact through-the-panel installation.</p> <p>The valve status indicator module shall provide the pump operator with the status of the valve at a</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>glance. Red shall mean fully closed; Green shall mean fully opened; Yellow shall indicate a gated position. Incandescent lamps shall provide a reliable signal with a wide viewing angle even in bright sun light. Reliable solid state valve position sensors shall be water and lubricant resistant. The integrated circuit board and lamp sockets shall be completely encased in epoxy for total protection from the elements.</p> <p>The riser for the deck gun shall terminate 3 inch NPT.</p> <p>There shall be one (1) Thuemling, or equivalent, individual pressure gauge installed on the pump panel. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operations to minus 40 degrees and to reduce lens condensation. Each gauge shall read 0-400 PSI and shall be a minimum of 2½ inches in diameter. A removable polished, stainless steel trim ring will be provided with each gauge.</p>			
264	<p><b>Polypropylene Foam Cell:</b> There shall be one (1) 30 gallon polypropylene foam cell incorporated into the polypropylene water tank.</p> <p>There shall be one (1) pressure/vacuum vent installed on the foam tank.</p> <p>There shall be one (1) drain hose connected to the foam cell. The drain shall have a ¼ turn valve installed inside the pump house and it shall drain below the frame rail of the chassis.</p>			
265	<p><b>Water Tank:</b> The water tank shall have a capacity of 500 U.S. gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the City of Grand Junction upon delivery of the apparatus.</p>			
266	<p><b>UPF Poly Tank Construction:</b> The UPF Poly-Tank® IIE, or equivalent, shall be constructed of 12 inch thick PT2E™ polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermoplastic, black in color, and U.V. stabilized for maximum protection.</p>			
267	<p><b>Booster Tank:</b> The booster tank shall be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	3 to 1 safety factor to facilitate easy removal.			
268	<b>Tank Baffles:</b> The transverse swash partitions shall be manufactured of 3/8 inch PT2E™ polypropylene (natural in color) and extend from approximately 4 inches off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8 inch PT2E™ polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.			
269	<b>Tank Sump:</b> There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of ½ inch polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4 inch schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2 inches above the sump to prevent air from being entrained in the water while pumping.			
270	<b>Tank Fill Connection:</b> All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.			
271	<b>Tank Lid:</b> The tank lid shall be constructed of ½ inch thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8 inches from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2 inch polypropylene dowels spaced a maximum of 30 inches apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped ½ inch x 13 inches to			

	SPECIFICATION	Meets	Does Not Meet	Comments
	accommodate the lifting eyes.			
272	<p><b>Tank Mounting:</b> The UPF Poly-Tank IIE shall rest on the body cross members in conjunction with such additional cross members, as required by the tank manufacturer.</p> <p>The tank shall be isolated from the cross members through the use of hard rubber strips with, a minimum Rockwell Hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation.</p> <p>Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restraints to minimize movement during vehicle operation.</p> <p>The tank shall be completely removable without disturbing or dismantling the apparatus structure.</p>			
273	<b>Lifetime Tank Warranty:</b> The tank shall have a lifetime warranty from UPF.			
274	<b>Water Tank Fill Tower:</b> The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of ½ inch PT2E polypropylene and shall be a minimum dimension of 8 inches x 8 inches at the outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have a ¼ uinch thick removable polypropylene screen and a PT2E polypropylene hinged-type cover.			
275	<b>UPF Tank Overflow:</b> The tank shall be equipped with a minimum of a 4 inch schedule 40 polypropylene overflow/air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.			
276	<b>Tank Drain Valve:</b> One (1) 1½ inch tank drain valve shall be provided under the tank sump. The valve shall have a locking lever to prevent accidental draining of the tank.			
277	<p><b>Water Tank Level Gauge:</b> The apparatus shall be equipped with one (1) Class 1 "Intelli-Tank", or equivalent, level gauge on the pump operator's control panel. The tank level gauge shall indicate the water level on an easy to read LED display and show increments of 1/8 of a tank. The tank level gauge system shall include:</p> <ol style="list-style-type: none"> <li>1) A pressure transducer that is mounted on</li> </ol>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>the outside of the tank in an easily accessible area.</p> <p>2) A super bright LED 4-light display with a visual indication at nine accurate levels.</p> <p>3) A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.</p>			
278	<p><b>Control Panel:</b> The left side of the pump enclosure shall be divided into two sections. The lower section shall be where all valve controls, the primer control, the discharge relief valve controls (pilot valve), and other mechanical controls are located. This surface shall be referred to as the “control panel”.</p> <p>All valve controls shall be the self-locking type, activated by either direct control or with a direct linkage utilizing friction locking bell cranks and universal ball swivels. The primary valve handles shall have color coded tags installed in a recessed area to clearly denote the purpose of each control.</p>			
279	<p><b>Instrument Panel:</b> The surface above the control panel shall contain all instruments, gauges, test fittings, and optional controls. This surface shall be referred to as the “instrument panel”. The instrument panel shall be independent and hinged and latched so that it may be opened. All instruments, gauges, and other equipment shall be installed with sufficient slack in any cabling, tubing, or plumbing to allow the panel to swivel to the fully open position.</p> <p>The instrument and gauge panel shall be vertically hinged “swing out” to provide access for service.</p>			
280	<p><b>Color Coded Labels:</b> To improve identification of discharges and intakes, color coded tags shall be provided. The tags shall utilize an etching process to provide easy visibility and improved field service life. Tags shall be affixed using an industrial grade adhesive backing, eliminating the need for pop rivets or screws into the panel or control handle.</p>			
281	<p><b>Right Side Pump Panel:</b> A single panel shall be installed on the right side of the pump enclosure. This shall be the area where any right side discharges, inlets, steamers, and other pump associated equipment are located. This panel shall be easily removable and held in place with quick release push latches. It shall be fully removable</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	for pump and plumbing access without the need to use hand tools. Any electrical equipment that may be installed shall be equipped with connectors so they may be easily separated from the opening created when the below described front access panel is removed.			
282	<p><b>Pump Panel Lights:</b> The pump operator's control panel and the right side pump panel shall each be illuminated by an On Scene, or equivalent, LED night stick lighting.</p> <p>The pump panel lights shall become energized upon setting the parking brake so the gauge information provided may be consulted at any time the apparatus is parked.</p> <p>A shield shall be installed over the pump panel lights to further protect them from the elements and to act as a reflector for additional illumination.</p>			
283	<p><b>Panel Surfaces:</b> The control panel, instrument panel, and right side pump panel shall be coated with a thermoplastic material for maximum resistance to abrasion and to minimize glare. The material shall be capable of withstanding the effects of extreme temperatures and weather.</p>			
284	<p><b>Pressure/Vacuum Test Ports:</b> Class 1 model 115100, or equivalent, pressure and vacuum test ports shall be provided on the pump panel.</p>			
285	<p><b>Pump Cooler Valve:</b> Class 1 model 38BV, or equivalent, pump cooling control valve shall be provided on the pump panel.</p>			
286	<p><b>Engine Cooler Valve:</b> Class 1 model 38BV, or equivalent, pump cooling control valve shall be provided on the pump panel.</p>			
287	<p><b>White Face/Black Numeral Gauge Display:</b> The master pump gauges and individual pressure gauges shall have a white face with black numbers and lettering providing a high contrast to allow the gauges to be easily read by the operator.</p>			
288	<p><b>Master Pump Gauges:</b> The pump vacuum and pressure gauges shall be supplied by Thuemling, or equivalent. Each gauge shall be fully filled with pulse and vibration dampening Interlube to insure proper operation to minus 40 degrees and to reduce lens condensation. The gauge shall read -30-0-400 PSI and shall be a minimum of 4½ inches in diameter.</p>			
289	<p><b>Dunnage Compartment:</b> There shall be a dunnage compartment above the pump</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	compartment. The dunnage compartment shall be constructed of Tread Brite.			
290	<b>Independent Pump Compartment:</b> The main body and the pump compartment shall be fabricated as individual units. Both the body and pump compartment shall be fabricated using precision holding fixtures to ensure proper dimensions. All attachment points shall be heavily reinforced.			
291	<p><b>Aluminum Body Construction:</b> The apparatus body shall be fabricated from 1/8 inch thick 5052-H32, smooth aluminum sheet. The complete apparatus body shall be fabricated utilizing the break and bend techniques in order to form a strong, yet flexible, uni-body structure. The body shall be constructed with holding fixtures to ensure proper dimensioning. The apparatus body shall be designed to meet the unique requirements as specified.</p> <p>The main body compartments on each side, as well as the rear center compartment if applicable, shall contain a sweep out floor design. Each compartment shall be made to the most practical dimensions in order to provide maximum storage capacity. The door opening threshold will be positioned lower than the compartment floor permitting easy cleaning of the compartments.</p> <p>Continuous, solid welded seams shall be located at the upper front and upper rear corners of the apparatus body. The flooring of all lower, main body compartmentation shall also have solid weld seams. All door jams, on both the top and the bottom, shall be solid welded. Each main door jam shall consist of a double jam design, comparable to a double struck frame design, which provides superior strength and durability. All double door jams are to be welded together utilizing the plug weld technique. All remaining compartment walls shall be stitch welding.</p> <p>The compartment floors, specifically L1 and R1 (found in item 295 and 296 below), shall have a minimum of two (2) 1 inch x 2 inch rectangular tubes welded to the entire width of the compartment floor. The two (2) rear side compartments as well as the rear center compartment, if applicable, shall be welded to the rear deck support structure. This rear deck</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>support structure is specially designed for the galvanized apparatus body substructure. A minimum of two (2) squares tubes, which are ¼ inch x 3 inches x 3 inches, shall run the entire width of the body from sidewall to sidewall. Each lower, rear compartment will be adequately stitch welded to the cross tubes providing strength and durability to the entire apparatus body.</p> <p>The body design shall include a “false wall” design in the lower portion of each lower, rear compartment. This is required in order to allow for easy accessibility to the rear electrical components found in the rear taillight cluster area.</p> <p>The upper area of the apparatus body directly above the side compartment door openings, shall have a header fabricated from smooth, aluminum sheet. This area shall be free from any body seams and shall be painted the same color as the apparatus body. The height of the header may vary depending on the following factors: apparatus design, lettering requirements, scene lights and warning light requirements as well as various other options.</p>			
292	<p><b>Body Sub Frame:</b> To assure proper body alignment and clearance, the body sub frame shall be constructed in a jig and fitted directly to the chassis.</p> <p>The chassis frame rails shall be fitted with fiber reinforced rubber to isolate the body frame members from direct contact with chassis frame rails.</p> <p>The main body sub frame shall be constructed from steel tubing. The sub frame shall run the full length of the body and shall be spaced the same width as the chassis frame rails. The main sub frame shall also be the integral support for the water tank. Vertical drop tubes shall be welded to the sub frame. From these vertical drop tubes shall extend cross members constructed of steel angle. These cross members shall extend out to support the compartments. Cross members shall be located at the front and rear of the body and in front and rear of the wheel well opening.</p> <p>The compartment area behind the rear axle shall be supported by a drop frame fabricated of steel tube and steel angles. The rear drop frame shall be constructed using vertical drop tubes, welded</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>to the main sub frame. All drop frame structures shall be welded directly to the body sub frame to allow the body to be a completely separate structure from the chassis.</p> <p>After fabrication the sub frame shall be hot dip galvanized for maximum protection against corrosion.</p>			
293	<p><b>Body Mounting:</b> The body sub frame shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece bracket. The two (2) brackets shall be fabricated of steel plates. The plates shall be painted to prevent any corrosion. Each mounting assembly shall utilize two (2) plated bolts and two (2) heavy duty springs. The assembly design shall allow the body and sub frame to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall limit stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strain due to load and chassis movement. Body mountings that do not allow relief from chassis movement shall not be acceptable.</p>			
294	<p><b>Tank Mounting:</b> The water tank shall rest on the sub frame cross members which are spaced as required by the tank manufacturer.</p> <p>The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum Rockwell hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operations.</p> <p>Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restrains to minimize movement during vehicle operations. The tank shall be completely removable without disturbing or dismantling the apparatus structure.</p>			
295	<p><b>Left Side Compartments:</b> COMPARTMENT L1 There shall be a full height compartment located ahead of the rear wheel on the left side of the apparatus body. This compartment shall be</p>			

