



shall include a listing of all Standard Features, Safety and Security Features and Accessibility Features to be provided as standard on this contract. A separate form in this RFP is provided to list Optional Features available and their related pricing.

The first bus produced under this agreement shall be considered the “prototype” bus. After inspection of this vehicle, TRIPS reserves the right to mandate changes to the electrical system wiring, related components and general quality control finishes. Contract language will be revised to reflect these changes and subsequent manufactured vehicles shall include all changes as standard in production.

2.1.2 Each Chassis GVWR being proposed shall be submitted as a separate proposal.

Proposed Chassis GVWR (in pounds) \_\_\_\_\_

2.1.3 Overall length 20’ – 31’ (excluding help bumpers) \_\_\_\_\_

2.1.4 Overall width (dual rear wheel) \_\_\_\_\_

2.1.5 Overall width (less DRW fenders) \_\_\_\_\_

2.1.6 Headroom, minimum 74” \_\_\_\_\_

2.1.7 Door Width, minimum (clear) 27” \_\_\_\_\_

2.1.8 Door Height, minimum 80” \_\_\_\_\_

2.1.9 Overall Height, maximum 109” \_\_\_\_\_

2.1.10 PASSENGER SEATS:  
 Seating Capacity of floor plans – minimum / maximum \_\_\_\_\_/  
 Seated Adult Capacity minimum / maximum \_\_\_\_\_/  
 Wheelchair positions minimum / maximum \_\_\_\_\_/  
 Seated Knee Room forward, minimum 26” \_\_\_\_\_  
 Seated Width per seat, minimum 17” \_\_\_\_\_  
 Cushion Height above finished floor, minimum 17.5” \_\_\_\_\_  
 maximum 18.5” \_\_\_\_\_

2.1.11 Each Proposal shall provide all available seating arrangement floor plans for TRIPS approval. Upon successful negotiation of a contract, any variance from this pre-approved list will require written permission from FDOT.

- 2.1.12 STEPS:  
Chassis Kneeler System Standard (Yes or No) \_\_\_\_\_  
Ground to Floor, no kneeler – Maximum 15” \_\_\_\_\_  
Ground to Floor, with kneeler utilized 11” \_\_\_\_\_
- 2.1.13 Cab Door & Front Passenger side seat deleted (Yes or No) \_\_\_\_\_
- 2.1.14 Air Bag, Frontal, Driver’s side only (Yes or No) \_\_\_\_\_
- 2.1.15 Mirror, Inside Rearview Day/Night (Yes or No) \_\_\_\_\_
- 2.1.16 Capacity of fuel tank in OEM Location – largest gallon capacity \_\_\_\_\_
- 2.1.17 Tires and Wheels shall be standard OEM size and load range for the GVWR of the proposed chassis. Tire size: \_\_\_\_\_  
Wheel size: \_\_\_\_\_
- 2.1.18 The vehicle shall conform in all respects to State of Florida Motor Vehicle laws (including, but not limited to, Chapter 316, Florida Statutes, Safety rules of the Department of Transportation, Chapter 14-90, promulgated under the requirements of Chapter 341, Florida Statutes) and the American with Disabilities Act, Title 49 Code of Federal Regulations, parts 38, Accessibility Specifications for Transportation Vehicles, Subpart B-Buses, Vans and Systems. This vehicle shall also comply with 40 CFR Parts 85 & 86 Air Pollution and Emission Standards for New Vehicles. Compliance with all applicable Federal Motor Vehicle Safety Standards shall also be required. The successful bidder will be required to provide any and all results of testing accomplished under the final rules issued by the Federal Transit Administration, 49 CFR Part 655 Bus Testing Program. The tests include the evaluation of maintainability, reliability, safety, performance, structural integrity, fuel economy and noise.  
Test based on: **5 years/ 200,000 miles**
- 2.1.19 Workmanship throughout the vehicle shall conform to the highest standards of accepted commercial practice and shall result in a neat and finished appearance. The complete vehicle(s) furnished must be of substantial and durable construction in all respects. All sub-components must be installed per the sub-component manufacturer’s standard mounting/installation/operations instructions. Any deviations on component mounting/installation/operations procedure must be approved in writing by the sub-component manufacturer and TRIPS prior to installation.

