U.S.D.A. Forest Service
National Technology And Development Center, San Dimas

# Ten Person Crew Carrier
# Apparatus Body Only Specification

Issue Date: February 2016

Supersedes: August 2015

# Table of Contents

## Record of Revisions

| Date | Revision Summary |
|---|---|
| **June 2011** | • Initial Release |
| **August 2011** | • Revision |
| **February 2012** | • Revision |
| **January 2015** | • Added Table of Contents<br>• Added Record of Revisions since February 2012<br>• Revised chassis system voltage drop for accessories to turn off<br>• Added auxiliary lighting, mounted in bumper cutout<br>• Revised cab console layout<br>• Added requirement that exhaust system shall also be clear of the spare tire<br>• Clarified requirements of roof seam welding<br>• Added requirement for protection of wiring, etc. close to cable loop (mounting)<br>• Added means to secure rear step when stowed<br>• Revised required size of body protection panels<br>• Added segregated battery compartments to driver's side<br>• Deleted ventilating louvers from driver's side horizontal compartment<br>• Added ventilating louvers to driver's side compartment aft of rear wheels<br>• Revised compartment shelves; 20 shelves total<br>• Added that Avex type rivets may be used in crew compartment interior<br>• Deleted bulkhead padding<br>• Revised crew compartment lighting brand<br>• Revised crew compartment reading lights<br>• Added requirement for provisions regarding spare tire storage<br>• Changed size (diameter) of clearance lights<br>• Changed from self-adhesive reflectors to riveted reflectors<br>• Added requirement for rear directional control head<br>• Changed letter size (height) of unit and equipment designators<br>• Deleted word “Hotshot” in reference to crew name<br>• Added size (height) of Crew Name on side of body<br>• Added requirement for Crew logo on rear crew compartment access door<br>• Added the emergency exit hatch shall be labeled<br>• Revised apparatus warranty to ten years |
| **February 2016** | • Updated Format<br>• Updated Govt. Provided Chassis Options<br>• Modified compartment design to include placement of DEF tank<br>• Added Hydraulic Jack and Lug Wrench Specification |

| Date | Revision Summary |
|---|---|
| **Future Revisions** | • This space is reserved for future revisions |

# 1 — General

## 1.1 Compliance with NFPA 1906

1.1.1 The apparatus described in this specification shall be compliant with the requirements of NFPA 1906, latest edition, except for the pump and tank requirements and where noted within the specification.

## 1.2 In-Service Weight Requirements

1.2.1 The in-service weight shall meet DOT gross axle and vehicle weight requirements; shall meet Forest Service Handbook (FSH) 7109.19 vehicle loading requirements using a rough road factor of 0.90; and shall not exceed 20,000 pounds on the rear axle when loaded as follows:

- With 250 pounds per seat, and
- With 1600 pounds allowance for tools, equipment and supplies evenly distributed in the storage compartments.

## 1.3 Tilt Test

1.3.1 The apparatus shall be tested at the estimated in-service weight in accordance with NFPA 1906.

## 1.4 Departure Angle

1.4.1 The departure angle shall be 20° minimum when loaded as specified.

## 1.5 Driver Controlled Rear Locking Differential

1.5.1 When the apparatus is driven over 15 miles per hour the driver-controlled rear locking differential shall automatically disengage and shall not automatically re-engage when driven below 15 miles per hour.

## 1.6 Structural Integrity

1.6.1 This specification requires testing and certification of the structural integrity of the body by an independent third party laboratory or test facility. Computer simulations or analyses are not acceptable. The requirements for structural integrity testing are included in the chapter titled "Crew Carrier Body Description."

## 1.7 Federal Motor Vehicle Safety Standards

1.7.1 Compliance with all applicable Federal Motor Vehicle Safety Standards (FMVSS) is required. Certificates of conformance shall be provided to the Government for the following standards:

- FMVSS 207 — Seating Systems

- FMVSS 209 — Seat Belt Assemblies
- FMVSS 210 — Seat Belt Assembly Anchorages
- FMVSS 302 — Flammability of Interior Materials

### 1.8 Brand Name or Equivalent Products

1.8.1 Products equivalent to the brand name components specified herein shall be approved in writing by the Government prior to contract award and documented in the resultant contract.

### 1.9 Government-Furnished Chassis

1.9.1 The government furnished chassis will be equipped as follows:

- Wheelbase: 165 inches
- Cab-to-Axle Length: 98 inches
- Power train: 300 horsepower and 860 foot-pounds torque minimum; Allison 3500 EVS automatic transmission
- Front Axle and suspension: 10,000 pound gross axle weight rating
- Rear Axle and suspension: 21,000 pound gross axle weight rating minimum, Hendrickson™ PRIMAAX® EX 23,000 pound suspension

1.9.2 An optional chassis may be furnished by the government as follows:

- Wheelbase: 165 inches
- Cab-to-Axle Length: 98 inches
- Power train: 330 horsepower and 950 foot-pounds torque minimum; Allison 3500 EVS automatic transmission
- Front Axle and suspension: 10,000 pound gross axle weight rating
- Rear Axle and suspension: 23,000 pound gross axle weight minimum, Hendrickson™ PRIMAAX® EX 23,000 pound suspension

# 2 — Chassis Electrical Requirements

## 2.1 Chassis Electrical Additional Equipment and Modifications

2.1.1 The crew carrier chassis shall be equipped with a heavy-duty 12-volt direct current (VDC) negative ground electrical system. The electrical system shall include all parts, components, switches, relays, wiring, and other devices required to assure complete, consistent and proper operation of the completed apparatus.

2.1.2 All lights are required to comply with Federal Government Codes for vehicles of this size and design shall be provided and installed. These lights shall include headlamps and front turn signals with hazard switch, cab marker and clearance lights, back up lights, stop-turn-tail and license plate lights.

2.1.3 All switches for the warning lights, auxiliary lights, and other electrical equipment shall be mounted on a separate switch panel located on the center console in the cab interior. The switches shall be functionally laid out, properly identified, and shall be located within easy reach of both the driver and the officer. The warning light system shall have a “master” switch, which shall allow for the pre-selection of all warning lights. All switches shall be of a heavy duty design.

2.1.4 The following accessories shall turn off via chassis OEM multiplex system when the chassis system voltage drops to 11.8 volts direct current:

- Power inverter
- Ground lights
- Scene lights
- Crew compartment lights
- Crew compartment heating and air conditioning unit
- 12-volt chargers
- Rear directional light bar
- Map light

2.1.5 The emergency lighting shall turn off via the chassis OEM multiplex system when the chassis system voltage drops to 11.8 volts direct current.

2.1.6 The following additional electrical equipment shall be installed on, and modifications performed to, the specified cab and chassis by the apparatus builder:

## 2.2 Battery Master Switch

2.2.1 One battery selector switch shall be provided in the cab. The switch shall be rated for 310 amps continuous duty and 500 amps intermittent duty. The switch shall be located on the floorboard to the left side of the driver's seat and placed as far aft as possible to protect accidental actuation and labeled ON/OFF. The exposed terminals shall be protected from

damage and inadvertent contact. One switch that meets these requirements is the Cole Hersee™ brand, Model #M-750.

2.2.2 Power to the chassis electronic control module shall be maintained when the switch is in the OFF position.

**2.3 Jump Start Stud**

2.3.1 The OEM auxiliary positive battery post shall be mounted on the driver's side, near the cab door and front of the apparatus body. The post shall be used to jump start the vehicle and be connected to the vehicle's starting batteries

**2.4 Back Up Alarm**

2.4.1 One solid state back up alarm shall be provided at the rear of the apparatus protected from impact and debris. The back-up alarm shall be wired to the reverse circuit of the transmission, and shall provide an audible alarm to the rear of the apparatus when reverse gear is selected. The alarm shall have a volume of 87 to 112 decibels while in operation.

**2.5 Map Light**

2.5.1 One flexible goose neck, L.E.D. map light shall be provided on the cab center console. One switch for the map light shall be located on the center console. One switch shall also be located on the light and shall include a three-way switch for white light and red light.

**2.6 Ground Lighting**

2.6.1 Four 2-inch clear L.E.D. lights shall be provided under the chassis steps, ground-facing, two on each side. The lights shall be angled to illuminate the area under the chassis cab steps. Lights shall be wired to the cab door switch and a switch in the cab and shall turn on automatically when a cab door is open.

2.6.2 One 4-inch L.E.D. light shall be provided near the rear step area under the bumper. The light shall be wired to the crew compartment rear access door and a switch in the cab and shall turn on automatically when the rear access door is open.

2.6.3 The ground light switch on the cab console shall enable the ground lighting to be either turned on with the door switches (“ON” position) or override the door switches and turn off all ground lighting (“OFF” position).

**2.7 Antennas**

2.7.1 Two antenna MNO Type bases with rain caps installed shall be supplied and mounted on the cab roof as specified. The antenna cables shall be routed to the cab interior, terminating at location of radio mounting bracket.

## 2.8 USFS Installed Radio Pre-Wire

2.8.1 The chassis cab interior shall be wired with power, ground, ignition switched power, and radio pre-broadcast wires to the siren or PA, and labeled to simplify USFS radio installation.