	<b>SPECIFICATION</b>	<b>Meets</b>	<b>Does Not Meet</b>	<b>Comments</b>
	<p>designated as L1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a double, vertically hinged swing-out door.</p> <p><b>COMPARTMENT L2</b> A compartment shall be located above the rear wheel on the left side of the apparatus body. This compartment shall be designated as L2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.</p> <p><b>COMPARTMENT L3</b> There shall be a full height compartment located behind the rear wheel on the left side of the apparatus body. This compartment shall be designated as L3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.</p>			
296	<p><b>Right Side Compartments:</b></p> <p><b>COMPARTMENT R1</b> There shall be a full height compartment located ahead of the rear wheel on the right side of the apparatus body. This compartment shall be designated as R1 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a double, vertically hinged swing-out door.</p> <p><b>COMPARTMENT R2</b> A compartment shall be located above the rear wheel on the right side of the apparatus body. This compartment shall be designated as R2 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, horizontally hinged lift-up door.</p> <p><b>COMPARTMENT R3</b> There shall be a full height compartment located behind the rear wheel on the right side of the apparatus body. This compartment shall be designated as R3 within these specifications and any ensuing paperwork or drawings after contract execution. It shall be equipped with a single, vertically hinged swing-out door.</p>			
297	<p><b>Transverse Rear Compartments:</b> The rear lower compartment shall be transverse from the left side</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	of the body to the right side of the body.			
298	<p><b>Rear Compartments:</b>  <b>COMPARTMENT T1</b>  There shall be a single compartment located at the rear of the apparatus. This compartment shall be designated T1 within these specifications and any ensuing paperwork or drawings after contract execution. The compartment shall be equipped with a roll-up door.</p> <p><b>COMPARTMENT T2</b>  There shall be a compartment located in the hose bed area designed for storage of two (2) ten foot sections of 5 inch hard suction hose, two (2) EMS backboards and one (1) 6 foot rubbish hook with D handle.</p>			
299	<p><b>Compartment Lighting:</b> All compartments shall be furnished with an LED compartment light mounted on the front corner of the compartment.</p> <p>All compartments that are equipped with a lap style door with an opening 42 inches or wider shall have a light installed on the front corner and rear corner of the compartment.</p> <p>The lights shall be rated at 100,000 hours of service with 74 lumens per 18 inch light. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8 inch polycarbonate tube. Multi clip attachments shall allow for installation into any roll up, or standard door configuration.</p> <p>An automatic door switch shall activate all compartment lights.</p>			
300	<p><b>Compartment Scuff Plates:</b> Anodized aluminum angle scuff plates shall be installed in the bottom sill area of all major equipment carrying compartments to reduce paint damage from equipment. The scuff plates shall be attached using a permanent bonding double sided tape.</p>			
301	<p><b>Compartment Door Construction:</b>  Compartment doors shall be of double panel construction. The outer panel shall be fabricated of .190, 5052-H32 aluminum and the inner panel of .125, 3003-H14 aluminum. There shall be a heavy duty automotive type extruded rubber molding installed on the overlap area of the doors to insure a weatherproof seal and prevent water from collecting in the door sills. All of the compartment doors shall have a polished stainless</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	steel continuous hinge connected to both the body and the door with stainless steel bolts and nuts. The hinge pin shall be stainless steel with a minimum diameter of ¼ inch.			
302	<b>Compartment Non-Locking Door Handles, Double Pan Doors:</b> Compartment door handles shall be non-locking stainless steel recessed “D” ring type handles. There shall be a safety latch with striker plate included with the door handle assembly.			
303	<b>Compartment Door Holders:</b> Cleveland style spring loaded door holders shall be furnished on all vertically hinged, swing-open compartment doors to hold the doors in either fully open or partially closed position. The spring-loaded door holder shall close the door automatically when it is positioned past center or return the door to the fully open position if the center point is not reached and the door is released. On compartments having double doors, the secondary door shall have a latch mechanism to secure the door when the primary door is opened. The door strut attachment tabs will be designed in such a way to prevent them from cracking or breaking due to stress.  Pressurized gas filled cylinders shall be furnished on all horizontally hinged, lift-up compartment doors to hold the door in the open position and assist in raising it. The gas filled cylinders shall assist in closing the door automatically when the door is positioned over center.			
304	<b>NFPA Step Requirements/Folding Steps:</b> All steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of at least 500 pounds. Steps shall be adequately lighted.  Each folding step shall have two large open slots to prevent buildup of ice or mud and to provide a handhold when necessary.  Steps shall be provided for the following locations: <ul style="list-style-type: none"> <li>• Three (3) folding steps on the left front compartment</li> <li>• Three (3) folding steps on the right front compartment</li> </ul>			
305	<b>Right Side Pump Access Door:</b> There shall be a Tread Brite door above the right hand side pump			