- 2.1.20 Welding procedures and materials shall be in accordance with standards of the American Society of Testing Materials and the American Welding Society. Welds not meeting these standards will be rejected. Rejection will result in the total replacement of sub-floor assemblies and/or cage assemblies. All exterior skin side welded surfaces shall be ground smooth and be free of unfriendly surfaces as part of the standard production process. All welds shall be inspected for quality and subject to on line inspection. All welding shall be performed using MIG welding machines utilizing Argon gas. All steel body/floor structure shall be coated rust inhibitor primer for corrosion protection and to prevent rust. *Proposer shall describe their corrosion prevention process and products utilized in application to vehicle and submit with proposal for this RFP.*
- 2.1.21 All parts, components and accessories shall be new. All exposed surfaces and edges shall be smooth, free from burrs and other projections and shall be neatly finished. The exhaust system and drive line shall be free from primer. Manufacturer shall certify that it has the equipment necessary to accomplish this task. Any sub-component installed underneath the vehicle shall not be primed.
- 2.1.22 All exposed surfaces and edges shall be smooth, free from burrs and other projections and shall be neatly finished. All fasteners used in the vehicle are backed by a Certificate of Quality by the manufacturer and have been found to be in accordance with all SAE and ANSI specifications.
- 2.1.23 The building of the chassis frame to produce the lower profile necessary to provide a completed bus that complies with ADA will be accepted for the installation of a wheelchair ramp. This process will allow for building chassis for various wheel bases. The State of Florida will allow cutting of the chassis for the purpose of installing a lowered floor and a wheelchair ramp. Cutting of the chassis to increase or decrease the length of the chassis to increase the GVWR will not be permitted. This will be verified through serial number checks. The proposal shall include a detailed description and drawings of frame insert section. The rear overhang, measured from the center of the rear axle to the outer edge of the rear bumper, cannot exceed 1/3 of the overall vehicle length. Rear frame extensions shall be Butt-welded with a continuous weld and shall exceed the requirements of the chassis manufacturer. In addition, the FDOT requires a 4" x 12" x 1/4" steel plate to be installed and welded with a continuous weld around the entire circumference of the plate and bolted. Further, The FDOT will not allow re-certification of the chassis OEM GVWR and GAWR. Any vehicle that exceeds the OEM GVWR and/or GAWR will not be accepted.

- 2.1.24 All vehicles shall be weighed “as built” before release and manufacturer’s engineering department shall perform a four corner weight analysis on each vehicle that indicates the weight of the vehicle and any attachments, the maximum weight of the occupants (150 pounds per seated position and 250 pounds per wheel chair position), and the weight of a full tank of fuel for GAWR and GVWR evaluation. A copy of the “as built” weight certification, four corner weight analysis and an “as built” floor plan shall be on each vehicle shipped to Florida for the TRIPS. The “as built” weight certification shall provide the following information for each individual bus:
- > VIN of the bus
  - > Manufacturer
  - > Body Serial Number
  - > A description (type) of the bus
  - > Date of certification
  - > The number of ambulatory passenger capacity including driver
  - > The number of wheelchair positions
  - > Four wheel weight distribution of the actual completed weight of the bus including all attachments
  - > Four wheel weight distribution of the weight of the ambulatory passengers including driver
  - > Four wheel weight distribution of the weight of the wheelchairs
  - > Four wheel weight distribution of the weight of the Fuel
  - > Four wheel weight distribution of the total weight of the vehicle
  - > Weight analysis must have signature and title of person submitting it

In addition to the manufacturer’s weight calculations and documents, TRIPS will require that the manufacturer’s complete and submit weight calculations on TRIPS Form #TRIPS-09-SCLF, found in *Exhibit 8*. The TRIPS will perform random four wheel weight analysis at the Springhill Inspection, Testing & Research Facility in Tallahassee. The total weight at each wheel must not exceed 50% of the GAWR for that axle and GVWR must not be exceeded. Any bus that exceeds either condition will be rejected.

- 2.1.25 Manufacturer will be responsible for delivering vehicles that are properly serviced, clean, and in first class operating condition. Pre-delivery service, at a minimum, shall include the following:

- \*1. Complete lubrication of chassis, engine, and operating mechanisms with manufacturer's recommended grades of lubricants.
- \*2. Check all fluid levels to insure proper fill.

- \*3. Adjust the engine for proper operating condition.
- \*4. Inflate tires to proper pressure.
- \*5. Check to insure proper operation of all components, accessories, gauges, lights, and mechanical and hydraulic features.
- \*6. Cleaning of vehicle, and removal of all unnecessary stickers and debris.
- \*7. Full front-end alignment utilizing heavy duty equipment and experienced trained technicians to perform proper alignment. All wheels shall be balanced, including spare tire. This alignment is to be performed only after vehicle is built complete and is at full curb weight. Vehicle shall be delivered with fully adjustable front end components installed to allow alignment in the field without replacing any components.
- \*8. Focusing of headlights utilizing equipment designed for this Purpose.

2.1.26 Manufacturer shall certify that it:

- \*1. Has in operation or has the capacity to have in operation, a manufacturing plant.
- \*2. Has adequate engineering personnel, or has the capability to have such personnel, to satisfy any engineering or service problem that may arise during the warranty period. Bidder must supply in proposal the number of engineers along with their designated areas of responsibilities.
- \*3. Has the necessary facilities and financial resources, or has the capability to obtain such facilities and resources, to complete the contract in a satisfactory manner within the required time.