## 2.9 Auxiliary Lighting

2.9.1 A pair of white L.E.D. auxiliary lights shall be installed in the center bumper cutout on either side of the license plate location. They shall be capable of being adjusted for both elevation and azimuth. The distance between the two lights shall be maximized. Each light shall produce a minimum of 3000 lumens, and be equipped with a diffused lens capable of projecting light with flood pattern. The maximum size of each light shall be 3¼ inches high by 3¼ inches wide by 3¼ inches deep and shall be equipped with an integral mounting bracket and wiring harness pigtail with connector. OEM chassis wiring and dash switch shall be used for installation if so equipped; otherwise the lights shall be installed with a relay and dash-mounted switch. Any mounting fasteners used for these lights shall not damage the hose stored in the bumper hose tray. The dash switch shall be labeled "AUXILIARY LIGHTS, OFF HIGHWAY USE ONLY." Rigid Industries™ Dually D2 Diffusion lights or equivalent shall be installed.

# 3 — Traffic Warning Systems

## 3.1 Traffic Warning Systems

3.1.1 The following traffic warning systems shall be provided and installed on the completed apparatus by the apparatus builder:

## 3.2 Electronic Siren

3.2.1 One 100/200 watt electronic siren controller shall be provided and mounted in the cab center console in a location convenient to both the driver and the officer. The siren shall have four basic siren tones: manual, wail, yelp and hi-lo, as well as an electronic air horn, radio rebroadcast capability and a public address system. An electronic siren controller that meets these requirements is the Federal Signal™, Model #PA300-MSC.

## 3.3 Speaker

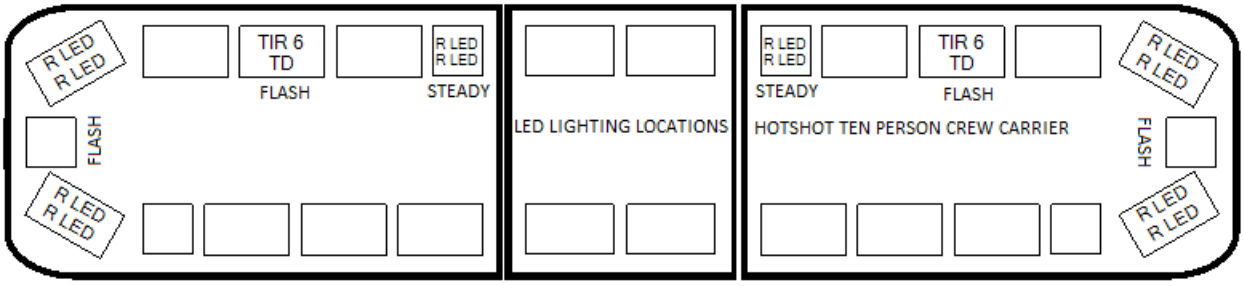
3.3.1 One 100 watt, non-corrosive, black nylon/composite siren speaker, with speaker bracket shall be provided and mounted behind the driver's side of the front bumper. The speaker shall be wired to the specified electronic siren controller.

## 3.4 Forward Upper Zone A/B/D Lightbar

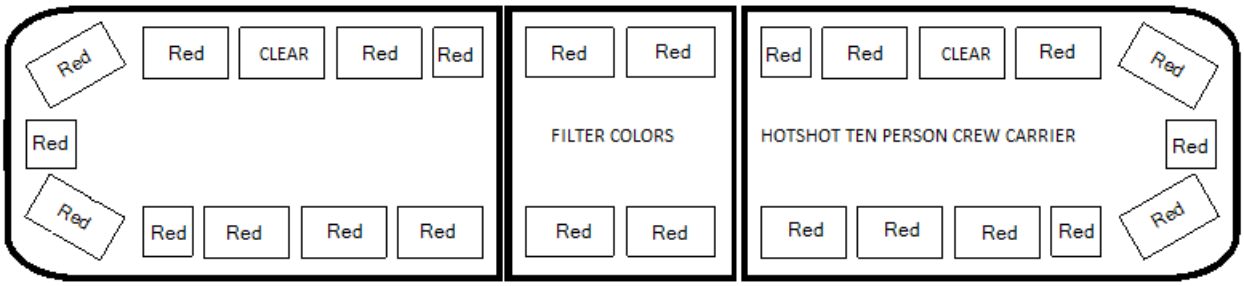
3.4.1 One L.E.D. lightbar shall be provided and installed on the cab roof, facing forward. The light bar shall be 55 inches wide, and shall contain six flashing L.E.D. modules and two steady burning L.E.D. modules. L.E.D. lighting locations and filter placement shall conform to the diagrams in this section (below) and consist of: four corner-mounted red flashing L.E.D. lights; two forward-facing flashing white L.E.D. lights; and two forward-facing steady burning red L.E.D. lights. All lenses/filters on the lightbar, except for the forward-facing white L.E.D. lights, shall be red. A Whelen™ brand Freedom IV® L.E.D. lightbar part number F4W2RRRR-USFSCCV, or equivalent meets this requirement.

3.4.2 The lightbar shall be permanently mounted to the cab roof and wired to the “Lightbar” switch in the cab center console. The two forward facing “takedown” modules shall be interlocked with the application of the emergency brake, placing the apparatus in blocking mode and disabling the modules as such.

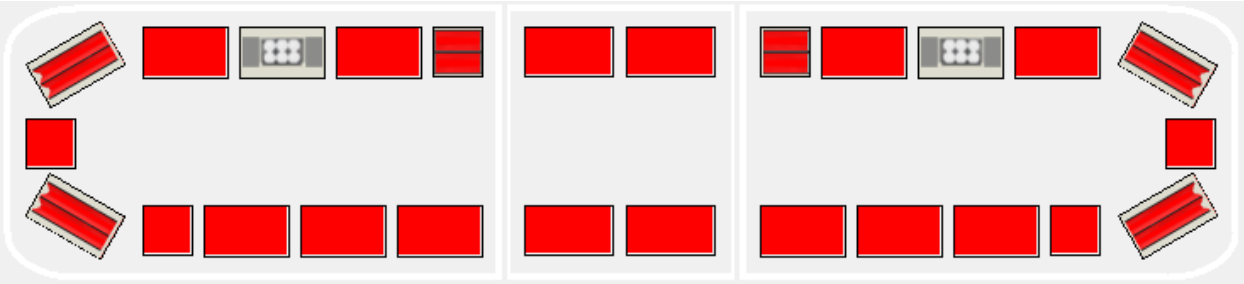
3.4.3 Diagram — L.E.D. Lighting Locations and Flashing/Steady Configuration



3.4.4 Diagram — Lightbar Filter Locations and Colors




3.4.5 Diagram — Lightbar Coloring



## 3.5 Aft Upper Zone B/D Warning Lights

3.5.1 Two red L.E.D. warning lights, with mounting flanges, shall be provided at the upper rear corners of the body, side-facing, one on each side of the body. The lights shall be wired to the “Warn Lights” switch on the cab center console. The warning lights shall be wired to a programmable L.E.D. flasher. Whelen™ brand, 600 Series, L.E.D. warning lights, or equivalent, shall be installed.

## 3.6 Upper Zone C Warning Lights

3.6.1 One amber, L.E.D. warning light, with mounting flange, shall be provided at the upper rear driver's side outboard corner of the rear of the body, rear-facing. The light shall be wired to the “Rear Amber” switch on the cab center console. Whelen™ brand, 900 series, L.E.D. warning light, or equivalent, shall be installed.

## 3.7 Lower Zone A Warning Lights

3.7.1 Two red L.E.D. warning lights, with mounting flanges, shall be provided and mounted in the lower outboard corners of the cab grille, forward-facing, one on each side. The lights shall be wired to the “Warn Lights” switch on the cab center console. Whelen™ brand, 700 Series, L.E.D. warning lights, or equivalent, shall be installed.

## 3.8 Forward Lower Zone B/D Warning Lights

3.8.1 Two ½ red, ½ white, side-by-side, L.E.D. warning lights, with mounting flanges, shall be provided and mounted on the sides of the chassis tilt hood, as low and as far forward as

possible, side-facing, one on each side. The lights shall be wired to the “Warn Lights” switch on the cab center console. The warning lights shall be wired to a programmable L.E.D. flasher. Whelen™ brand, 700 Series, L.E.D. warning lights, or equivalent, shall be installed.

### 3.9 Lower Zone C Warning Lights

3.9.1 Two L.E.D. warning lights shall be provided at the lower rear of the body in the bottom position of a common housing with the DOT lights, rear-facing, one on each side. The lights shall be wired to the “Warn Lights” switch on the cab center console. Whelen™ brand, 600 Series, L.E.D. warning lights, or equivalent, shall be installed.

### 3.10 Air Horn

3.10.1 One 15-inch air horn shall be provided and mounted under the hood on the passenger's side. One foot switch shall be provided on the driver's side cab floor, and one momentary pushbutton switch shall be provided on the upper right corner of the officer's side top surface of the cab center console. A Buell™ brand, Model #1063 air horn, or equivalent, shall be installed.

### 3.11 Headlight Flasher

3.11.1 One solid state headlight flasher shall be installed and wired for daytime operation. The flasher shall be a multipurpose type with a high-beam activated cut out option. The flasher shall be wired to the “Wig Wag” switch on the cab center console, through the parking brake valve, so that it is disabled when the parking brake is applied. A headlight flasher that meets these requirements is the Whelen™ brand, Model #UHF 2150A.

# 4 — Chassis Additions and Modifications

## 4.1 Additional Equipment Installation

4.1.1 The following additional equipment shall be installed on, and modifications performed to, the specified cab and chassis by the apparatus manufacturer:

## 4.2 Apparatus Fluid Types and Quantities

4.2.1 A permanently-mounted label, showing the recommended fluid types and quantities for the apparatus chassis and associated components, shall be provided in the apparatus cab interior near the driver's seating position.