	SPECIFICATION	Meets	Does Not Meet	Comments
	panel to allow access to the pump compartment. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing a push button latch. A gas strut shall be provided on the door. This door shall be wired into the door ajar warning light circuit. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint fro chipping and scratching.			
306	<b>Front Pump Access Door:</b> There shall be a Tread Brite access door panel provided on the front of the pump compartment. The panel shall b of the single pan design and shall be positively latched in the closed position utilizing a push button latch. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. The area shall be accessible when the cab is tilted.			
307	<b>Compartment Venting:</b> Each body compartment shall be properly vented in a manner that will reduce the amount of dirt and water that may enter the compartment. Venting shall be directly to the atmosphere rather than into another compartment. The vent opening, which is located in the lower corner of the compartment, shall have filter which is easily removable to allow cleaning. Each compartment shall be equipped with drain holes to allow standing water to exit.			
308	<b>Heat Deflector Shield, Exhaust:</b> A deflector shield shall be provided to aid in dissipating exhaust heat from adversely affecting anything stored in the body.			
309	<b>Left Side Modular Running Board:</b> A modular running board shall be installed on the left side of the pump compartment module. The running board shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.  All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.			
310	<b>Right Side Modular Running Board:</b> A modular running board shall be installed on the right side of the pump compartment module. The running board shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>to maintain a uniform appearance.</p> <p>All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.</p>			
311	<p><b>Modular Rear Deck:</b> A modular bolt-on deck shall be installed on the rear of the apparatus to form a full width step area. The rear deck shall be constructed of non-slip Tread Brite. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.</p> <p>All running boards shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.</p>			
312	<p><b>Stainless Steel Screws:</b> Stainless steel screws shall be provided throughout the body in locations such as overlays, pump panels, and other numerous hardware mounting locations. Screws shall be type 410 stainless steel containing 2% molybdenum, or equivalent.</p>			
313	<p><b>Stepping, Standing, Walking Surfaces:</b> All exterior surfaces designated by the manufacturer as stepping, standing or walking areas shall be constructed of grip strut or textured Tread Brite and shall provide a highly slip resistant surface, even when the surface is wet. All interior surfaces designated by the manufacturer as stepping, standing or waling areas shall be slip resistant when the surface is dry.</p> <p>The degree of slip resistance shall be in compliance with the intent of NFPA 1901 newest edition.</p> <p>The apparatus should utilize aluminum tread plate as an overlay of the main apparatus body structure. Aluminum tread plate may also be utilized in the construction of enclosure doors, lids and covers, where applicable. Aluminum tread plate is not to be utilized as a main structural member of the apparatus body or pump enclosure.</p>			
314	<p><b>Tread Brite Overlays:</b> There shall be aluminum Tread Brite overlays installed on the apparatus in those areas designated as walking areas or where additional scuff protection of the apparatus finish is desired.</p> <p>The top Tread Brite overlay shall be mounted flush with the outer edges of the apparatus body.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>A “J” channel shall be incorporated into the body design in order to provide a rain gutter to further assist in preventing excessive moisture from getting into the compartments.</p> <p>Overlays shall be totally insulated from the apparatus with nylon shoulder washers that extend into the hole that is drilled into the body. Stainless steel cap nuts shall be employed where bolts may damage equipment or cause injury. After painting and final construction overlays shall be additionally sealed at the edges with a caulking compound. In addition the following areas shall also be sealed with caulking compound:</p> <ul style="list-style-type: none"> <li>·Front compartment vertical areas on both sides.</li> <li>·Above the forward section of the water tank.</li> </ul>			
315	<p><b>Rear Wheel Wells:</b> The fenders shall be integral with the body side and compartments with a seamless appearance. The fenders shall be fitted with bolt-in removable full circular inner lines in the wheel well area for ease of cleaning and maintenance. There shall be sufficient clearance provided in the wheel well to allow the use of tire chains when the apparatus is fully loaded.</p>			
316	<p><b>Rear Fenderettes:</b> Two (2) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, one on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce build-up of road grime. The stainless steel fenderettes shall be polished to a high quality finish.</p>			
317	<p><b>Road Rub Rails:</b> Rub rails shall be installed beneath the compartment doors to protect them from damage should the body be brushed or rubbed against another object. The rub rails shall be 3/16 inch aluminum channel, 2½ inch x 1 inch. The rub rails shall be highly polished and then bright dip anodized. Rub rails shall be installed on the body utilizing non-corrosive nylon spacers and secured with stainless steel bolts. The outside edge of the rub rails shall be even with the fenderettes and bolt-on steps to prevent snagging.</p>			
318	<p><b>Rear Tow Hook:</b> One (1) rear tow hook shall be installed directly below the rear of the chassis frame rails. The tow hook shall be capable of a 15,000 lb straight pull rating.</p>			
319	<p><b>Handrails:</b> All handrails, unless otherwise stated,</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>shall be constructed of knurled aluminum of not less than 1¼ inch diameter. All railing shields and brackets shall be chrome plated, and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.</p> <p>Location of handrails:</p> <ul style="list-style-type: none"> <li>·Horizontal rear hand rail above the rear center compartment.</li> <li>·Grab handle on top of catwalk on the left side of the apparatus in front of the tank fill tower.</li> <li>·Grab handle on top of catwalk on the right side of the apparatus.</li> <li>·Left rear vertical hand rail from top of body to just above the rear step.</li> </ul>			
320	<p><b>Hydraulic Ladder Rack with Pike Pole Storage:</b> The ladders shall be mounted above the high compartments on the right side of the apparatus on a pivoting ladder rack. The pivoting ladder rack shall be operated hydraulically, lowering the ladders firmly to shoulder height for easy removal and reloading.</p> <p>The hydraulic ladder rack shall be painted the same color as the apparatus and shall have space available for two (2) pike poles to be stored directly on the ladder rack. The control switch shall be located on the right side of the body to allow viewing the ladder rack when operating the mechanism. The control shall be wired to the parking brake and shall only be operable when the parking brake is applied.</p> <p>When in the up position the ladder rack lifting mechanism shall be fully retracted into the apparatus body and shall be flush with the side of the apparatus. Pilot operated check valves shall be installed in the hydraulic system to lock the rack in the stored position by maintaining pressure on the hydraulic cylinder.</p> <p>There shall be a master shut off switch and a flashing indicator light on the chassis dash to warn the driver when the ladder rack is in the down position or in motion when the chassis parking brake is disengaged. The warning light shall be operative regardless of the position of the master switch. Reflective striping shall be applied to the ladder rack assembly in a manner that will readily</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>indicate a hazard or obstruction to personnel.</p> <p>In addition to the reflective striping, Whelen TIR3 series, or equivalent, LED lights shall be affixed to the front and rear of the ladder rack. These lights shall automatically become energized any time the ladder rack is not fully bedded.</p>			
321	<p><b>Ground Ladder Brackets:</b> The ground ladder brackets shall provide a quick method of removing and reloading the ladders. A quick release shall allow personnel to loosen and unhook the strap in order to remove the ladder and a ratchet style mechanism shall securely and easily fasten the ladders back into place.</p> <p>In addition to the brackets, the following shall also be provided:</p> <ul style="list-style-type: none"> <li>·One (1) 10' folding attic ladder, Duo Safety 585A with one (1) set of Zico model FLB mounting brackets</li> <li>·One (1) 14' roof ladder, Duo Safety 775A</li> <li>·One (1) 24' Two section extension ladder, Duo Safety 900A</li> <li>·One (1) 8' Fiberglass Pike Pole, Duo Safety FP8</li> <li>·One (1) 10' Fiberglass Pike Pole, Duo Safety FP10</li> </ul>			
322	<p><b>Adjustable Shelving/Shelves:</b> In each compartment there shall be two (2) strut channels, one (1) per side, installed in compartments to all for maximum adjustability of shelves.</p> <p>There shall be one (1) adjustable shelf in each compartment constructed of 3/16 inch aluminum sheet with 2 inch lips. The shelves shall be coated with Line-X™, or equivalent, thermoplastic polyurethane coating. The shelves shall be fabricated in such a manner that liquids readily drain when spilled.</p>			
323	<p><b>Roll Out Equipment Tray:</b> There shall be one (1) roll out tray installed on the apparatus. The tray shall be provided with a SlideMaster™ model SM2-MP roller type assembly, or equivalent. The roller assembly shall have a rated capacity of 600 pound distributed load and shall have 70% extension capabilities. A mechanical lock assembly shall be provided to lock the tray in the extended position and the retracted position. The tray shall be constructed of 3/16 inch aluminum sheet with 3 inch lips. The tray shall be coated</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>with Line-X™, or equivalent, thermoplastic polyurethane coating.</p> <p>The tray roller assembly shall have a powder coated finish for added corrosion protection.</p>			
324	<p><b>Roll Out Drawers:</b> Compartment R1 shall contain three (3) roll out drawers built into the compartment suitable for storage of various small hand tools.</p>			
325	<p><b>Air Bottle Compartments:</b> There shall be a minimum of four (4) single cylinder air bottle compartments installed in the rear wheel well area. The tubes shall be constructed from injection molded plastic to assist in preventing damage to the air cylinders. There shall be drain hole in the rear of the compartment.</p> <p>The single air bottle compartment shall have Cast Products, or equivalent, hinged door. All hinges and mounting hardware shall be concealed. A Southco lever latch, or equivalent, shall be utilized for opening and securely closing the door. A gasket shall be provided to keep the inside of the compartment dry.</p>			
326	<p><b>Hose Bed Capacity:</b> The hose bed shall have the capacity for 600 feet of 5 inch LDH fire hose, 600 feet of 2 ½ inch double jacketed fire hose and two (2) bed of 200 feet of 1¾ inch double jacketed fire hose. Each hose bed shall be divided by adjustable dividers.</p>			
327	<p><b>Hose Bed Flooring:</b> The floor of the hose bed compartment shall be constructed of Dura-Dek, or equivalent, fiber reinforced plastic material. The flooring shall be fabricated of “T” beam pultrusions in parallel connected with cross slats that are first mechanically bonded and then epoxied, forming a large sheet.</p> <p>The top portion of each “T” cross section shall measure 1¼ inches wide and 3/16 inch thick with beaded ends. The vertical portion shall be 3/8 inch thick, beading out at the bottom to a thickness of ½ inch and tall enough to result in an overall height of 1 inch. The “T” sections shall be spaced ¾ inch apart to allow for drainage and ventilation.</p> <p>Each “T” beam shall be constructed utilizing a core of 250,000 continuous glass fiber strands that are high in resistance to tension, compression and bending. An outer sheath consisting of a</p>			