2.1.27 Dealer will be required to submit weekly status reports into the TRIPS Database Center, which tracks the progress of each individual vehicle through the procurement and production process, from receipt of order through delivery and acceptance of each individual vehicle by the agency. This report shall be coordinated with the manufacturer's report and must be submitted the first workday following the previous workweek.

See Part 2, **Exhibit 1: TRIPS Database Dealer Requirements**, for information describing the process for Dealers to submit Weekly Status Reports to the TRIPS Database Center.

2.1.28 Dealer shall be responsible for delivering vehicles that are properly serviced, clean and in first class operating condition. Pre-delivery service, at a minimum, shall include the following:

- \*1. Correct and repair all deficiencies noted in the TRIPS Pre-delivery Inspection Report conducted on each individual vehicle at its Springhill Bus Inspection Research & Testing facility in Tallahassee. All repairs must be completed before delivery to Purchaser. The Dealer must enter detail of the repair action into the TRIPS Database Center for the specific VIN of each vehicle inspected by TRIPS Staff.
- \*2. Check all fluid levels to insure proper fill levels.
- \*3. Adjust the engine for proper operating condition.
- \*4. Inflate tires to proper pressure.
- \*5. Check to insure proper operation of all components, accessories, gauges, lights, and mechanical and hydraulic features.
- \*6. Cleaning of vehicle, and removal of all unnecessary stickers, markings and debris.

2.1.29 All sub-component units installed such as, but not limited to wheelchair ramp, restraint systems, passenger seating, event data recorders, alternators, air conditioning, air compressor and any other subcomponent installed by the bus manufacturer shall be installed per the sub-component manufacturer's installation instructions. Bus manufacturer must certify that said sub-components have been installed per the instructions provided and a copy of all installation instructions shall be provided to TRIPS; with changes, revisions and / or updates to installation instructions and procedures being immediately communicated to the TRIPS for review and approval. Submit Manufacturer Installation Instructions for all components with proposal.

## **2.2.0 ENGINE**

2.2.1 Gasoline engine shall be manufacturer's standard for this size bus considering components and accessories proposed. The proposed engine

must give satisfactory performance over terrain encountered in Florida with maximum passenger load. Manufacturer shall propose engine horsepower and torque.

2.2.2 Diesel engine shall be manufacturer's primary option for this size bus considering components and accessories proposed. The specified engine must give satisfactory performance over terrain encountered in Florida with maximum passenger load. Manufacturer shall propose engine horsepower and torque.

2.2.3 TRIPS reserves the right to accept hybrid drive-train system and/or Alternative Fuel engines when offered by the manufacturer, during the term of this contract

2.2.4 Manufacturer extended warranty (**See Part 3: Options**).

### **2.3.0 COOLING SYSTEM**

2.3.1 The FDOT will accept the OEM heater hose in the engine compartment. Silicone hose with constant torque clamps shall be installed between the OEM connection and the auxiliary heater. All heater hose shall be routed below floor level to ensure passenger safety. Electric-vacuum controlled auxiliary heater fluid shut-off valves shall be included as standard equipment.

### **2.4.0 EXHAUST SYSTEM**

2.4.1 The vehicle shall be equipped with a heavy duty, corrosion resistant exhaust system which meets or exceeds FMVSS and EPA noise level and exhaust emission (smoke and noxious gas) requirements. Heavy-duty exhaust hangers shall be standard equipment and shall be bolted to the frame. All hanger U-bolt thread orientation must be directed sideways. All altered exhaust joints shall be welded with a continuous weld.

2.4.2 The exhaust tailpipe shall terminate at the left rear corner of the bus.

2.4.3 Galvanized heat shielding shall run between the exhaust system and the floor of the vehicle, at a minimum, this shield shall meet OEM Up-Fitter Guide requirements, or approved equal.

### **2.5.0 DRIVE SHAFT**

2.5.1 Protective metal guards for the drive shaft shall be provided at each drive line U-joint to prevent a broken shaft from touching the ground, contacting

any brake line, or whipping through the floor. The drive shaft guards shall conform to 49 CFR. Manufacturer shall provide a detailed description of the guard(s) proposed.

For each drive shaft section, the protective metal guard shall be located within  $\frac{1}{4}$  of the length of the shaft and behind the forward U-joint. The bottom portion of the hoop shall be no more than three (3) to four (4) inches from the outer surface of the drive shaft.

### **2.6.0      SUSPENSION**

2.6.1      All chassis shall be equipped with air ride suspension system, capable of giving an acceptable ride under various load and road conditions. The system shall include an air compressor, air dryer, air reservoir tank, air distribution box and air system control. Air compressor shall be engine mounted and provided with an easily accessible air filter. Air reservoir tank shall have a drain lanyard to drain oil and/or water.

2.6.2      Front and rear suspension with full curb-side kneeling feature shall be provided. Bus shall kneel only when door is opened and return to proper height when door is closed.

2.6.3      Constant ride height control with adjustable electronic height sensors shall be provided. Submit a detailed description of air ride suspension system proposed.