4.2.2 This label shall list the recommended fluid types and quantities for the following components:

- Chassis Engine Lubricant
- Chassis Engine Coolant
- Chassis Power Steering Fluid
- Chassis Transmission Fluid
- Chassis Drive Axle Lubricant

## 4.3 Seating Capacity

4.3.1 The completed crew carrier apparatus shall be designed to have a fully enclosed seat with an approved seat belt for each occupant. The term “fully enclosed” shall mean four sides, a top and a bottom, with an appropriate door for easy entrance to and exit from the seating position.

4.3.2 A warning label, listing the seating capacity of the completed apparatus, shall be provided in the apparatus cab interior. This label shall be located so that it is visible from all seating positions.

4.3.3 This apparatus shall have a seating capacity of ten personnel; two in the cab and eight in the crew compartment.

## 4.4 Seat Belt Warning

4.4.1 A warning label, stating: “DANGER- Personnel Must Be Seated And Seat Belts Must Be Fastened While Vehicle Is In Motion Or DEATH OR SERIOUS INJURY MAY RESULT,” shall be provided in the apparatus cab interior and crew compartment area. This label shall be located so that it is visible from all seating positions.

## 4.5 Vehicle Height Warning

4.5.1 A warning label, listing the overall height, length and GVWR of the completed apparatus, shall be provided in the apparatus cab interior. This label shall be located so that it is visible from the driver's seating position.

### 4.6 Final Stage Manufacturer Vehicle Certification

4.6.1 A Final Stage Manufacturer vehicle certification label shall be provided and installed in the apparatus cab driver's door jamb area.

### 4.7 Noise Hazard Warning

4.7.1 A warning label, stating: “WARNING: Noise Hazards Occur During Siren Operation,” shall be provided and installed in the apparatus cab interior. This label shall be located so that it is visible from all seating positions.

### 4.8 Air Filter Ember Protection Screen Warning

4.8.1 A warning label, stating: “This apparatus is equipped with an air filter ember protection screen; routine inspection is required,” shall be provided and installed in the apparatus cab interior. This label shall be located so that it is visible from the driver's seating position.

### 4.9 Cab Console

4.9.1 The cab shall be equipped with a sloped operator's control console located between the front driver's and officer's air ride seats. The console shall be fabricated from steel, and painted with a matte black finish.

4.9.2 Two switch panel groupings, containing a total of eleven switches with pilot lights, shall be provided on the console. The switches shall be numbered and function labeled, and configured from left to right, as referenced in contract drawings, as follows:

| Row 1 | Row 2 |
|---|---|
| 1- EMERGENCY MASTER | 7- GROUND LIGHTS |
| 2- LIGHT BAR | 8- LEFT SCENE |
| 3- WARN LIGHTS | 9- REAR SCENE |
| 4- REAR AMBER | 10- RIGHT SCENE |
| 5- WIG WAG | 11- MAP LIGHT |
| 6- HORN/SIREN | |

4.9.3 A low battery indicator RED light shall be installed and be clearly visible from the driver's seat.

4.9.4 An air horn push button shall be installed on the cab console.

4.9.3 The console shall contain one flexible map light, two 12-volt power outlets, and two 120-volt alternating current power outlets powered by the inverter. The 12-volt power outlets shall be located one at each lower corner of the console. The 120-volt alternating current outlets are not required to be located on the top of the console and may be located in a location convenient to the occupant seated in the passenger seat.

### 4.10 Center Console Aft Storage

4.10.1 A compartment for storage of items, such as maps and hand-held radios, shall be provided and attached directly behind the center console. The storage compartment shall be fabricated from steel and painted with a matte black finish. Configuration and size of the compartment shall be as-specified by the Government. The height and width shall not exceed the cab console. The storage compartment shall be configured so as to be easily removable for access to the console inspection panel.

### 4.11 Front Tow Hooks

4.11.1 Two original equipment front tow hooks shall be supplied with the chassis from the chassis manufacturer.

### 4.12 Tow Eyes

4.12.1 Two heavy-duty tow eyes shall be provided at the rear of the apparatus, below the rear step. The tow eyes shall be mounted to the chassis frame.

### 4.13 Front Fenders, Rubber

4.13.1 An extruded black rubber fenderette shall be installed on each front wheel well opening on the chassis tilt hood.

### 4.14 Mud Flaps

4.14.1 One pair of flexible rubber mud flaps shall be provided on both sides of the apparatus body behind the rear wheels. The mud flaps shall not bear company logo.

4.14.2 The mud flaps shall extend down far enough to be effective but shall not allow the flaps to become entangled with the rear tires when the apparatus is backing up.

### 4.15 Exhaust System

4.15.1 The exhaust system shall be routed to the rear of the crew compartment behind the rear most window as required per FMVSS regulation. The exhaust piping shall be the same size as the original, and shall be routed and supported as required to provide maximum ground clearance; clear of the vehicle suspension, axle, frame, hoses, wiring, brake canisters, spare tire and other vehicle components.

### 4.16 Heat Protection

4.16.1 The exhaust after-treatment system shall be sufficiently shielded or wrapped to protect the underside of the chassis cab during active regeneration. Heat from regeneration shall not be detected by personnel seated inside the cab.

### 4.17 Air Line, Fuel Hose, Electrical Harness and Connector Protection

4.17.1 All air lines, fuel lines and electrical harnesses below the chassis frame rails shall be protected with a fire proof sleeve. All protected and wrapped lines shall have continuous coverage, to include the line to tank connections.

### 4.18 Cabin Air Ember Guard

4.18.1 The cabin air filter shall be protected by an ember guard with a maximum mesh opening of 0.039 inches.

### 4.19 Auxiliary Air Outlet

4.19.1 A quick disconnect female auxiliary air outlet shall be provided in the driver's side 80 inches wide by 17 inches high by 18 inches deep compartment. An air protection valve (90 pounds per square inch) shall be placed at the OEM truck air tank at the highest possible level, followed by a shut off valve.

# 5 — Crew Carrier Body Description

## 5.1 Body Design

5.1.1 The crew carrier body shall be designed for fire service operations only. Commercially designed bodies intended for use in other vocations or applications are unacceptable in quality, construction, design or durability. The crew carrier body module shall utilize a full welded sub-frame, independent of the chassis.

## 5.2 Structural Integrity

5.2.1 A structural integrity test report and a certificate of conformance shall be provided by an independent third party laboratory or test facility certifying that the body complies with the roof and side load requirements of AMD 001, Ambulance Body Structure Static Load Test as follows:

5.2.2 Roof Load Test: The body shall withstand a force equal to 2.5 times the curb weight of the vehicle applied to the roof of the body. The downward vertical movement at any point on the roof application plate shall not exceed 5.13 inches. Each exterior exit door of the vehicle shall be capable of opening and closing, and all emergency escape windows shall open, during the full application of the force and after release of the force. No structural damage to any load bearing or supporting members (i.e., torn or broken material, broken welds, popped or sheared body rivets, bolts and/or fasteners) shall be evident during the application of the force and after the release of the force.

5.2.3 Side Load Test: The body shall withstand a force equal to 2.5 times the curb weight of the vehicle applied to either the driver or passenger side of the body. The movement at any point on the side application plate shall not exceed 5.13 inches. The rear door of the vehicle shall be capable of opening and closing, and the roof emergency escape shall open, during the full application of the force and after release of the force. No structural damage to any load-bearing or supporting members shall be evident during the application of the force and after the release of the force.

5.2.4 Testing shall be performed on a body that is structurally identical to production units. The test report shall include video and photo documentation of the testing. Computer simulations or analysis (e.g. a finite element analysis) is not an acceptable substitute for testing. Test articles are considered maximum stress units and shall not be used for production.

5.2.5 After certification, the contractor shall notify the Government immediately in writing when a material changes in any way, when a major manufacturing process changes in any way, or when a manufacturing location changes. The need for recertification shall be determined by the Government when there are changes to the product or this specification.

## 5.3 Body Construction

5.3.1 The body module shall be comprised of a welded superstructure framework consisting of vertical and horizontal components fabricated from structural steel tubing. The superstructure framework is intended to protect occupants and the integrity of the emergency escapes, and shall as a minimum include the entire perimeter of crew compartment envelope, the perimeters of the four escape windows, the roof escape, the rear door, and the cab to body pass-through. The vertical framework at the front and rear of the body module shall extend the height of the body from the sub-frame to the superstructure roof. In addition to the perimeter framework at the front and rear of the body module, the framework shall also include, as a minimum, a third transverse structural member across the roof and extending the height of the body from the superstructure roof to the sub-frame, positioned vertically between the two side windows and storage compartments. Offsetting or staggering of the required vertical framework is not acceptable. Fabrication of the structural framework and framework members from formed sheet steel is not acceptable.

Sheet aluminum bodies, extruded aluminum bodies, or bodies that are of bolted or riveted body construction shall not be acceptable. The superstructure framework and the body sub-frame shall be a unitized design to form a single weldment assembly for structural integrity. All welding, metal work and fabrication shall be completed with the highest degree of quality and precision. All fasteners utilized in the construction of the body module shall be high quality corrosion resistant and suitable for its intended use. Any threaded fasteners utilized shall be machine screw type, and all holes shall be properly sized and tapped to create threads to receive them. Threaded expanding inserts shall be utilized where required. All fasteners shall utilize a locking method to prevent loosening from vibration. Strict attention shall be given to the elimination of hazards to personnel and equipment, such as rough edges, sharp corners, or protruding nuts and bolts. All exposed welded corners on aluminum tread plate shall be polished to a bright finish. All exposed corners shall be radiused and deburred. Where fasteners may come into contact with personnel or equipment, acorn type nuts or countersunk fasteners shall be utilized. All structural seams shall be fully seam welded, with all other body seams being caulked prior to painting.