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>continuous strand mat to prevent lineal splitting and slipping shall surround the core. The sheath shall also serve to draw the protective resin to the bar surface. Both reinforcements shall be pulled through an isophthalic polyester resin, treated with antimony trioxide for fire resistance, to form a solid length.</p> <p>The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. The bright white coating shall be baked on.</p>			
328	<p><b>Aluminum Hose Bed Partitions:</b> Hose bed partitions shall be installed in the hose bed. The partitions shall be fabricated from ¼ inch smooth aluminum plate and an aluminum extrusion.</p> <p>The partitions shall be mounted on hot-dipped galvanized slide rails at the front and rear of the hose bed.</p> <p>Where no obstruction such as a fill tower is present, the slide rails shall allow full movement of the partition along the width of the hose bed. Each hose bed partition shall have an oval shaped hand hold slot to assist in moving the partition. This shall provide the capability for variable hose load configurations and capacities.</p>			
329	<p><b>Vinyl Hose Bed Cover:</b> There shall be a heavy duty vinyl coated nylon hose bed cover installed don the apparatus. The front edge of the cover shall be retained in a “C” channel to prevent wind from lifting it. In addition, the end flap shall be secured with a positive means to prevent unintentional deployment of the hose.</p>			
330	<p><b>Wiring Harnesses:</b> Wiring harnesses shall be the automotive type, engineered specifically for the builder’s apparatus, and shall meet the following criteria. Under no circumstances shall diodes, resistors, or fusible links be located within the wiring harness. All such components shall be located in an easy to access wiring junction box or the main circuit breaker area. All wire shall meet white book, baseline advanced design transit coach specification and Society of Automotive Engineers recommended practices. It shall be stranded copper wire core with cross linked polyethylene insulation complying with SAE specification J1128. Each wire shall be hot stamp function coded every three inches starting one inch from the end and continuing throughout the</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>entire harness. In addition to function coding, each wire shall be number and color coded.</p> <p>All terminals on the ends of the wiring harness shall be soldered unless a crimping tool or machine is used that gives an even and precise pressure for the terminal being used. All terminals shall be pull tested to insure their integrity.</p>			
331	<p><b>Outputs:</b> The outputs shall perform all the following items without added modules to perform any of the tasks.</p> <ol style="list-style-type: none"> <li><b>Load Shedding:</b> The System shall have the capability to Load Shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like Load Shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.</li> <li><b>Load Sequencing:</b> The System shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system. No add-on modules shall be acceptable; the module with the outputs must perform this function.</li> <li><b>Output Device:</b> The System shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than 100 times that of a relay. No add-on modules shall be acceptable; the module with the outputs must perform this function.</li> <li><b>Flashing Outputs:</b> The System shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, or 160 FPM. This means any light can be specified with</li> </ol>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>5. <b>PWM:</b> The modules shall have the ability to PWM at some outputs so that a Headlight PWM module is not needed. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p> <p>6. <b>Diagnostics:</b> An output shall be able to detect either a short or open circuit. The System shall be able report in “real time” a text based message that points the maintenance person to a specific output.</p>			
332	<p><b>Inputs:</b></p> <ol style="list-style-type: none"> <li>1. The inputs shall have the ability to switch by a ground or battery signal.</li> <li>2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.</li> </ol>			
333	<p><b>Automatic Climate Control:</b> The Multiplex system shall have the capability to provide automatic climate control which shall occur by the use of PWM outputs and a digital readout that combines other vehicle functions. The Climate control shall be an integral part of the Multiplex system. No add-on modules shall be acceptable, the module with the outputs must perform this function.</p>			
334	<p><b>Auto-Throttle:</b> The Multiplex system shall be able to perform automatic high idle via a network gateway or by using an existing output on a module to provide the proper signals to an OEM Engine ECU. This task shall be handled with existing inputs and outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.</p>			
335	<p><b>Displays:</b> Displays shall be able to provide real time information regarding Load Shedding and System Status, such as network traffic/errors or shorts and open circuits.</p>			
336	<p><b>System Network:</b> The Multiplex system shall contain a Peer-to-Peer network. A Master Slave type network is not suitable for the Fire/Rescue industry. A Peer-to-Peer network means that all</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	the modules are equal on the network; a Master is not needed to tell other nodes when to talk.			
337	<b>System Reliability:</b> The Multiplex system shall be able to perform in extreme temperature conditions, from 40 degrees to +85 degrees C (-40 degrees to +185 degrees F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.			
338	<b>Weatherproof Door Switches:</b> Due the harsh environment and susceptibility to moisture on the fire ground, the fire apparatus compartment doors shall utilize weatherproof switches. Two different types of switches shall be used. Weatherproof proximity switches shall be utilized where space permits. In tight locations, mechanical weatherproof switches shall be used. <b>No Exceptions.</b>  The switches shall be used for activation of the compartment lights and shall provide a signal to the door open circuit in the cab.			
339	<b>12 Volt System Schematic:</b> A complete electrical schematic for the apparatus shall be provided. This schematic shall be specifically prepared for this individual unit rather than a generic schematic designed to accommodate all apparatus.			
340	<b>12 Volt System Test:</b> After completion of the unit, the 12 volt electrical system shall undergo a battery of tests as listed in the latest addition of NFPA Pamphlet 1901. These tests shall include, but not be limited to: a reserve capacity test, alternator performance test at idle, alternator performance test at full load, and a low voltage alarm test. Certification of the results shall be supplied with the apparatus at the time of delivery.			
341	<b>Rear Work Light Switch:</b> A switch shall be installed above the tail light bezel on the left side. The switch shall be wired to the backup lights to provide additional work lighting. The rear work light circuit shall be deactivated when the park brake is disengaged. In addition to the lights being activated by the above switch, the lights shall also come on when the transmission is placed in reverse.			
342	<b>Midship Turn Signals:</b> There shall be one (1)			