### **2.7.0      AXLES**

2.7.1      Axles shall be manufacturer's standard. Axle must be load rated for the GVWR of the size bus involved.

2.7.2      Axles shall accommodate front and rear air ride suspension system.

### **2.8.0      BRAKES**

2.8.1      Brakes should be capable of stopping a fully loaded vehicle at a deceleration rate equivalent to a 22-foot stop from a speed of 20 miles per hour and meet the FDOT Performance Brake Test Procedure (Part 2, **Exhibit 4**). They must be capable of this type of stop 3 times in a rapid succession from a speed of 20 miles per hour without brake fade.

2.8.2      The parking brake shall be capable of holding a fully loaded vehicle on a 15 degree incline and meet the FDOT Emergency/Park Brake Procedure Test (Part 2, **Exhibit 5**). The system shall incorporate a warning light on

the instrument panel to indicate to the driver when the parking brake is applied.

2.8.3 The controls for the wheel chair ramp shall be interlocked with the vehicle parking brake system and transmission to ensure the vehicle cannot be moved from the park position when the ramp system is activated. The interlock must meet ADA Title 49 Lift Interlock requirements.

2.8.4 The interlock system shall be a solid state, microprocessor-controlled unit that utilizes "Plug and Play" connections to the chassis, incorporating intermittent fault filter technology to eliminate false signals from activating the system, and have a dash mounted LED to display sub-system status. The system shall be an Intermotive ILIS system, or approved equal.

### **2.9.0 TIRES & WHEELS**

2.9.1 Steel wheels are standard. Aluminum wheels will be provided as an option **(See Part 3: Options)**.

2.9.2 Stainless steel wheel liners / inserts, front and rear wheels will be provided as an option **(See Part 3: Options)**.

2.9.3 A spare tire, mounted on the same type wheel assembly of the tires mounted on bus, shall be provided as standard and shipped loose with each vehicle. The spare tire shall be covered and secured so as not to damage the interior of the bus in shipment.

### **2.10.0 ELECTRICAL**

2.10.1 The vehicle shall be equipped with a heavy-duty (12 volt) electrical system. All components are to be selected and integrated to function in an environment characterized by low engine (alternator) speeds and high amperage draws (due to lights, air compressor, wheelchair ramp, 4-way flashers, air conditioning, or heater, and other accessories in constant operation). The entire electrical system, shall comply with CFR 49 sections 393.29, 393.30, 393.31, 393.32, and 393.33 respectively.

2.10.2 The vehicle shall be equipped with a belt driven American Power Systems Alternator, or approved equal, capable of producing output at engine idle that exceeds the total amperage draw with all systems (excluding the wheelchair ramp) functioning. Alternator must be capable of producing this level of output with alternator surface temperatures up to 220 degrees Fahrenheit. Manufacturer shall perform testing of total amperage draw on all vehicles under this contract to ensure compliance. The upgrade (non-

OEM) alternator manufacturer shall provide a permanent label under the hood stating brand, model number, serial number and alternator output. The OEM alternator output cable to the OEM power supply box must be retained and a separate second stage cable shall be installed ensuring even voltage distribution between the two sets of circuits. If an alternator or alternators is/are equipped with a separate rectifier bridge or an external regulator, the rectifier and or regulator shall be mounted inside cab of the vehicle. Manufacturer may be asked to furnish a sample of any aftermarket alternator for testing prior to award of contract. The alternator(s) proposed must meet or exceed the alternator manufacturer performance standards and **Part 2, Exhibit 6: Alternator Output Test.**

- 2.10.3 The vehicle shall have dual 700 CCA batteries located in a readily accessible area on a pullout stainless steel tray under the body. The access door shall be non-locking latch type. The vehicle shall be equipped with a storage battery electrical power main disconnect switch. The disconnect switch shall be labeled in red lettering "Battery Disconnect, Emergency Use ONLY".
- 2.10.4 A fast idle system shall be installed which will automatically increase the engine speed (RPM) to approximately 1500 RPM on gasoline engines and 1200 RPM on Optional diesel engines. The fast idle shall be Inter-motive Advanced Fast Idle Systems (AFIS), or approved equal. Include a Gateway Module capable of being actuated either by driver, a voltage sensor, an air conditioner, an air compressor command, or a low coolant temperature command. This fast speed idle shall engage only when the vehicle is in Park and the parking brake applied.
- 2.10.5 The vehicle shall be equipped with a Cooper Bussman Dual Vehicle Electrical Center (DVEC) specifically designed for this application. The DVEC shall incorporate diode protected relays, environmentally sealed input and output connections. The connectors will be color coded and keyed to eliminate incorrect installations. The tethered thermoplastic cover with a sealing gasket incorporates a legend that displays circuit fusing and identification information. A secondary rear terminal mini fuse and power distribution module will be provided that offers up to 10 additional circuits, 5 fused and 5 with relays.
- 2.10.6 A reverse direction alarm (BUA) in compliance with SAE J994b with respect to acoustical performance for a Type B device, but emitting at least 7dbb (A) plus or minus 4db with a supply of 14 volts. Conformity to the environmental test stipulated by the SAE shall not be required.