5.3.2 The roof shall be 16 gauge minimum galvaneal ASTM A-60 steel sheet. Roof seams shall be continuously welded at the corners where they intersect with the lower rear and front body panels. The balance of the roof seams shall be skip welded and sealed to limit distortion and not remove protective rust inhibiting zinc coating from sheet metal.

5.3.3 The body shall be completely modular in design, thereby allowing its transfer to a new chassis, without cutting or welding, in the event of an accident or chassis replacement.

## 5.4 Body Sub-Frame

5.4.1 The body sub-frame shall be fabricated from structural steel tubing and/or channel. The sub-frame structural material shall be appropriately sized to withstand the static and

dynamic loads and stresses during the apparatus' operation on unimproved road conditions at maximum allowable payload, plus allowing for the industry's standard safety factor. The sub-frame design shall be a nested, NOT stacked, sub-frame, or similar, to allow for the lowest vertical center of gravity that can be achieved. The longitudinal structural members and the cross-members shall be nested and welded to each other. They shall be located such to provide maximum structural stability in the stated operating conditions.

5.4.2 The sub-frame shall be mounted to the chassis frame rails utilizing spring mounts at the front mounting points and shear plates at the rear mounting points.

**5.5 Body Materials**

5.5.1 All materials utilized in the fabrication of the body shall be of the correct type, alloy, and thickness to withstand the intended usage and provide protection against cracking, corrosion or metal fatigue. All materials utilized shall be of open stock origin, available to all apparatus manufacturers and commonly available through local sources, for the rapid and economical repair or modification of the body. Any use of proprietary parts or materials in the construction of the body shall be unacceptable, due to the potential for delays or difficulties in the event future repairs or service become necessary.

**5.6 Body Mounting**

5.6.1 The crew carrier body module shall be mounted utilizing spring mounts and shear plate mounts to allow for a degree of independent movement between the body frame and the chassis frame. The body shall be mounted at six mounting points. There shall be four spring mounting points at the forward end of the body. There shall be two shear plate type mounting points at the aft end of the body module.

5.6.2 The mounts at the forward end of the body shall be comprised of a two-piece design, fabricated from steel plate, with the upper section welded to the body module sub-frame and the lower section bolted to the exterior vertical surface of the chassis frame rails. The upper mount section shall be designed to nest within the lower mount section. The body mount sections shall be aligned and connected by properly sized Grade 8 bolts, equipped with an appropriate tension rating spring, flat washers and a locking nut.

5.6.2.1 Four mounts of this design shall be provided, two on each side of the body.

5.6.3 The mounts at the aft end of the body shall be comprised of vertical steel plates minimum that are welded to the body sub-frame and bolted to the exterior vertical surface of the chassis frame rails. These mounts shall extend rearward horizontally to incorporate the rear step supports and rear tow eyes.

5.6.3.1 Two mounts of this design shall be provided, one on each side of the body.

5.6.4 The body may be isolated from the chassis frame by using ¾ inch thick rubber, vulcanized to ¼ inch steel plate. The steel plate shall be welded or otherwise permanently affixed to the body frame.

5.6.5 All mounting nuts, bolts, and washers required for complete crew carrier body installation shall meet or exceed SAE and industry standards. All of the mounting hardware shall be plated to reduce corrosion. All nuts shall be Stover™ style lock nuts.

5.6.6 A secondary retention system, consisting of four 0.375 inch diameter minimum woven aircraft cable loops with bolted clamp connector, shall be installed to prevent the crew carrier body and frame from completely separating from the chassis frame in the event of an accident where the primary system fails. Two cable loops shall be installed at the forward end of the body, one on each side, and two cable loops shall be installed at the aft end of the body, one on each side. Any wiring, wiring harnesses or air lines adjacent to or in close proximity to the cables shall have adequate sheathing to prevent damage.

**5.7 Rear Step/Bumper**

5.7.1 A full-width DOT-compliant rear step/bumper assembly shall be provided at the rear of the crew carrier body for assistance in entering or exiting the crew compartment. The step assembly shall have a tread surface fabricated from a minimum of 10 gauge steel plate with a structural steel support framework. The rear step/bumper assembly shall be bolted directly to the chassis frame rails for strength, and all exterior surfaces of the step shall be finished with black non-skid Dura Coat™ material, or equivalent. The rear step/bumper assembly shall have a depth of approximately 8.00 inches.

5.7.2 A steel fold down step, fabricated from grip strut tread and steel flat bar, shall be provided in the center of the bumper to achieve a maximum distance of 24 inches from the ground to the first step. The rear step/bumper assembly shall be completely modular in design, and shall be capable of being unbolted and removed for repair or replacement. The step shall rotate up and towards the bumper 270° when not in use, with the step sides horizontal and flush to the top step and the step recessed into a slot in front of the top step when stored. The step shall be positively secured in the stowed position by means of a finger pull slam latch mounted on the curbside of the step. The step/bumper design and installation shall be such to allow for a minimum departure angle of 20 degrees.

5.7.3 A warning plate shall be affixed to the rear of the crew carrier body in a conspicuous place. The warning plate shall read: “WARNING: DO NOT RIDE ON REAR STEP WHILE VEHICLE IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT”

**5.8 Rear Skid Plate**

5.8.1 Two skid plates shall be installed on the rear underside of the body between the spare tire and the rear bumper. The skid plates shall span from each outside body edge, wraps around to protect body sides, to the frame rail and wrap under and flush to the rear

bumper. The skip plates shall be fabricated from three-sixteenth inch minimum abrasion resistant (AR) steel plate and shall be coated to provide corrosion resistance.

**5.9 Body Protection Panels**

5.9.1 The vertical corners and bottom edges of the body shall be covered with a 2 inch wrap of aluminum tread plate. The outboard lower front portion of the body shall be overlaid with a polished aluminum tread plate protection panel covering, approximately 24 inches wide by 44 inches high each side.

5.9.2 Body scuff guards shall be provided and installed on the bottom edge of all compartment door openings.

**5.10 Body Dimensions**

5.10.1 The crew carrier body shall have overall exterior dimensions of 100 inches wide by 90 inches high by 168 inches long ± 0.25 inches.

**5.11 Compartmentation**

5.11.1 The compartments may be constructed integral with the rest of the body or may be constructed independently as modular units. All compartment walls and floors shall be fabricated from 16 gauge minimum galvanneal ASTM A-60 steel sheet. The compartments shall either be framed using a structure of steel members (steel tubing, angle and/or channel) or constructed using sheet steel formed into structural shapes to meet the specified compartment dimensions. The side compartments shall be welded together and permanently welded to the body module superstructure. The compartment fronts shall be formed so as to have a channel around the perimeter of the opening. The channel shall be continuous and be seal welded at each corner to make a weather tight door seal channel.

5.11.2 All compartment interiors shall be free of exposed electrical harnesses.

5.11.3 All enclosed compartments shall be water and dust tight.

5.11.4 All compartments shall be as large as possible, as determined by the design of the apparatus.

5.11.5 All compartments shall be attached to the crew carrier body sub-frame and superstructure only, in order to maintain a truly modular design. Compartments shall not be attached directly to the chassis frame rails.

5.11.6 The approximate compartment sizes required are listed below:

**5.12 Driver's Side Compartments**

5.12.1 One vertical compartment shall be provided at the forward corner of the lower side body section of the crew carrier body. The compartment shall be accessible through a vertically-

hinged door, with the hinged side of the door toward the front of the body. The compartment shall be equipped with steel Unistrut™ channels for shelves. There shall be a segregated battery storage compartment with a separate latching access door in the bottom inboard wall of the compartment to house two batteries. Modifications to this compartment may be required to accommodate the Diesel Exhaust Fluid (DEF) tank supplied by the chassis manufacturer. Modifications to this compartment shall be approved by the Government.

Approximate Compartment Size: 34 inches wide by 43 inches high by 18 inches deep ± 0.25 inches.

5.12.2 One vertical compartment shall be provided directly aft of the compartment at the forward corner of the lower side body section of the crew carrier body, directly forward of the rear wheels. The compartment shall be accessible through a vertically-hinged door, with the hinged side of the door toward the rear of the body. The compartment shall be equipped with steel Unistrut™ channels for shelves. There shall be a segregated battery storage compartment with a separate latching access door in the bottom inboard wall of the compartment to house two batteries.

Approximate Compartment Size: 34 inches wide by 43 inches high by 18 inches deep ± 0.25 inches.

5.12.3 One horizontal compartment shall be provided directly aft of the compartment forward of the rear wheels of the crew carrier body. The compartment shall be accessible through a horizontally-hinged overhead lift-up door. The compartment shall be equipped with steel Unistrut™ channels for shelves. Two door latches and handles shall be provided on the lift-up door.

Approximate Compartment Size: 80 inches wide by 17 inches high by 18 inches deep ± 0.25 inches.

5.12.4 One horizontal compartment with pull out drawer shall be provided, spanning the wheel well. A drawer of maximum size shall be installed in this compartment. The drawer shall be horizontally mounted with a slider mechanism, and have a stop to keep the drawer from retracting when on uneven ground. It shall have five 4-inch high aluminum adjustable dividers. The drawer shall have a hinged lid of ⅛-inch aluminum that, when the lid is closed and the drawer is open, can be used as a work area.