	SPECIFICATION	Meets	Does Not Meet	Comments
	Truck-Lite model 21, or equivalent, LED midship auxiliary/turn signal lights installed in the rub rail, on each side of the body.			
343	<b>Clearance Lights:</b> Grote model 65282, or equivalent, red LED clearance lights shall be installed on the rear of the body as necessary to be in full compliance with applicable ICC and DOT codes and regulations.			
344	<b>Ground Lighting:</b> Truck-Lite model 40, or equivalent, lights shall be installed beneath the apparatus in areas where personnel may be expected to climb on and off the apparatus. The lights shall illuminate the ground within 30 inches of the apparatus to provide visibility of an obstructions or hazards. These areas shall include, but not be limited to, side running boards and the rear step area.			
345	<b>Walkway Lights:</b> Lights shall be mounted in a manner that illuminates all walkways and steps for safe operation of the apparatus. These lights shall become illuminated when the parking brake is engaged.			
346	<p><b>Firecom 3010 Intercom:</b> There shall be a Firecom 3010 intercom system provided on the apparatus. The system shall include six (6) positions in the cab, and one (1) at the pump panel. Each position in the system shall have intercom capabilities.</p> <p>The following positions shall have radio interface capabilities: Driver, Officer, and Pump Panel.</p> <p>There shall be two (2) Firecom model UH-10, part number 105-0192-00 under the helmet, radio transmit headsets included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a red push to talk button.</p> <p>There shall be four (4) Firecom model UH-20, part number 105-0193-00 under the helmet, intercom only headset(s) included with the intercom system. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a momentary push and hold to talk button.</p> <p>There shall be one (1) Firecom model HE-150, part number 108-0675-15, 15 foot coiled</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>extension cable(s) supplied. The cable shall be compatible with any single plug Firecom headset.</p> <p>There shall be six (6) Firecom HM-10, headset plug-in modules, part number 107-0407-00 installed. The modules are designed for interior mounting and shall accommodate a Firecom single plug headset.</p> <p>There shall be one (1) Firecom model PP-20, part number 107-0413-00, waterproof headset module installed. The module shall have a snap tight spring hinged lid to protect against moisture and allow for exterior mounting. The module shall be designed to accommodate Firecom single plug headsets.</p>			
347	<p><b>Mobile Radio Interface Cable, Firecom:</b> There shall be a Firecom mobile interface cable provided with the intercom system. The cable is radio specific and will allow the Firecom intercom system to interface with the mobile radio system. The mobile radios being used are Motorola XTL-2500.</p>			
348	<p><b>Pump Compartment Lights:</b> There shall be two (2) LED lights installed in the pump compartment. The lights shall be activated by an automatic switch in the right side pump compartment access door and shall be located in a manner that will provide maximum lighting.</p>			
349	<p><b>Tail Lights:</b> There shall be a Whelen 600 series, or equivalent, LED tail light assembly installed on each side of the rear of the apparatus. Each assembly shall include one (1) red LED stop/tail light model number 60R00BRR, one (1) amber LED model 60A00TAR turn light with arrow and one (1) clear halogen backup light model 60F000CR. The lights shall be mounted in a chrome plated composite housing.</p>			
350	<p><b>Streamlight Rechargeable Lights:</b> There shall be two (2) Streamlight model 45102 20 watt spot, rechargeable LiteBoxes supplied and installed on the apparatus. The lights shall be wired direct to the chassis batteries</p>			
351	<p><b>Customer Supplied Radio and Antenna:</b> There shall be one (1) City supplied radio and one (1) City supplied antenna shipped to the apparatus manufacturer for installation.</p>			
352	<p><b>Onan Hydraulic Generator Set:</b> An Onan model 8RBAB hydraulic driven generator set shall be installed on the apparatus. The generator shall be rated at 8,000 watts at 120/240 volts. Current</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>frequency shall be stable at 60 hertz. The power generating unit shall be modular unit, housed in stainless steel with an acoustical material added for maximum sound dampening. The module shall consist of the hydraulic motor, generator, blower, cooler, and all other necessary components.</p> <p>For ease of maintenance, the only part of the system that shall require accessibility shall be the oil reservoir which shall be located so as to facilitate periodic checks and the adding of hydraulic fluids.</p>			
353	<p><b>Warranty Period:</b> Onan shall warrant that the 8RBAB series hydraulic generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery.</p> <p>A ninety (90) day adjustment policy shall be free of charge. This policy provides that Cummins Inc. will make minor adjustments to the generator set during the first three (3) months of ownership.</p> <p>In addition to the five (5) year or one thousand (1,000) hour warranty, a travel time repair allowance of 2-1/2 hours and mileage cost up to one hundred (100) miles shall be included for the first two (2) years</p>			
354	<p><b>Generator Hot Shift PTO Connection:</b> The hydraulic pump for the generator system shall be connected to the chassis transmission through a “Hot Shift”, electrically engaged power-take-off system. The control to engage and disengage the power-take-off system shall be installed in the chassis cab.</p>			
355	<p><b>Generator Display Meter:</b> There shall be an LED generator display meter provided with the generator. The display meter shall automatically sense a generator signal and begin displaying information. The digital meter display shall constantly monitor and display voltage, frequency and amps. The display shall be capable of displaying total accumulated run time hours when the MODE button is pressed once. When the MODE button is pressed twice the display shall show the temperature of the oil returning to the oil reservoir.</p> <p>The frog display shall be located on the pump panel.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
356	<b>Load Center:</b> The entire 120/240 volt electrical system shall be installed in strict compliance with NFPA Pamphlet 1901 newest edition. This shall include all testing, labeling, wiring methodology, and dimensional requirements. Certification of compliance shall accompany the apparatus at the time of delivery. There shall be a 120/240 volt load center incorporated into the 120/240 volt wiring system. The load center shall include adequate circuit breakers to protect the loads specified on this apparatus. All 120/240 volt A.C. wiring shall be done in accordance with NFPA Pamphlet 1901 as well as nationally accepted electrical codes.			
357	<b>Branch Circuit Over Current Protection:</b> Over current protection devices shall be provided for circuits in accordance with NFPA 1901 newest version. The load center shall be equipped with a non-GFI two pole main breaker when the six (6) or more individual branch circuits are present. Over current protection devices shall be marked with labels to identify the function of the circuit they protect.			
358	<b>Protective Covers and Enclosures for Electrical Terminals:</b> All ungrounded electrical terminals shall have a protective cove or be in an enclosure.			
359	<b>120 Volt Twist Lock Receptacles:</b> There shall be two (2) NEMA L5-20 120 volt 20 ampere rating twist lock type receptacles wired to the generator. The receptacles shall have spring loaded weather resistant covers.			
360	<b>Rear Cab Wall Telescoping Light Mounts:</b> The following 240 volt telescoping lights shall be mounted to the rear of the cab: <b>Telescoping 240 Volt Lights:</b> There shall be Two (2) Fire Research NightMaster model LTA510-M12 telescopic lights installed. The light poles shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position.  The lamphead shall have one (1) quartz halogen 1000 watt 240 volt bulb. The bulb shall draw 4.2 amps and generate 22,000 lumens. The bulb shall be accessible through the front. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a star shaped locking knob. The lamphead shall be no more than 5 3/8 inches deep by 10 1/2 inches			