**2.11.0 WIRING HARNESS & ROUTING**

- 2.11.1 The wiring harness must be built by a reputable wiring harness manufacturer and must be built to length of bus. Bidder must supply the name of this manufacturer and provide a list of recent customers; and must submit a proposed wiring schematic. Each harness shall be as-built with the exception of optional items, but each wiring schematic must identify each optional circuit. Harness may incorporate wiring for options not selected by the end user. Schematics shall include each connector pin number and location. It shall also include symbols indentifying electrical components along with location of each component. Each set of schematics shall have a legend that identifies each symbol used, including grounds.

All wiring shall be vinyl insulated to 200 degrees Fahrenheit, shall meet SAE standards, and shall be color coded and number coded at least every eighteen (18) inches and permanently labeled to identify their function. Battery cables shall be 1/0 gauge with minimum of 0.075" wall plastic insulation. All wiring shall be of sufficient size to carry the required currents without excessive voltage drop.

Entire harness system and mating electrical components are plug-connected with lock tab connectors; all terminals are machine crimped; all harnesses shall be covered in high temp conduit and all exterior under body/under hood connectors are Weather-Pak connectors.

All multi-pin connectors with 12 or more conductors shall be environmentally sealed electrical connectors with a tab connector. All connectors with 3 to 12 circuits that are under the hood and/or under the vehicle shall be environmentally sealed high impact plastic connectors with pull apart locking tabs. All connections containing one to two circuits shall be made with Posi-Lock connectors. Any solder joints must be pre-approved by FDOT. **NO BUTT CONNECTORS WILL BE ALLOWED.**

- 2.11.2 All body wiring shall be run inside the body in a protected area. All wiring shall be in a loom and secured for maximum protection. Clamps shall be rubber or plastic coated to prevent them from cutting the wiring insulation. When routing wiring under vehicle all wiring shall be encased in a loom and attached to the frame and sub-floor structure with rubber or plastic coated P-clamps every 12 inches and shall not be bundled with hoses. The harness shall run in straight lines as close to the chassis frame rails as possible. Any harness that goes over the rear suspension shall be encased in a conduit fixture securely fastened to the sub-floor rails or routed inside the frame rails.

- 2.11.3 All fuses and relays (other than chassis OEM) shall be placed in an electrical panel. The panel shall be accessible through a non-locking door. Connection to OEM electrical system shall be accomplished through connectors supplied by the chassis manufacturer using locking mating connectors. A legend shall be provided on the circuit box door that displays circuit fusing and identification information.

## **2.12.0 FDOT CRASH AND SAFETY TESTING STANDARDS**

It is mandatory that the Proposer meet the approval requirements of the FDOT Crash and Safety Testing Standards. Award of contract is contingent on successfully completing a two-step Pre-Approval process and obtaining a Temporary Waiver Contract. The Pre-Approval process must be completed within 90 days of award of contract. If satisfactory results are obtained, TRIPS will then issue a Temporary Waiver Contract Award for a period of no more than 24-months from issuance of the temporary waiver. Satisfactory Full Scale testing should be completed within 24-months. Detailed information on the Pre-Approval Process requirements can be found in **Part 2, Exhibit 7: Pre-Qualification Structural Test Procedure**

*The Pre-approval Process (90-days) consists of two steps:*

*Step 1 – Manufacturer submits to TRIPS detailed cage structural drawings, a description of the method of attachment and a description of materials to be used in its construction. Upon TRIPS completing their review, any structural concerns will be discussed with the manufacturer.*

*Step 2 – TRIPS will notify the manufacturer to send test panels for evaluation. The panels required are a floor/sidewall, roof/sidewall and partial sidewall panel sections. TRIPS will complete the panel evaluation within 90-days of receipt of the panels at their Tallahassee, FL Bus Inspection & Testing Facility.*

If the manufacturer fails to meet the approval requirements at the end of the temporary waiver contract period, the Contract Award will be terminated. Information on the full scale approval requirements on these standards can be found in **Part 2, Exhibit 8: FDOT Crash and Safety Test Approval Process (Full Scale)**.

- 2.12.1 Structural drawings for the proposed bus shall be submitted with the proposal. The vehicle construction shall meet or exceed minimum standards set by FDOT.

2.12.2 All joints shall be caulked and sealed at the time of construction to produce water and dust tight seal. In addition to the Federal Motor Vehicle Safety Standards (FMVSS) or the Advanced Design Bus (ADB) Crash Worthiness Test requirements, the manufacturer shall also meet all applicable State of Florida Regulations in effect at the time of manufacture.

2.12.3 All dimensions, positioning of components, clearances, etc., shall be based on standard adult passengers.

**2.13.0 FLOOR**

2.13.1 Proposals shall include a description of the material that will be used and structural drawings of the floor assembly.