Approximate Compartment Size: 54 inches wide by 6 inches high by 18 inches deep ± 0.25 inches.

5.12.5 One compartment shall be provided directly aft of the rear wheels of the crew carrier body to store fuel cans and drip torches. The compartment shall be accessible through a vertically-hinged door, with the hinged side of the door toward the front of the body. Machine stamped ventilating louvers shall be furnished at the inboard wall of this compartment. The compartment shall be equipped with steel Unistrut™ channels for

shelves. One stainless steel drip tray, of maximum length and width, shall be provided on the floor of the compartment with a 1 inch full perimeter lip.

Approximate Compartment Size: 26 inches wide by 26 inches high by 18 inches deep (26 inches deep below the floor) ± 0.25 inches.

5.12.6 One horizontal compartment shall be provided aft of the drip torch compartment, at the lower rear of the crew carrier body. The compartment shall be accessible through a vertically-hinged door, with the hinged side of the door toward the rear of the body. The compartment shall be equipped with steel Unistrut™ channels for shelves.

Approximate Compartment Size: 20 inches wide by 26 inches high by 18 inches deep (26 inches deep below the floor) ± 0.25 inches.

**5.13 Passenger's Side Compartments**

5.13.1 One vertical compartment shall be provided at the forward corner of the lower side body section of the crew carrier body. The compartment shall be accessible through a vertically-hinged door, with the hinged side of the door toward the front of the body. The compartment shall be equipped with steel Unistrut™ channels for shelves.

Approximate Compartment Size: 34 inches wide by 43 inches high by 18 inches deep (26 inches deep below the floor) ± 0.25 inches.

5.13.2 One vertical compartment shall be provided directly aft of the compartment at the forward corner of the lower side body section of the crew carrier body, directly forward of the rear wheels. The compartment shall be accessible through a vertically-hinged door, with the hinged side of the door toward the rear of the body. The compartment shall be equipped with steel Unistrut™ channels for shelves.

Approximate Compartment Size: 34 inches wide by 43 inches high by 18 inches deep (26 inches deep below the floor) ± 0.25 inches.

5.13.3 One horizontal compartment shall be provided directly aft of the compartment forward of the rear wheels of the crew carrier body. The compartment shall be accessible through a horizontally-hinged drop down door. The compartment shall be equipped with steel Unistrut™ channels for shelves. Two door latches and handles shall be provided on the drop-down door.

Approximate Compartment Size: 80 inches wide by 23 inches high by 18 inches deep ± 0.25 inches.

5.13.4 One horizontal compartment shall be provided directly aft of the rear wheels of the crew carrier body. The compartment shall be accessible through two vertically-hinged barn doors, with the D-ring latch installed on the primary door toward the front of the body. The secondary door shall be equipped with a barrel bolt installed on the interior panel of the door.

Approximate Compartment Sixe: 46 inches wide by 20 inches high by 18 inches deep (26 inches deep below the floor) ± 0.25 inches.

### 5.14 Compartment Doors – Steel Overlap Type

5.14.1 All compartment doors shall be recessed into the crew carrier body sides, with overlapping outer door panels for a secondary seal. Their construction shall be a double panel design with 14 gauge steel outer lap panel and an 18 gauge steel inner panel. The inner panel shall be welded to the outer panel and a full width reinforcement channel shall be attached to both the inner and outer panels. No welds shall be visible on the outer door panel, door pan sides or inner door panel. The door edges shall be contoured, with radiused corners, to provide a smooth, snag-free perimeter.

5.14.2 The door design shall be such to allow for servicing and/or replacement of the latch mechanism.

5.14.3 All compartment door opening channel perimeters shall be fitted with black automotive grade, closed-cell, Neoprene® “D” section open center door seals with adhesive backing. All door outer panels shall have automotive-grade, closed-cell, self-adhesive, “ribbed” type gaskets fitted to the overlap surface for a secondary seal.

### 5.15 Door Latches and Hardware

5.15.1 All compartment door latch assemblies shall be installed with threaded fasteners, shall not be welded, and shall be easily removable through the outer panel of the door for servicing or replacement. All door latch assemblies shall be of a flush-mount, rotary “D-Handle” design, with all external components fabricated from polished stainless steel. All latches shall be of a slam-type design, with a two-point latching operation. Matching striker bolts shall be utilized with all latch assemblies. All striker bolts shall have slotted mounting holes, and shall be attached with bolts to captive steel plates in the body structure for strength and ease of adjustment. Welded striker bolts or plates shall not be acceptable.

5.15.2 The following door latch assemblies meet these requirements:

5.15.3 Compartment Door Handle Assembly – Hansen™ brand, Model # 279L SS

5.15.4 Compartment Door Latch Assembly – Hansen™ brand, Model # 550

5.15.5 Striker Bolt Assembly – Hansen™ brand, Model # 551S

5.15.6 All hardware shall be corrosion resistant and suitable for its intended use. All nuts and bolts shall be stainless steel. Stainless steel nuts shall be the self-locking type. All latch assemblies shall be keyed alike to 1250. All compartment locks for a given crew carrier shall be either vertical or horizontal when locked so that it is visually apparent whether or not a compartment is locked or unlocked. Ten spare keys shall be provided.

5.15.7 All doors shall be equipped with full length, heavy-duty piano hinges. The piano hinge shall be 100% stainless steel, continuous piano hinge with a three-sixteenths inch stainless steel pin. The hinge shall be welded to the door between the inner & outer panels. The hinge shall be bolted to the compartment inner frame so that there are no fasteners visible on the door or the compartment when the door is closed. The mounting holes in the hinge shall be pre-punched in a uniform and standard manner to allow easy replacement of the hinge in the future if damaged. The mounting holes will be slotted to allow to adjustment of the door to the compartment.

**5.16 Door Hold Open Devices**

5.16.1 All vertically-hinged, outward-opening compartment doors shall be provided with one over center spring type hold back device (door check) properly sized for the door, and installed horizontally at the top of the compartment door opening. The hold open device shall assist the compartment door while opening and closing, and shall be securely fastened to the compartment door inner pan and compartment ceiling with threaded fasteners, enabling it to be easily removed for repair or replacement. All vertically-hinged, outward-opening compartment doors shall be capable of being closed with one hand, allowing a free hand to hold equipment or supplies.

5.16.2 All horizontally-hinged, overhead lift-up compartment doors shall be provided with two extending, gas cylinder type hold open devices, one mounted vertically on each side of the compartment door opening. The pressure rating of the gas cylinders shall be carefully matched to the size and weight of the compartment door, and they shall hold the compartment door securely open at more than 90 degrees to the apparatus body without any additional support. The gas cylinder hold openers shall dampen the upward movement of the compartment door while opening, and shall permit the closing of the compartment door without the need to release any type of manual locking devices.

5.16.3 The gas cylinders shall be securely fastened to the compartment door inner panels and compartment side walls with threaded fasteners and shall be easily removable for repair or replacement. All horizontally-hinged, overhead lift-up compartment doors shall be capable of being closed with one hand, allowing a free hand to hold equipment or supplies.

5.16.4 All horizontally-hinged, drop-down compartment doors shall be provided with two heavy-duty chains, encased in anti-rattle sheath, one on each side of the compartment door opening, welded to a compartment frame reinforcement bracket. Each chain shall have a detachable “S” hook on the door end that will hold the door open at 90 degrees to the body or allow the door to swing down 180 degrees.

5.16.5 The doors on the crew carrier body shall be provided as follows:

5.16.6 Single, vertically hinged painted swing open doors shall be provided on the following compartments:

- Both compartments forward of rear wheels, two on each side of the body.

- Compartment aft of rear wheels, two on each side of body.

5.16.7 Single, horizontally hinged painted lift-up door shall be provided on the following compartment:

- Compartment above the rear wheel well quarter panel area on the driver's side.

5.16.8 Single, horizontally hinged painted drop-down door shall be provided on the following compartments:

- Compartment above the rear wheel well quarter panel area on the passenger's side
- Compartment with drawer above wheel well quarter panel area on driver's side

5.16.9 The doors listed above shall include locking exterior latches.

**5.17 Compartment Floor Mats**

5.17.1 All enclosed side body compartments shall be equipped with 0.075 inch thick black floor matting. The matting shall be cut to fit the exact dimension of the compartment bottom, without interfering with the door fully closed. The floor mats shall be easily removable without the use of tools to allow the compartment to be cleaned. The floor mats shall be designed to provide ventilation to the equipment stored in the compartment, and to protect the stored equipment from direct contact with the metal compartment floor surfaces. The matting shall provide maximum drainage and traction and feature fungus, mold and chemical resistance. Black Turtle Tiles® #1212-S or equivalent shall be used.

**5.18 Adjustable Shelf Channels**

5.18.1 A minimum of four vertically-mounted steel Unistrut™ channels shall be provided and installed in designated compartments for the current or future installation of infinitely-adjustable shelving, slide out trays or equipment brackets. The channels shall so designed as to allow the use of spring-loaded, self-tightening extrusion nuts inside the channels to install the specified shelving.