	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>high by 16 ½ inches wide. Lamphead and mounting arm shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.</p> <p>The above 240 volt light shall be controlled with the circuit breaker.</p>			
361	<p><b>Mounted Portable Halogen Work Lights:</b> There shall be two (2) halogen work lights mounted to the top of the apparatus at the rear (one each side). The lights shall be equipped so they can be activated from inside the cab for scene lighting and can also be unplugged and removed for use with the cord reel or other electrical receptacles.</p>			
362	<p><b>Electric Cord Reel:</b> There shall be one (1) 120 volt electric rewind cord reel installed on the apparatus with a rewind button installed for 12 volt rewinding of the cord reel. The reels shall be equipped with 20 feet of cord installed with a cable stop to prevent damage to cable. Rollers shall be supplied to prevent damage to electrical cable if pulled in any direction.</p> <p>The cord reel shall be located as determined at the pre-construction meeting.</p>			
363	<p><b>Cord Reel Junction Box:</b> There shall be one (1) electrical junction box equipped with four (4) electrical receptacles mounted to the cord reel. Each receptacle shall be twist lock type and equipped with a spring loaded snap cover. The cord reel shall be prewired to the junction box to supply power to the four receptacles. Each side of the junction box shall be fitted with faceplates which are back lighted so that plug orientation to the receptacles is quick and easy to align.</p> <p>Junction box mounting shall be located as determined at the pre-construction meeting</p>			
364	<p><b>Deutsch Plugs on Warning Lights:</b> All warning lights shall be supplied with Deutsch plugs connectors.</p>			
365	<p><b>Upper Zone A Visual Warning:</b> There shall be one (1) custom length 82 inch light bar installed on the chassis cab roof with Whelen Engineering model FN72VLED, or equivalent, and part number 9LLTH82, or equivalent, added to make the total length 82 inches. The light bar shall be equipped with two (2) forward facing linear “Red” LED’s, two (2) forward facing linear “White” LED’s, two (2) corner forward facing</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>“Red” LED’s, and two (2) corner rear facing “Red” LED’s.</p> <p>The light bars shall be equipped with clear lenses. All clear LEDs in the light bar shall be deactivated in the Blocking Right of Way mode.</p>			
366	<p><b>Opticom Emitter:</b> There shall be one (1) low profile LED Opticom emitter located in the light bar. The emitter shall be have a performance range of up to 2,500 feet to provide preemption of all intersections equipped with the Opticom infrared system.</p> <p>The emitter shall be wired in such a manner as to be disabled when the park brake is set. A switch in the main switch panel shall control the unit in conjunction with the park brake circuit.</p>			
367	<p><b>Upper Zone C Visual Warning:</b> There shall be two (2) Whelen Engineering model MCFLED2R Micro Edge, or equivalent, LED lights installed high at the rear of the apparatus. The lights shall have red lenses.</p>			
368	<p><b>Lower Zone B Visual Warning:</b> There shall be one (1) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>			
369	<p><b>Lower Zone C Visual Warning:</b> There shall be two (2) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>			
370	<p><b>Lower Zone D Visual Warning:</b> There shall be one (1) Whelen Engineering model 60R02FRR, or equivalent, super LED lights with flanges installed in the lower warning zone. The lights shall be red with red lenses.</p>			
371	<p><b>Thermoplastic Coating:</b> In the designated areas (found in item 372 below) Line-X™, or an equivalent two component spray-in-place thermoplastic polyurethane system, shall be used for maximum protection of the body and equipment. The system shall utilize flexible 100% solids applied with high pressure impingement-mix polyurethane dispensing equipment.</p> <p>The coating shall be a fast cure, textured surface, multi-purpose material designed for commercial and industrial applications. It shall exhibit excellent adhesion to the body and serve as a protective, abrasion resistant liner where applied.</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	The density of the material shall be a minimum of 70 PCF as measured using ASTM test method D-1622. The taber abrasion resistance shall be a minimum of 0.03% per 1000 cycles as measured utilizing ASTM test method D-4060. The minimum tensile strength as measured using ASTM D-2370 shall be 1540 pounds per square inch			
372	<b>Body Compartmentation Coating:</b> The interior of the body compartments shall be coated with a gray thermo-plastic polyurethane coating. The coating shall be durable enough to withstand every day abuse of equipment removal and shifting.			
373	<p><b>Body Paint Preparation:</b> After the body and components have been fabricated and assembled they shall then be disassembled prior to painting so when the apparatus is completed there shall be finish paint beneath the removable components. The body shall be totally removed from the chassis during the painting process to insure the entire unit is covered. The apparatus body and components shall be metal finished as follows to provide a superior substrate for painting.</p> <p>All aluminum sections of the body shall undergo a thorough cleaning process starting with a phosphoric acid solution to begin the etching process followed by a complete rinse. A chemical conversion coating shall be applied to seal the metal substrate and become part of the aluminum surface for greater film adhesion.</p> <p>After the cleaning process the body and its components shall be primed with a High Solids primer and the seams shall be caulked.</p> <p>All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be heavily chrome plated. Iron fittings shall be copper underplated prior to chrome plating.</p>			
374	<p><b>Paint Process:</b> The paint process shall follow the strict standards as set forth by PPG Fleet Finish Guidelines.</p> <p>The body shall go through a three-stage paint process: primer coat, base coat (color), and clear coat. In the first stage of the paint process the body shall be coated with PPG F3980 Low VOC / High Solids primer to achieve a total thickness of</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>2-4 mills. In the second stage of the paint process the body shall be painted with PPG FBCH Delfleet™ High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve hiding. In the final stage of the paint process the body shall be painted with PPG DCU-2002 Clear Coat. A minimum of two to three coats shall be applied to achieve a total dry film thickness of 2-3 mills.</p> <p>As part of the curing process the painted body shall go through a Force Dry / Bake Cycle process. The painted components shall be baked at 185 degrees for 3 hours to achieve a complete coating cure on the finished product.</p>			
375	<p><b>Hand Polished:</b> After the force dry / bake cycle and ample cool down time, the coated surface shall be sanded using 3M 1000, 1200, and or 1500 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed with 3M super duty compound to add extra shine to coated surface. No more than .5 mil of clear shall be removed in this process.</p>			
376	<p><b>Apparatus Body Color:</b> The apparatus shall be painted with PPG High Solids Polyurethane Base Coat. The apparatus shall be painted (RED) PPG #FBCH - 71096-ALT.</p>			
377	<p><b>Touch Up Paint:</b> One (1) two ounce bottle of acrylic enamel touch up paint or two (2) touch up paint pens, if color is available, shall be supplied.</p>			
378	<p><b>NFPA Compliant Reflective Striping:</b> Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with the National Fire Protection Associate Pamphlet 1901, latest edition. It shall consist of a straight, 6 inch wide stripe along the front of the chassis and along the sides, staying below the tops of the wheel well areas. The reflective striping shall be white in color</p>			
379	<p><b>Chevron Reflective Striping:</b> In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The reflective striping shall cover at least 50% of the rear facing vertical surface, per NFPA 1901 newest edition. The striping shall consist of alternating red and yellow, fluorescent yellow or fluorescent yellow-green reflective stripes. Each stripe shall be a minimum of inches wide and shall be applied to</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>the apparatus at 45 degree angle.</p> <p>The chevron striping shall consist of 3M part numbers 1172 EC, red and 3983, fluorescent yellow-green.</p>			
380	<p><b>Rub Rail Reflective Striping:</b> There shall be 2 inch reflective striping installed in the rub rail channel. The reflective striping shall be diamond grade quality material for increase visibility. The reflective shall be silver in color.</p>			
381	<p><b>Undercoating:</b> The apparatus shall undergo a two (2) step undercoating process. The first step shall be a rubberized polyurethane base compound that is applied after the body has been primed. The materials used shall incorporate unused paint products to reduce the amount of waste released into the environment. This coat shall be applied to all hidden pockets and surfaces that shall not be visible after completion.</p> <p>As a final step, the entire underside of the body shall be coated with a bituminous based automotive type undercoating when the apparatus is completed. During this application, special care shall be taken to avoid spraying the product on air lines, cables, or other items that would cause normal maintenance to be hindered.</p>			
382	<p><b>Mud Flaps (4):</b> There shall be two (2) mud flaps at the front of the chassis and two (2) at the rear of the unit. The mud flaps shall be a minimum of 3/8 inch thick to prevent "sailing".</p>			
383	<p><b>Wheel Chocks and Mounting:</b> There shall be one (1) pair of Cast Products Inc., or equivalent, wheel chocks provided with the apparatus. The chocks shall be mounted in brackets that are easily accessible under the left side body.</p>			
384	<p><b>Additional Hardware:</b> There shall be one (1) bag of stainless steel nuts, bolts, and washers supplied with the apparatus for mounting of equipment.</p>			
385	<p><b>Helmet Brackets, OEM Supplied:</b> The apparatus manufacturer shall supply brackets for mounting helmets in the chassis cab. These brackets shall comply with NFPA 1901, newest edition, and shall meet the 9G requirements. The Zico model UHH-1 brackets shall hold both traditional and contemporary style helmets without any adjustments necessary. Storing and removing a helmet that is on the bracket shall be quick and easy.</p>			
386	<p><b>Fuel Fill:</b> The fuel fill pocket shall be located in</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	the left rear wheel well area. The fuel fill shall have a Cast Products, or equivalent, aluminum door with bezel installed.			
387	<b>Fuel Tank Gauge Access Panel:</b> There shall be a removable panel provided in the rear compartment to allow for access to the fuel tank gauge without removing the fuel tank.			
388	<p><b>Manufacturing Labels:</b> A permanent plate shall be mounted in the driver's compartment specifying the quantity and type of the following fluids that may be used in the apparatus for normal maintenance. Where a fluid is not applicable to the unit, the plate shall be marked N/A to inform the service technician who may not be familiar with the apparatus.</p> <ul style="list-style-type: none"> <li>•Engine oil</li> <li>•Engine coolant</li> <li>•Transmission fluid</li> <li>•Pump transmission fluid</li> <li>•Pump primer fluid</li> <li>•Drive axle fluid</li> <li>•Air conditioning refrigerant</li> <li>•Power steering fluid</li> <li>•Cab tilt mechanism fluid</li> <li>•Transfer case fluid</li> <li>•Equipment rack fluid</li> <li>•Air compressor system lubricant</li> <li>•Generator system lubricant</li> <li>•Front tires air pressure</li> <li>•Rear tires air pressure</li> </ul> <p>A permanent plate shall be affixed in the driver's area that states the maximum number of personnel allowed to ride on the apparatus at any time.</p> <p>A sign shall be affixed in the chassis cab, in plain sight of the driver that states the overall travel height, overall length, and gross GVWR of the apparatus.</p> <p>On any gated inlet on the apparatus, a permanent label shall be provided that states:</p> <p style="padding-left: 40px;">“WARNING: Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharges hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.”</p>			