2.13.2 Flooring shall be 5/8 inch thick, engineered wood Advantech, or approved equal, with moisture barrier and sealed edges.

2.13.3 The entire body frame under structure of the vehicle shall be primed on all surfaces, allowing the primer to cover all metal surfaces, applied at the time of manufacture. Any sub-component installed underneath the vehicle shall not be primed. Proposer shall submit details of the primer to be utilized.

**2.14.0 WHEEL HOUSINGS**

2.14.1 Rear wheel housing shall be constructed of 14 gauge (minimum) one-piece steel constructed and adequately reinforced to prevent deflection. Ample clearance shall be provided for tires under load and operating on both smooth and rough terrain. All steel shall be treated for corrosion resistance. In the event that tires extend beyond side of the vehicle, splash aprons and fenders shall be provided.

2.14.2 Front wheel housings are to be provided with the chassis cab section.

**2.15.0 PASSENGER ENTRY**

2.15.1 Steps shall not be necessary; all passengers shall enter by way of the passenger door. Bus shall kneel (lower) a minimum of 4 inches when the passenger door is opened, to a maximum 11 inches from ground to bottom of entry.

**2.16.0 DOORS**

2.16.1 Passenger entry door shall be a dual, electric swing out type with two glass windows. Door shall be 42 inches minimum, clear door opening

shall be a minimum of 39 inches wide by a minimum of 75 inches in height.

- 2.16.2 All entry doors shall utilize long-life friction reducing materials and/or methods at upper and lower door-leaf pivot points. All door header linkages and rotation points shall incorporate similar long-life friction reducing materials/methods in their construction.
- 2.16.3 The passenger entry door shall be in the body directly rearward of the passenger door.
- 2.16.4 The entry door shall be fully encompassed by an integrally welded steel door surround. The entire door surround shall be fully welded to the steel substructure (cage) and floor cross members and become an integral part of the vehicle structure. Entry doors shall incorporate gaskets and / or seals to provide a barrier against intrusion by wind, water, and dust around their perimeter. The seal at the center of the door shall be by means of full height overlapping rubber seals, and shall include a barrier or sweep at the bottom of both doors.
- 2.16.5 The passenger entry door shall function through the use of an electric door operator. This door operator shall be modular in design for easy installation and reliable performance. The door operator shall develop sufficient force to close the doors and keep closed during normal operation, while at the same time provide slam free operation. The door operator shall either open or close the door in approximately 2.5 seconds.

For emergency situations, a manual door release control shall be provided adjacent to the door, and shall be designed to permit simple operations to override the electric door operator. This manual door release control shall be quickly identified for emergency exit only. For normal operations, the door operator shall not open the passenger door until the transmission lever is placed in *PARK*. With the door in the open position, the transmission will remain locked in the *Park* position until the door is totally closed. The entry door shall be equipped with a sensitive edge as standard that will reopen the door when closed on a passenger or object in the doorway.

## **2.17.0 EMERGENCY EXITS**

- 2.17.1 Hinge-out windows shall be installed for emergency escape. Emergency escape windows shall comply with FMVSS-217.
- 2.17.2 A rear emergency door with upper and lower windows shall be installed. The emergency door shall be equipped with an audible alarm and light indicating to the driver, should the door be ajar or

opened while the engine is running. This door shall have a lock to prevent entry from outside. In all seating arrangements a 12 inch wide (minimum) unobstructed aisle shall be provided leading to the rear emergency door.

2.17.3 The vehicle transmission shall not shift out of the park position when the rear emergency door is locked or when the door is unlatched or opened. An audible alert capable of 95 db(A) and a driver warning light shall be produced any time the emergency door is open and the ignition is on.

2.17.4 Emergency escape windows shall be clearly labeled and operation instructions shall be clearly visible at each escape window. The emergency release handle will meet FMVSS-217 requirements and shall not return to the locked position automatically; it shall require the driver or other authorized person to manually re-lock it. All emergency exits shall comply with F.A.C. 14-90.

2.17.5 Each emergency exit shall be identified with a 12 volt red LED lamp assembly, with a 10,000 hour life bulb, wired to the vehicle ignition circuit. This system, along with window signage, shall provide passengers with a clear identification of exit routes. Next to or immediately below each LED light fixture shall be a decal, one (1) inch Helvetica Medium white letters on red background, stating "Emergency Exit".

2.17.6 For standardization purposes, all vehicles shall be equipped with a Specialty Manufacturing Pro Lo roof hatch that is equipped with both an internal and external operating handle. Hatch shall open from rear toward the front.

**2.18.0 SASH AND GLASS**

2.18.1 Side sash shall be T-slider type. The sash shall be equipped with latches. Sash shall not slide (open or close) upon brake application. Side sash and rear glass may be either laminated safety glass or tempered safety glass.