**5.19 Compartment Shelves**

5.19.1 Twenty adjustable shelves shall be provided and installed in the completed body compartments. The shelves shall be fabricated from 16 gauge galvanized steel, with a 90 degree break on all four sides, 2 inches in height. All shelves shall have removable 16 gauge galvanized steel dividers running front to back approximately 3 inches on centers. The shelves and dividers shall be free of welds, sharp corners or rough edges. The shelves shall be attached to the Unistrut™ channels fastened to the compartment side walls and shall be infinitely adjustable. Spring-loaded extrusion nuts and locking fasteners shall be provided.

5.19.2 The shelf locations shall be as follows:

- Three in the forward vertically-hinged compartment, both sides of body
- Two in the vertically-hinged compartment, aft of the forward compartment, directly forward of the wheel well, both sides of body
- One in the horizontally-hinged compartment above the wheel well, both sides of body
- One in the vertically-hinged (fuel can and drip torch storage) compartment aft of the wheel well, driver's side of the body
- One in the rearward vertically-hinged compartment, driver's side of the body
- Three in the crew compartment rear storage, both sides of body

**5.20 Crew Compartment Interior**

5.20.1 The crew compartment interior side walls and ceiling shall be insulated with 2-inch thick fiberglass insulation, covered with 20 gauge minimum sheet steel panels. The sheet steel interior panels shall be welded to the tubing superstructure framework. Stainless steel Avex type rivets may be used in lieu of welding. The crew compartment floor shall be heavy-duty ⅛-inch diamond plate steel deck.

5.20.2 The interior roof panels (ceiling) shall be continuous between the side overhead storage shelves such that there are no exposed sheet metal seams between the overhead storage.

**5.21 Crew Compartment Windows**

5.21.1 All crew compartment windows shall be fabricated from automotive safety glass with dark factory tint and black aluminum frames. The following windows shall be provided in the crew carrier body:

5.21.2 Four side-facing; top-hinged, swing out emergency exit windows, with dual horizontally-sliding glass panels and screens, two windows on each side-facing wall of the crew carrier body. All side windows shall be approximately 54 inches wide by 22 inches high. The windows shall be clearly marked on the interior of the crew compartment with “EMERGENCY EXIT” labeling.

5.21.3 One (rear-facing, with vertically-sliding glass panels and screens, approximately 18 inches wide by 24 inches high, installed in the upper half of the crew compartment rear access door.

**5.22 Crew Compartment Roof Vent and Escape Hatch**

5.22.1 One 24 inch by 24 inch, 4-position pop-up roof vent and escape hatch shall be installed in the crew compartment roof. The hatch shall be installed in the center most position of the roof without interfering with the structural integrity. The roof vent shall be clearly marked on the interior of the crew compartment with “Emergency Exit” labeling. A Transpec™, 1000-028-001, or equivalent, roof vent and escape hatch shall be installed.

### 5.23 Camper Boot

5.23.1 The rear cab glass of the truck chassis shall be removed. The rear window opening shall be reinforced to accept the mounting of a camper boot. When the crew carrier body is mounted on the truck chassis the cutout in the forward bulkhead shall be at the same vertical elevation and of the same lateral dimensions as the chassis cab rear window when measured from the vehicle centerline. The shape of the cutout shall be comparable to the truck chassis rear window opening. A camper boot shall be installed in the truck chassis rear window space to bridge the front opening of the crew compartment and the chassis cab interior.

5.23.2 The boot shall consist of three layers and be fabricated from weather resistant and fire retarding material. Fabric and foam must meet FMVSS 302 – Flammability of Interior Materials. The boot material shall be covered on the outside with a gray silicone/fiberglass cloth. Boot center shall be an accordion style rubber, and inside crew compartment layer shall be black vinyl adequately secured to the front bulkhead. Construction and installation of the camper boot shall be weatherproof and allow for maximum movement between the chassis cab and crew compartment. Final installation shall present a neat appearance. The cutout in the forward crew compartment bulkhead and truck chassis shall be adequately reinforced to make the surrounding sheet metal rigid for the boot installation.

### 5.24 Crew Compartment Heating and Air Conditioning Unit

5.24.1 One 55,000 BTU air conditioning system shall be provided. Controls shall be mounted in an approved location in the crew compartment. One 35,000 BTU evaporator, with heater core, shall be provided and installed. The unit shall be installed near the ceiling, centered on the interior of the forward bulkhead of the crew compartment, between the right and left overhead storage. The air conditioning unit shall be plumbed to a 10 cubic inch chassis engine-mounted air conditioning compressor. The chassis OEM air conditioning compressor shall not be integrated into the crew compartment air conditioning system. One 60,000 BTU condenser, remote-mounted condenser shall be mounted on the upper front exterior bulkhead of the crew carrier body. All components of the crew compartment air conditioning system shall be connected with proper fittings and refrigerant hoses. The system shall include manually controlled heat shut off valves to control hot water flow to the rear passenger compartment evaporator.

5.24.2 The following components, or their equivalents, shall be installed:

- American Cooling Technologies, Inc.™ (ACT) Advanced Bus Air Conditioning System, with EZ-3 evaporator, and CS-2 condenser
- Seltec™ air conditioning compressor
- Aeroquip™ EZ Clip fittings and GH-134 refrigerant hoses

### 5.25 Air Conditioning Condenser Guard

5.25.1 A guard shall be provided for the air conditioning condenser mounted on the front of the crew carrier body to protect it from damage. The guard shall be designed in such a manner as to allow for maximum air flow to and around the condenser, and shall be removable for maintenance access. The guard shall be painted to match the color of the crew carrier body.

### 5.26 Crew Compartment Seating

5.26.1 Eight seats, with high back backrests shall be provided and installed in the crew compartment, four on each side of the center aisle. The seats shall be black vinyl, with spindle recliner control, mounted on a fixed pedestal. The seats shall be provided with one armrest, installed on the aisle side of the seat. A seat that meets these requirements is the H.O. Bostrom™ Sierra.

5.26.2 Each seating position shall have the following:

- One 12-volt outlet
- One L.E.D. reading light with ON/OFF switch
- Two cup holders
- Personal storage compartment with a hinged lid, equipped with an upholstered armrest and lockable latch
- Aircraft style, 2-point, manually adjustable, non-retractable lap belt

### 5.27 Seatbelts

5.27.1 Seatbelts shall be manually adjustable, non-retractable, push button release lap belts, Federal Motor Vehicle Safety Standards (FMVSS 209) approved. The total belt length shall be 60 inches, having an adjustable side of 49 inches and a fixed (buckle) side of 11 inches. The fixed side shall be mounted on the aisle side of the seat. The lap belts shall allow the passenger to adjust the belt manually for comfort and personal fit.

5.27.2 All seatbelts shall be red in color. A product that meets this requirement is a Beam's™ Seatbelts Model 1256.

### 5.28 Crew Compartment Overhead Storage

5.28.1 Two overhead storage compartments shall be provided at the intersection of the crew compartment interior ceiling and side walls. These storage compartments shall be located above the crew compartment seats, and shall span from the front to the rear storage area of the crew compartment, one on each side of the crew carrier body. Each storage compartment shall be approximately 146 inches long by 14 inches high by 26 inches deep ± 0.25 inches, and shall be equipped with a cargo retention system spanning the full height and width of the overhead storage, divided at each vertical support to provide personal gear storage. The retention system shall consist of sturdy mesh material with two inch wide black polypropylene webbing material sewn around the perimeter of the mesh

material. Footman loops shall be used to attach the netting to the top and bottom edges of the storage framework. The system shall be permanently attached to the lower footman loops, and shall be secured at the top and with 2-inch side release buckles. Each overhead storage compartment shall be capable of supporting an equally dispersed load of 250 pounds minimum.

**5.29 Crew Compartment Lower (Personal) Storage**

5.29.1 Two lower storage compartments shall be provided on top of the horizontal surfaces created by that portion of the lower side body compartments that protrudes into the crew compartment interior. These storage compartments shall be located outboard of the crew compartment seating positions and shall span from the front to the rear storage area, one on each side of the crew compartment. Each compartment shall be divided into four sections on each side of the crew compartment. Each section shall be provided with cup holders, and an area of approximately 27 inches long by 15 inches wide by 4 inches deep ± 0.25 inches for storage of the crew's personal items. Each storage section shall be provided with a hinged lid, which shall be equipped with an upholstered armrest and a 1250 lock, all oriented in the same direction.

**5.30 Crew Compartment Rear Storage**

5.30.1 Two storage compartments shall be provided at the rear of the crew compartment interior. These storage compartments shall span from the aft most seat to the rear of the crew compartment, one on each side of the crew carrier body. The storage compartment on the driver's side shall be approximately 17.5 inches long by 61 inches high by 31 inches deep ± 0.25 inches, with a minimum clear opening of 15 inches. The storage compartment on the passenger's side shall be approximately 17.5 inches long by 67 inches high by 31 inches deep ± 0.25 inches, with a minimum clear opening of 15 inches. Each compartment shall be equipped with steel Unistrut™ channels for shelves. Each storage compartment shall be equipped with a cargo retention system spanning the full height and width of the compartment, split horizontally approximately two-thirds from the top and shall consist of sturdy mesh material with two inch wide black polypropylene webbing material sewn around the perimeter of the mesh material. Footman loops shall be used to attach the netting to each side the storage framework. The system shall be permanently attached to the front footman loops, and shall be secured to the rear with 2-inch side release buckles.

**5.31 Crew Compartment Lighting**

5.31.1 Four interior L.E.D. lights shall be provided, with one installed above each of the emergency exit windows. Each of these lights shall be equipped with an HI/OFF/LOW switch and shall be powered through the chassis ignition switch. The emergency exit lights shall be on a separate circuit from the other crew compartment interior lights. Maxxima™ #M84434, 6-inch, 42 diode pattern, 900 lumens, or equivalent, shall be installed.