	SPECIFICATION	Meets	Does Not Meet	Comments
	All other appropriate labels to ensure safe operation of the apparatus shall be permanently affixed in conspicuous locations.			
389	<p><b>Pre-Construction Meeting:</b> There shall be a pre-construction meeting held at the factory. The pre-construction meeting is the most important meeting during the after-award process. The purpose of this meeting is to finalize all aspects of the specifications, discuss and clarify all design details and to share or provide all information so all parties are in agreement on the apparatus being constructed. The ultimate goal of the pre-construction meeting is for the City and the dealer representative to discuss and clarify all aspects of the proposed apparatus and to provide all necessary information to the apparatus manufacturer that shall ensure the apparatus is built to the satisfaction of all parties involved.</p> <p>The apparatus manufacturer shall create and forward to the dealer a “Pre-construction” binder containing the following items:</p> <ul style="list-style-type: none"> <li>•Complete Specifications including the Body, Chassis and Aerial (if applicable).</li> <li>•Detailed Amp Draw Report</li> <li>•A listing of clarifications or questions from the manufacturer that require attention, such as shelf locations, lettering details, etc.</li> <li>•Full Size “C” Drawings, minimum of five (5)</li> <li>•11” x 17” Drawing</li> <li>•Paint Sample Plates for color matching of existing apparatus</li> <li>•Paint Confirmation form</li> </ul> <p>During this pre-construction meeting, any changes or clarifications must be documented on a manufacturer issued change order. The change order shall be signed by the City and Dealership and ultimately by the apparatus manufacturer. The change order officially becomes an extension of the contract upon official signatures of all three parties. All change order items resulting from the pre-construction meeting shall be implemented into the official shop order document.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>			
390	<b>Pre-Paint Inspection:</b> There shall be an inspection of the apparatus in the pre-paint stage			

	SPECIFICATION	Meets	Does Not Meet	Comments
	<p>of production by the City. The City shall be given the opportunity to visually inspect the chassis, pump panel, plumbing, and all other body options so that any discrepancies may be addressed prior to the painting process. A factory representative shall be present at the inspection to answer all questions. The manufacturer shall give adequate notice to the dealer as to when the apparatus shall be available for inspection.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>			
391	<p><b>Final Inspection:</b> There shall be an inspection of the apparatus in the final stage of production. The City shall be given the opportunity to visually inspect the completed apparatus including the chassis, pump panel, plumbing and all other body options so that any discrepancies may be addressed prior to the apparatus leaving the factory. A factory representative shall be present at the inspection to answer all questions. The manufacturer shall give adequate and accurate notice to the dealer as to the date the apparatus shall be completed. If any discrepancies are found during the final inspection, they shall be addressed immediately. At that point the manufacturer shall provide a firm delivery date.</p> <p>The Grand Junction Fire Department shall bear the expense of travel, meals and lodging for two of their members to attend this meeting.</p>			
392	<p><b>Delivery and Demonstration:</b> Delivery of the completed apparatus to Grand Junction, CO shall be provided. On initial delivery of the fire apparatus, a qualified representative shall demonstrate the apparatus and provide initial instruction to representatives of the City regarding the operation, care and maintenance of the apparatus and equipment supplied at the City's location. The delivery and instruction schedule shall be determined by the delivery engineer/ representative and the City.</p>			



**SECTION 11: RESPONSE FORM**

The City of Grand Junction will receive sealed Proposals, on this form, in the office of the City Clerk, 250 North 5<sup>th</sup> Street, Grand Junction, Colorado 81501. This price is to furnish materials, supplies, equipment and/or services, as shown below and/or attached hereto: **FOB DESTINATION delivered at Grand Junction, Colorado. TRANSPORTATION CHARGES PREPAID.** All in accordance with the Proposal conditions, special provisions, and specifications attached or as indicated below.

Purchasing representative: Susan Hyatt (970)-244-1513 [susanh@gjcity.org](mailto:susanh@gjcity.org)

**One (1) each, Fire Engine Pumper Truck, as per the attached minimum specifications**

**Net price for one each Fire Engine Pumper Truck** \$ \_\_\_\_\_.

Written: \_\_\_\_\_ Dollars.

Year/Model No. \_\_\_\_\_

Manufacturer Name: \_\_\_\_\_

If quoting a demonstrator indicate the mileage \_\_\_\_\_.

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**Optional net price for CNG engine w/60 DGE tank:** \$ \_\_\_\_\_.

Written: \_\_\_\_\_ Dollars.

Manufacture/Year/Model No. \_\_\_\_\_

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**Optional net price for Compressed Air Foam System (CAFS):** \$ \_\_\_\_\_.

(See Attachment A for specifications)

Written: \_\_\_\_\_ Dollars.

Manufacture/Year/Model No. \_\_\_\_\_

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**Additional Information required from Specification Form:**

**Item 7 on Specification Form:**

**Overall Height:** Specify overall height of vehicle measuring with tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus. **Measurements are:** \_\_\_\_\_" (\_\_\_\_'\_\_\_\_")

**Item 8 on Specification Form:**

**Overall Length:** The overall length of the vehicle shall be approx. \_\_\_\_\_" (\_\_\_\_'\_\_\_\_").

**Item 9 on Specification Form:**

**Vehicle Top Speed:** The vehicle's top speed shall be \_\_\_\_\_ mph.

**Item 150 on Specification Form:**

**10 (Ten) Inch Extended Cab and In Cab Roll Up Storage Cabinets:** The cab shall be extended by 10 inches and there shall be two (2) roll up compartments in the crew area of the cab located to the outside of the forward facing seats. One (1) will be located on each side of the forward facing seats. The cabinets will be as large as space allows but the dimensions will be approximately 22"x50"x15".

**Price for the option:** \$ \_\_\_\_\_

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**Optional Trade:** Unit 1124, Fire Engine Pumper Truck, 1993 KME Renegade, Serial Number 1K9AF4282PN058824, L-10 Cummins Engine, Allison Automatic, 6,652 engine hours, 500 gallon combo tank, 1250 GPM Pump.

\$ \_\_\_\_\_ Trade Offered

Written \_\_\_\_\_ Dollars

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**Delivery in** \_\_\_\_\_ **days.**

**Addenda:** Offeror hereby acknowledges receipt of Addenda Numbers: \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_.

<b>Submittal Check list</b>	<b>Yes</b>	<b>No</b>
One Original and One Electronic Copy of response are included		
Verification & Certification Form and Specification Form are included (Sections 9 and 10)		
ISO 9001 Certificate of Compliance included		
Manufacturer's Warranty of the chassis is included		
Manufacturer's Warranty of the electrical, lights, ambulance box Engine, cab, brakes and transmission and all other warranties that apply to the vehicle is included		
Written guarantee enclosed for 1 year replacement of defective components at no cost to the City		
Manufacturer's brochure(s) included		
Addenda acknowledged above (if applicable)		
Manufacturer's Statement of Origin included (Section 3.16)		
Bidder's maintenance policies and associated costs. (Section 4.4)		
References have been provided. (Section 4.6)		
Exceptions to Specifications included, if needed (Section 10)		

DATE \_\_\_\_\_

- Prompt payment discount of \_\_\_\_\_ percent of the net dollar amount will be offered to the City if the invoice is paid within \_\_\_\_\_ days after the receipt of the invoice.
- The undersigned certifies and agrees that this Proposal is submitted in accordance with all applicable Federal, State, County, and City laws.
- The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.

\_\_\_\_\_  
 (Company Name of Vendor – Typed or Printed)

\_\_\_\_\_  
 (Phone Number of Vendor)

\_\_\_\_\_  
 (Address of Supplier)

\_\_\_\_\_  
 (Authorized Dealer Agent – Typed or Printed)

\_\_\_\_\_  
 (City, State, and Zip Code)

\_\_\_\_\_  
 (Authorized Agent Signature)

\_\_\_\_\_  
 (Fax Number of Supplier)

\_\_\_\_\_  
 (E-mail Address)

## ATTACHMENT A

### COMPRESSED AIR FOAM SYSTEM (CAFS):

**HUSKY 12 FOAM SYSTEM:** A Pierce Husky 12 foam proportioning system shall be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class "A" & "B" foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation will be based on direct measurement of water flow, and remain consistent within the specified flows and pressures. The system will automatically balance and proportion foam solution at rates from 0.1% to 9.9% regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

The design of the system will allow operation from draft, hydrant, or relay operation. This will provide a versatile system to meet the demands at a fire.