Side sash glass .....double density\*  
Rear end glass .....double density\*  
Windshield glass .....single density  
Driver's window glass .....single density  
Right side glass opposite Driver.....single density  
Entrance door glass .....single density

Tinting color shall be smoke (gray) .....single density

**\*NOTE: Maximum tinting shall be 31% light transmittance.**

- 2.18.2 Glazing material shall be in accordance with the latest version of ANSI - Z26.1, Safety Code for Safety Glazing Materials for Motor Vehicles Operating on Land Highways. Glass must be AS-2 tempered. Glass grade shall be visible on each window pane.
- 2.18.3 The street-side (left) rear most passenger window shall be fixed, not allowing the window to be opened. This is to keep exhaust fumes from entering the bus.
- 2.18.4 Window frames maybe anodized black or remain clear metal finish, as per the desire of the Purchaser. The Proposer shall submit if there is a pricing differential for both of these finishes.

## **2.19.0 LIGHTS**

### **2.19.1.0 Exterior Lights**

- 2.19.1.1 Tail brake lights, rear turn signals, back-up lights and state license tag light shall be LED fixtures. A center-top mounted third brake light shall be provided and it shall be an LED fixture. The mid-bus and front and rear marker lights shall all be LED fixtures. Proposer shall provide technical information, life expectancy, warranty and identification of the manufacturer providing the above LED lighting.

### **2.19.2.0 Interior Lights**

- 2.19.2.1 Vehicles shall incorporate side, over passenger seats and/or center ceiling mounted interior lighting and shall be LED fixtures.
- 2.19.2.2 The number of lights and their light output shall be determined by providing a minimum average of 15 foot- candles illumination on a 1 square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Floor surface in the aisles shall be a minimum of 10 foot-candles. For interior floor, seat and aisles the light fixture must maintain constant light output over a 12 volt range. Each light fixture must have an integral power driver to maintain proper current and voltage to the fixtures.
- 2.19.2.3 There shall be two (2) shielded front passenger door well floor/ramp lights, wired to illuminate when the passenger door opens and shall be mounted to provide light on the entry floor/ramp platform. The floor/ramp light shall meet with ADA requirements and shall activate only when the doors open and will turn off when doors close. The lights shall be LED type.

- 2.19.2.4 A separate light shall be installed to illuminate the outside area on the ground surface to a level of no less than 1 foot-candle for a distance of three (3) feet beyond the doorway. The outside door light shall be located to prevent casting a shadow on the step tread and shall illuminate the ramp when deployed. Lamps at the front passenger door shall comply with ADA requirements and shall activate only when the doors open. The light fixtures shall be LED type.
- 2.19.2.5 Vestibule (area between passenger door and driver seat) shall be illuminated to a minimum of 4 foot-candles with the front doors open and a minimum of 2 foot-candles with the front doors closed.
- 2.19.2.6 The driver's seat and instrument panel area shall have a flush-mounted ceiling light to provide general illumination and it shall be capable of illuminating the area between the lower half of the steering wheel nearest the operator and the operator's seat, to a level of 10 to 15 foot-candles. This light shall be controlled by the operator through a switch on the front console or with the integral design of the light fixture. This light shall illuminate without ignition activation.
- 2.19.2.7 Instrument panel and switch panel shall be indirectly lighted in a way as to prevent casting a glare on the windshield. All light sources shall be located to minimize windshield glare when the bus is in motion, with distribution of the light focused primarily on the passengers' reading plane.
- 2.19.2.8 Light fixtures shall utilize an integral harness and weatherproof connector to inhibit water and dirt intrusion yet allow for easy removal and service. Lens material shall be polycarbonate. All light fixtures, excluding instrument panel and switch panel, in this section shall be LED. Proposer shall provide technical information, life expectancy, warranty and identification of the manufacturer providing the above LED light.

## **2.20.0 REFLECTORS**

- 2.20.1 Reflectors shall be size, type color and location required to comply with the requirements of both FMVSS - 108 and the regulations established by the State of Florida.

## **2.21.0 STANDARD SEATS**

- 2.21.1 Standard seating shall be *Freedman Feather Weight Low Back* seats. They must meet or exceed all applicable Federal Motor Vehicle Safety Standard including FMVSS 210 seat belt certification test. All seats shall have the following minimum requirements. Upholstery material

will be vinyl thirty-two ounce per linear yard. Colors are shown in Exhibit A, Part 1. The bidder shall provide a description of the seats they propose along with a copy of their seat pull test for the model bus.