5.31.2 Three interior L.E.D. lights shall be provided on the centerline of the crew compartment ceiling, evenly spaced from the front to the rear of the crew compartment interior. These lights shall be controlled by both the crew compartment rear access door switch and a toggle switch mounted on the inside rear wall surface of the crew compartment on the passenger's side of the rear access door. The toggle switch, when in the “ON” position, shall override the door switch. Maxxima™ #M84435, 6-inch, 36 diode pattern, 800 lumens, or equivalent, shall be installed.

5.31.3 Eight dual color (red/white) L.E.D. reading lights shall be provided on the ceiling of the crew compartment, one located above each crew compartment seating position. These lights shall be powered through the chassis ignition circuit and shall be controlled with an individual switch mounted on each light. Maxxima™ #M84434RW, or equivalent, shall be installed.

**5.32 Crew Compartment Rear Access Door**

5.32.1 One crew compartment access door approximately 33 inches wide by 68 inches high ± 0.25 inches shall be provided at the rear of the crew carrier body. The rear access door shall be hinged on the passenger's side, and open outward. The hinge shall be capable of supporting the rear door without sagging for a minimum of five years. The hinge shall be a continuous piano hinge, all stainless steel material with a minimum ¼-inch stainless steel hinge pin. The door shall be bolted to the frame.

5.32.2 The crew compartment rear access door lock assembly shall meet the requirements of Federal Motor Vehicle Safety Standard 206. The door shall be capable of being locked from either the inside or outside, with the lock mechanism allowing exit from the crew compartment interior when the door has been locked from the outside.

5.32.3 A combination door stop and hold-open assembly shall be provided at the rear of the crew carrier body to limit the travel of the door and to hold it securely in the open position.

**5.33 Grab Handles**

5.33.1 To assist in entering or exiting the crew compartment, a grab handle with chrome end stanchions shall be provided to the left of the access door. The grab handle shall be a minimum ⅞-inch diameter, approximately 24 inches long, mounted vertically. An interior grab handle shall be provided on the rear access door inner panel, mounted horizontally below the window in the door. It shall be positioned to be accessible from the ground when standing at the rear of the vehicle with the door open.

**5.34 Spare Tire Storage**

5.34.1 A spare tire storage system shall be mounted below the rear of the crew carrier body. The spare tire and wheel shall be suspended on a cable carrier from the underside of the crew carrier body. The cable shall be routed over a pulley assembly mounted to a body sub-frame cross-member. The cable shall be tightened to stow the spare tire and loosened to

retrieve the spare tire with a removable crank handle. A ratchet and pawl assembly shall be provided on the exterior of the rear facing body panel, below the rear crew entry door, to maintain tension on the cable.

5.34.2 The spare tire storage system shall have an additional safety chain and ratchet with removable set pin securing the tire in place. The chain and ratchet shall be capable of supporting the weight and maintaining the spare tire in place should the ratchet and pawl system become damaged or unlocked during travel.

5.34.3 Provisions shall be required to allow for proper placement, storage and clearance of the spare tire from chassis components and exhaust. A bracket and/or heat shield shall be used for this purpose.

**5.35 Drip Rails**

5.35.1 Horizontal drip rails shall be provided the entire length of the crew carrier body where the exterior side wall surfaces meet the roof. A full width horizontal drip rail shall be provided across the back of the crew carrier body where the exterior rear-facing wall surface meets the roof. A section of horizontal drip rail shall be provided across the front of the crew carrier body on either side of the air conditioning condenser. All side body compartment doors shall have horizontal drip rails provided above them.

**5.36 Wheel Wells**

5.36.1 The vertical body quarter panels spanning between the rear wheel well openings and the crew carrier body structure shall be fabricated from the same material as the body, and shall be completely welded to the crew carrier body structure to provide a seam-free surface. The quarter panels shall be finish painted to match the body.

**5.37 Wheel Chock Mounting Brackets**

5.37.1 Two vertical wheel chock mounting brackets shall be installed at the rear of the crew carrier body, one mounted vertically on each side, inboard of the rear DOT lighting, above the bumper. Aluminum tread plate shall be provided above the mounting brackets to protect the paint from damage.

# 6 — Body Electrical Requirements

## 6.1 General Requirements

6.1.1 All crew carrier body electrical components shall be served by independent circuits which shall be separate and distinct from the crew carrier cab and chassis electrical circuits. All wiring supplied and installed by the apparatus manufacturer shall be installed in flexible split convoluted loom and shall be color coded. All wiring supplied and installed by the apparatus manufacturer shall be grease, oil and moisture resistant; and shall be securely fastened with insulated metal clamps and nylon wire ties. Wiring shall be routed and/or protected to eliminate exposure to moving parts or debris. Solderless insulated connectors shall be utilized at all splice joints and shall be enclosed with heat shrink tubing for extra corrosion protection. Automatic reset type circuit breakers shall be provided wherever possible.

## 6.2 Electrical Equipment

6.2.1 The following electrical components shall be provided and installed on the completed apparatus by the apparatus builder:

## 6.3 Rear Dot Lighting

6.3.1 The rear DOT lighting shall consist of the following components:

## 6.4 Tail Lights, Brake Lights

6.4.1 A pair of red L.E.D. combination tail/brake lights shall be provided at the rear of the body, one on each side, above the rear step/bumper. Whelen™ brand, Model # 60R00XRR, or equivalent, shall be installed.

## 6.5 Turn Signal Lights

6.5.1 A pair of amber L.E.D. arrow style turn signal lights shall be provided at the rear of the body, one on each side, above the rear step/bumper. Whelen™ brand, Model # 60A00TAR, or equivalent, shall be installed.

## 6.6 Back Up Lights

6.6.1 A pair of clear halogen back up lights shall be provided at the rear of the body, one on each side, above the rear step/bumper. Whelen™ brand, Model # 60J000CR, or equivalent, shall be installed.

6.6.2 The above DOT lighting shall be provided with a vertical cast aluminum four-position frame at the rear of the body, one on each side. The frames shall have a polished aluminum finish, and shall also contain the lower Zone “C” warning lights.

### 6.7 License Plate Bracket and Light

6.7.1 One clear light fixture, with license plate mounting bracket, shall be provided at the rear of the body.

### 6.8 Cluster/Clearance Lights and Reflectors

6.8.1 Three 1¼-inch round red L.E.D. clearance lights, flush mounted, shall be provided at the rear of the body, below the rear crew compartment access door, above the step/bumper assembly. Trucklite™, #10250R, or equivalent, shall be installed.

6.8.2 Two red 2-inch by 6-inch L.E.D. clearance lights, with stainless steel brush guards, one on each side of the body, shall be provided on the rear upper outboard corners of the body, facing to the side of the apparatus. Trucklite™, #21051R, or equivalent shall be installed.

6.8.3 Two amber 2-inch by 6-inch L.E.D. clearance lights, with stainless steel brush guards, one on each side of the body, shall be provided on the upper outboard corners of the body, facing to the front of the apparatus. Trucklite™, #21051Y, or equivalent shall be installed.

6.8.4 Two riveted red reflectors, one on each side of the body, shall be provided on the rear step/bumper assembly, facing to the sides of the apparatus.

6.8.5 Two riveted red reflectors, one on each side of the body, shall be provided on the lower outboard corners of the body, above the rear step/bumper assembly, facing to the rear of the apparatus.

### 6.9 Rear Directional Light Bar

6.9.1 One directional light bar shall be provided at the rear of the crew carrier body. The light bar shall be 30 inches wide and shall consist of 8 lamps. The light bar shall be surface-mounted, centered above the crew compartment rear access door, and shall be controlled by three switches on the cab center console. Whelen™, Model TAD8, or equivalent, shall be installed. Whelen™, Model TADCTL1 control head for directional light bar, shall be installed.

### 6.10 Scene Lights

6.10.1 Two 9-inch by 7-inch L.E.D. scene lights, with clear 26 degree lenses, shall be provided and installed as specified below. Each light shall be wired to an individual switch on the cab center console. Whelen™ brand, 900 series, #9SC0ENZR or equivalent, shall be installed.

6.10.1.1 One on the upper passenger's side of the body, centered front to rear, facing to the side of the apparatus.

6.10.1.2 One on the upper driver's side of the body, centered front to rear, facing to the side of the apparatus.

6.10.4 Two 7-inch by 3-inch L.E.D. scene lights shall be provided and installed; one on the upper rear driver's side and one on the upper rear passenger's side of the body, facing to the rear of the apparatus. The lights shall be wired to an individual switch on the cab center console. Whelen™ brand, 600 series, #70C0ELZR, or equivalent, shall be installed.

### 6.11 Compartment Lights

6.11.1 L.E.D. strip lighting shall be provided and installed in each exterior compartment. Full length L.E.D. strip lighting shall be installed behind the door frame on the left side, right side and top. The strip lighting shall be positively attached to the inside of the compartment and shall be easily removable for replacement or repair. No adhesive tape shall be used to mount the lights of mounting clips. The L.E.D. strip lighting provided shall have a maximum spacing of 2½ inches between the light-emitting diodes. Vista Manufacturing™, Inc., Model LKL, or equivalent, shall be installed.

6.11.2 Each compartment shall be equipped with one manual “push-pull” off-on waterproof marine type switch mounted in the top corner as close to the door hinge as possible. This switch will allow for the L.E.D. strip lights to be turned on manually and off upon the door closing. Cole Hersee™, #W606, or equivalent, shall be installed.