**1. System Capacity:** The system will have the ability to deliver the following minimum foam solution flow rates at accuracies that meet or exceed NFPA requirements at a pump rating of 250 PSI.

200 GPM @ 6%

400 GPM @ 3%

1200 GPM @ 1%

Class A foam setting in .1 % increments from .1% to 1%. Typical settings of 1%, .5% and .3% (Maximum capacity will be limited to the plumbing and water pump capacity)

**2. Control System:** The system will be equipped with a digital electronic control display located on the pump operators panel. Push button controls will be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

The percent of injection will have presets for class A and class B foam. These presets can be changed at the fire department as desired. The percent of injection will be able to be easily changed at the scene to adjust to changing demands.

In order to minimize the use of abbreviations and interpretations, system information will be displayed on the panel by way of .50 tall LEDs that total fourteen characters (two lines of 7 each). System on and foam pump on indicator lights will also be included. Information displayed will include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

The control display will direct a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor will compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve will be installed in the plumbing to prevent foam from contaminating the water pump.

**3. Low Level, Foam Tank:** The control head will display a warning message when the foam tank in use is below a quarter tank.

**4. Hydraulic Drive System:** The foam concentrate pump will be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A system that drives the foam pump via an electric motor will not be acceptable. A large parasitic

electric load used to power the foam pump can cause an overload of the chassis electrical system.

Hydraulic oil cooler will be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler will be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir will be of four (4) gallons minimum capacity and will also be of sufficient size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

**5. Foam Concentrate Pump:** The foam concentrate pump will be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. The pump will be constructed of brass body; chrome plated stainless steel shaft, with a stainless steel piston. In order to increase longevity of the pump, no aluminum will be present in its construction.

A relief system will be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump

The foam concentrate pump will have minimum capacity for 12 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system will deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump will be self-priming and have the ability to draw foam concentrate from external supplies such as drums or pails.

**6. External Foam Concentrate Connection:** An external foam pick-up will be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up will be designed to allow continued operation after the on-board foam tank is empty. The external foam pick-up will be designed to allow use with training foam or colored water for training purposes.

**7. Panel Mounted Strainer / External Pick-Up Connection:** A bronze body strainer / connector unit will be provided. The unit will be mounted to the pump panel. The external foam pick-up will be one (1) - 1.00" male connection with chrome-plated cap integrated to a 2.00" strainer cleanout cap. A check valve will be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen will be installed in the body of the strainer / connector unit. Removal of the 2.00" cleanout cap will be all that is required to gain access to and remove the stainless steel basket screen. The strainer / connector unit will be ahead of the foam concentrate pump inlet port to insure that all agents reaching the foam pump has been strained.

**8. Pick-Up Hose:** A 1.00" flexible hose with an end for insertion into foam containers will be provided. The hose will be supplied with a 1.00" female swivel NST thread swivel connector. The hose will be shipped loose.

**9. Discharges:** The foam system will be plumbed to six discharges. The discharges capable of dispensing foam will be same as CAFS System.

**10. System Electrical Load:** The foam proportioning will not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

**11. Tank Selector:** An electric valve will be used for the foam supply valve. The foam supply valve will be controlled at the foam system control head for ease of operation. The supply valve will be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

**12. Maintenance Message:** A message will be displayed on the control head to advise when system maintenance needs to be performed. The message will display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

**13. Flush System:** The system will be designed such that a flush mode will be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic will ensure the foam tank supply valve is closed prior to opening the flush valve. The flush valve will be operated at the foam system control head for ease of operation. The valve will be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve will be labeled and located under the driver's side running board.

**14. Foam Generating System, CAF:** A Pierce Hercules® system rated to provide 200 cfm capacity for generating compressed air foam will be provided. The system will supply six (6) discharges with compressed air foam. It will be capable of providing foam solution or compressed air foam from any of the specified CAFS discharges simultaneously. In addition, the consistency of the compressed air foam (wet to dry) from each discharge will be adjustable. All CAF capable discharges will have the discharge valve control, air injection control, and discharge pressure gauge mounted in a group on the operator's panel. Each CAF capable discharge will feature a wafer type check valve to prevent reverse flows of compressed air foam that is integrated into the discharge valve. The wafer check valve will be a type and design approved by the manufacturer of the discharge valve.

**15. Discharges to CAF Capable:** The front bumper discharge, the 2.50" discharge in rear, the deck gun, and all crosslays discharges will be capable of discharging compressed air foam. There is no second pump on the vehicle

**16. Air Compressor:** A Pierce Hercules® oil flooded rotary screw compressor rated at 200cfm @ 150psig will be provided. The compressor will be mounted between the chassis frame rails. The compressor will be driven by the vehicle transmission through a clutch type PTO. All components of the system will be sized and rated for the system to deliver compressed air, uninterrupted, for up to 2 hours at a time without undue stresses, vibrations, or overheating. The air compressor will be capable of delivering the rated capacity of the compressor when the fire pump is delivering 400gpm @150psi from tank or draft.

All components of the air compressor system will be readily available on the domestic air compressor market (USA). The compressor will be designed and assembled by Pierce Manufacturing using standard components available to air compressor OEM's.

The PTO will be a 10 bolt SAE type mounted to the PTO opening of the vehicle's Allison transmission. The PTO will be rated for at least 20 percent more torque throughput than the air compressor will demand.

The air/oil separator for the compressor system will be easily serviced. The separator will be inside the air/oil receiver tank. The separator will consist of two stages. The first stage being a centrifuge arrangement engineered into the tank. The second stage will be a dual cartridge arrangement featuring an "inside to outside" flow of the air through the cartridges. The separation system will be capable of a 250 SCFM flow at 40 psi tank pressure. The allowable oil carry over will be no more than 10 parts per million oil in air.

A steel air/oil receiver tank will be provided. The tank will be constructed and tested to the applicable standards as addressed by NFPA 1901 for CAF system air compressor tanks. The tank will be mounted in a manner that allows easy access to the fill opening and the level sight gauges. The tank will be of the vertical type with the minimum pressure valve of the compressor system integrated into the top of the tank. The minimum pressure valve will be rotatable to facilitate different discharge arrangements from the tank.

The compressor lubricant will be filtered by cartridge type filter. The filter will have a 25 micron rating and a safety bypass valve. The filter assembly will be mounted and located in a manner that allows easy service. A thermostat valve will be integrated into the oil filter assembly's housing. The thermostat will route lubricant to the oil cooler to maintain the compressors temperature between minimum and maximum limits.

A water/oil cooler will be provided to cool the compressor. The cooler will be sized to meet the duty cycle requirements as specified. The oil cooler will use water from the vehicle fire pump as the cooling medium and will be protected from freezing by adequate drains and other means.

A heavy duty, automotive type, dry element air cleaner will be provided. The air cleaner will be mounted in such a manner as to be easily serviced. The air cleaner will be mounted, or the inlet of the filter routed, in such a manner that the air cleaner intakes fresh air from outside the vehicle body.

The system will have the following safety or monitoring devices.

Minimum pressure valve

Compressor lube temperature gauge

Compressor system pressure gauge

Air flow meter

Compressor lube temperature warnings, audible and visible

High pressure relief valve on receiver tank

Applicable warning and information decals

The compressors PTO controls will be installed in such a manner as to render the PTO inoperative if the fire pump is not engaged. Further, the air compressor's PTO engagement will be prevented at compressor pressures above 10 psi at compressor re-start. The air compressor will be controlled by a modulating inlet valve mounted on the air compressors inlet port. A controller will be provided that senses air pressure and controls the delivery volume of the air compressor while maintaining a constant pressure. The controller will feature an automatic balancing system to maintain the air pressure within plus or minus 5% of the discharge pressure of the fire pump, throughout a pressure range of 60psi to 175psi.

The compressor system will have operators controls at the pump panel for the following functions.

Automatic pressure regulation, to match the compressor discharge pressure to the pump discharge pressure.

Fixed pressure regulation, to set the air pressure at on pressure for the use of air tools, etc.

PTO engagement switch

PTO engaged indicator light

**17. CAF Air Delivery System Materials:** The CAF system air delivery materials will be stainless steel, bronze, or brass. No cadmium plated or raw steel fitting will be used. The CAF air valve manifold block may be aluminum material. All other fittings from the compressor MPV to the respective discharges will be stainless steel, bronze, or brass.