### 6.12 Power Inverter

6.12.1 One power inverter, with 12-volt direct current input; 120-volt alternating current output; four outlets, 1500 watts continuous output; 2500 watts minimum peak output (instantaneous) shall be installed in the front driver's side compartment on the top panel. It shall be bolted on to allow maintenance or replacement. All electrical wires passing thought the compartment shall run in flexible split convoluted loom. Any wire pass through holes in the compartment shall be sealed with rubber grommets. Two outlets shall be installed in the cab console and two outlets shall be installed in the crew compartment.

# 7 — Electrical System Performance Test, Low-Voltage

## 7.1 Test Required

7.1.1 The apparatus low voltage electrical system shall be tested as required by this section and the test results shall be certified by the apparatus manufacturer. The certification shall be delivered to the Government with the documentation for the completed apparatus. The tests shall be performed when the air temperature is between 0 degrees Fahrenheit and 110 degrees Fahrenheit (18 degrees Celsius and 43 degrees Celsius).

## 7.2 Test Sequence

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

## 7.3 Reserve Capacity Test

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

## 7.4 Alternator Performance Test At Idle

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

## 7.5 Alternator Performance Test at Full Load

7.5.1 The total continuous electrical load shall be applied with the chassis engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two hours. The activation of the electrical system load management system shall be permitted during this test. The activation of an alarm due to excessive chassis battery discharge, as detected by the system required by NFPA (current edition), or an electrical system voltage of less than 11.8 volts direct current for a 12-volt direct current nominal system, for more than 120 seconds, shall be considered a failure of this test.

**7.6 Low Voltage Alarm Test**

7.6.1 Following the completion of the tests described above, the chassis engine shall be turned off. With the chassis engine turned off, the total continuous electrical load shall be applied and shall continue to be applied until the excessive battery discharge alarm activates. The chassis battery voltage shall be measured at the battery terminals.

7.6.2 The test shall be considered to be a failure if the low voltage alarm has not yet sounded 140 seconds after the voltage drops to 11.70 volts direct current for a 12-volt direct current nominal system. The chassis battery system shall then be able to restart the chassis engine. The failure of the chassis battery system to restart the chassis engine shall be considered a failure of this test.

**7.7 Documentation**

7.7.1 The manufacturer shall provide the results of the low-voltage electrical system performance test, certified in writing, with the documentation provided to the Government at the time of delivery of the completed apparatus.

7.7.2 The test results shall consist of the following documents:

(1) Documentation of the electrical system performance tests.

(2) A written electrical load analysis, including the following:

- The nameplate rating of the alternator.
- The alternator rating under the conditions specified in NFPA 1906 (current edition).
- Each of the component loads specified that make up the minimum continuous electrical load.
- Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load.
- Each individual intermittent electrical load.

# 8 — Apparatus Finish

## 8.1 Body Finish Procedure

8.1.1 All exposed steel surfaces shall be thoroughly cleaned and prepared for finish painting.

8.1.2 The crew carrier body shall be masked as needed to prevent the painting of unwanted areas and overspray damage. Due to its modular design, the crew carrier body shall be completely finish painted prior to its installation on the chassis.

8.1.3 All exterior surface scratches and blemishes shall be filled with body putty and sanded down, along with all primed surfaces.

8.1.4 The complete crew carrier body shall be cleaned, blown free of dust; washed with thinner; and wiped with tack cloths. A non-sanding primer shall be applied and when dry, the apparatus body shall be sprayed with three coats of finish paint. All loose body components shall be treated in the same manner.

8.1.5 Any irregularity in any painted surface shall be repaired prior to the application of the finish paint coats.

8.1.6 The compartment interiors are to be sealed for leaks and the inside surface areas cleaned and prepped, then finish painted with a durable polychromatic, modified nitrocellulose coating that is V.O.C. compliant , isocyanate and lead free. One product that meets these requirements is Zolatone™ 20 Series. Color shall be #20-11 (Apollo Gray).

## 8.2 Crew Carrier Body Color

8.2.1 The crew carrier body shall be painted to match the color of the chassis cab exterior. The chassis cab shall not be repainted. The color of chassis cab exterior and body exterior shall be No. 14260 of Federal Standard No. 595 (Forest Service Green).

8.2.2 The crew compartment interior shall be painted silver in color.

8.2.3 The crew compartment interior floor shall have a protective/non-skid coating applied, black in color. The non-skid coating shall be applied to the entire floor surface and up the sidewalls 12 inches high.

## 8.3 Chassis Finish

8.3.1 The chassis cab exterior paint finish shall be supplied by the chassis manufacturer.

## 8.4 Striping

8.4.1 A 4-inch wide white reflective stripe shall be provided and installed horizontally on both the chassis cab and body. The stripe shall be placed as high as possible on the vertical surfaces on the sides of the chassis tilt hood and shall run the full length of the apparatus body in the space above the compartment and below the windows, and at that height

around the rear of the apparatus. A break shall be provided in the striping on either side of the apparatus body approximately over rear wheel centerline, and, in the rear, approximately below the window on the driver's side. The ends of the horizontal stripe shall be sloped at approximately 45 degrees on either side of the break.

8.4.2 DOT approved 2-inch wide alternating red and white conspicuity tape shall be applied as a minimum to the outward edge of the forward and aft facing surfaces of double panel compartment doors for enhanced visibility when compartment doors are open.

**8.5 Cab and Body Lettering and Striping**

8.5.1 Unless otherwise specified, block style lettering, fabricated from reflective material, shall be provided and installed on the apparatus as follows:

8.5.2 The word “FIRE,” in 4-inch tall white letters, shall be centered in the break in the horizontal 4-inch stripe on each side of the body, approximately over rear wheel centerline. The word “FIRE,” in 4-inch tall white letters, shall be centered in the break in the horizontal 4-inch stripe in the rear, approximately under the window on the driver's side.

8.5.3 The unit designator and equipment designator (Example, CA-BDF-C14A), in 6-inch tall white letters, shall be provided on the forward and center compartment doors, toward the bottom edge, on each side of the apparatus body.

8.5.4 The Crew name (Example, Mill Creek Hotshots), in tall 8-inch tall black letters, shall be provided on each side of the body in the area above the windows. Crew name, and font type shall be provided by the Government.

8.5.5 The Crew name (Example format, Mill Creek IHC), in tall Arial® black font, upper case letters, shall be provided on the roof of the crew compartment.

8.5.6 The Crew logo, in full color, maximum 22 inches in diameter, shall be provided on the rear crew compartment access door. Crew art work shall be provided by the Government.

8.5.7 The emergency exit windows and hatch shall be clearly marked on the exterior of the crew compartment with “EMERGENCY EXIT” labeling.

8.5.8 The apparatus manufacturer shall install Government-supplied door decals (shield and vehicle numbers) on the front cab doors, below the reflective striping.

**8.6 Truck Identification Plate**

8.6.1 A durable truck identification plate, fabricated from corrosion resistant metal, shall be provided and installed. The plate shall state the name and address of the apparatus manufacturer, and the serial number of the unit.

# 9 — Equipment

## 9.1 Equipment Provided

9.1.1 The following equipment shall be provided with the completed apparatus. The equipment shall be new and unused, and shall meet all current NFPA, OSHA and other applicable safety regulations.

## 9.2 Manuals and Drawings

9.2.1 The following specified materials shall be provided with the completed apparatus:

9.2.2 One apparatus manufacturer's operation and service manual, to include:

- Manufacturer's Record of Construction
- Warranty Registration and Information
- Operator Safety Information
- Vehicle Exterior Maintenance Instructions
- Maintenance and Lubrication Information & Charts
- Complete Electrical Diagrams
- Component Literature (i.e.: siren)

## 9.3 Road Kit

9.3.1 The completed crew carrier shall be equipped with a road kit containing the following items:

9.3.2 One 2½ pound Class B/C fire extinguisher with vehicle mounting bracket, shipped loose

9.3.3 One set of warning triangle reflectors, containing three folding reflectors in a plastic storage case

9.3.4 One 12-ton hydraulic jack with handle and lug wrench

## 9.4 Wheel Chocks

9.4.1 Two NFPA-compliant solid bottom wheel chocks shall be provided with the complete crew carrier. Zico™ Model #AC-32-W, or equivalent, shall be provided.

# 10 — Warranty Provisions

## 10.1 Ten Year Apparatus Warranty

10.1.1 All materials and workmanship herein specified, including all equipment furnished, shall be guaranteed for a period of ten years after the acceptance date of the apparatus, unless otherwise noted, with the exception of any normal maintenance services or adjustments which shall be required.

10.1.2 Under this warranty, the apparatus manufacturer shall be responsible for the costs of repairs to the apparatus that have been caused by defective workmanship or materials during this period.

10.1.3 This warranty shall not apply to the following:

- Any component parts or trade accessories such as chassis, engines, tires, signaling devices, batteries, electric lights, bulbs, alternators, and all other installed equipment and accessories, in as much as they are usually warranted separately by their respective manufacturers, or are subject to normal wear and tear.
- Failures resulting from the apparatus being operated in a manner or for a purpose not recommended by the apparatus manufacturer.
- Loss of time or use of the apparatus, inconvenience or other incidental expenses.
- Any apparatus which has been repaired or altered outside of the apparatus manufacturer's factory in any way that affects its stability, or which has been subject to misuse, negligence, or accident.