- 2.21.2 Two (2) adult passenger capacity shall be 35 inch minimum cushioned transit type, the cushion depth shall be 16 inch minimum and the cushion height above the floor shall be 17½ inch minimum, 18½ inch maximum. Back cushion height must be 22 ½ inches from the top of the seat cushion and 36 ¾ inches from the top of the back cushion to the floor.
- 2.21.3 All seat belts shall be the Freedman USR (Under Seat Retractor). Seat belts shall meet or exceed FMVSS 209 (seat belt assemblies, performance and strength) and FMVSS 210 (seat belt mounting certification.) The passenger seats, frames and seat belts should operate as a complete system. All two-point seat belts must be permanently mounted on the seat frame. Seat belts attached to the floor track or wall track are not acceptable. All seat belt retractors must be permanently located under or behind the seating position. All seat belts must be user friendly, easy to operate, lightweight, and durable with metal buckles.
- 2.21.4 All seat frames will be attached to the vehicle by the use of mounted tracks, Unistrut P3300 galvanized, that are welded to the floor and walls.
- 2.21.5 All welded joints of the seat frame shall be ground to a smooth finish.
- 2.21.6 All metal parts and surfaces shall be chemical cleaned, applying iron phosphate; electrostatic applied black paint and baked to provide a rugged, long lasting, rust and corrosion resistant finish.
- 2.21.7 All seat frames must be high quality heavy duty steel tube; jig welded, and utilizes a heavy duty wire mesh grid for seat support. The back rest must have steel straps for back support; plastic straps are not acceptable.
- 2.21.8 All seats must include a "Knee Saver" backrest design that improves hip-to-knee room.
- 2.21.9 All cushions must be molded polyurethane to ensure maximum individual passenger comfort and durability.
- 2.21.10 All seats must be removable from the base frame.
- 2.21.11 All seats must be manufactured to provide substantial weight reduction while retaining safety standards. Standard seat weight without options

may not exceed 48 lbs. for double positions and 28 lbs. for single positions.

- 2.21.12 All aisle seat positions are to have top grab rails. Grab rails must be molded and bolted to the seat frame structure. The grab rails must meet White Book test requirements.
- 2.21.13 All upholstery must use plastic extruded "J" clips to fasten the cover to the frame. No special tools must be required to remove or replace covers.
- 2.21.14 All seats must have a piece of automotive chipboard inserted between the outside back and the seat frame to insulate the passenger from the knees of the passenger behind him/her.
- 2.21.15 Provide Freedman Seating Featherweight Mid-High rigid frame seats as an option **(See Part 3: Options)**.
- 2.21.16 Provide Freedman Seating Featherweight High Back rigid frame seats as an option **(See Part 3: Options)**.
- 2.21.17 Provide all Freedman seat upholstery material with "*Dimensions With Nanocide*" provided by CMI Enterprises, or approved equal, as an option **(See Part 3: Options)**.
- 2.21.18 Provide all Freedman Featherweight or 3-PT passenger seat with Dimensions vinyl line of coated transit bus seating fabric with antimicrobial Nanocide, by CMI Enterprises, or approved equal, as an option **(See Part 3: Options)**.
- 2.21.19 Upgrade interior side wall panels with Nanocide antimicrobial fabric as an option **(See Part 3: Options)**.
- 2.21.20 Extend the length of the standard seat belts provided. Two seat belt extensions are to be provided as standard. A third or more seat belt extensions may be purchased **(See Part 3: Options)**.

## **2.22.0 FOLD-AWAY SEATS**

- 2.22.1 Forward facing seating shall be Freedman Aisle Maker 3-Step seats. They must meet or exceed all applicable Federal Motor Vehicle Safety Standards including FMVSS 210 seat belt certification test. All seats shall have the following minimum requirements.
- 2.22.2 Standard seat cushion width must be 17½ inches (single seat) or 35 inches (double seat). Back cushion height must be 24¼ inches from

the top of the seat cushion and 37 1/16 from the top of the back cushion to the floor.

- 2.22.3 The seat must be cantilevered and must not require an aisle leg or tether for support.
- 2.22.4 The foldaway seat must require no more than three (3) operations to either store or deploy.
- 2.22.5 In the stored position, the foldaway seat must be less than 11 inches wide.

### **2.23.0 FLIP SEATS**

- 2.23.1 Seating must meet or exceed all applicable Federal Motor Vehicle Safety Standards including FMVSS 210 seat belt certification test. All seats shall have the following minimum requirements.
- 2.23.2 Two (2) adult passenger capacity shall be a 35 inch minimum cushioned transit type, the cushion depth shall be a 17 inch minimum and the cushion height above the floor shall be 17½ inch minimum, 18½ inch maximum. Back cushion height must be 22½ inches from the top of the seat cushion and 36¾ inches from the top of the back cushion to the floor.
- 2.23.3 The operation of the flip seat will be performed by pulling a handle to release the lockup or lock down mechanism. There must be no spring action. Double seats must move up and down as a single unit.
- 2.23.4 All flip seats must match the visual and functional design of the other non-flip seats in the bus.
- 2.23.5 In the stored position, the flip seat must be less than 12 inches wide.
- 2.23.6 All seat belts must be attached directly to the seat frame and the anchorage must meet FMVSS 210.
- 2.23.7 All seat frames must be attached to the vehicle by the use of floor and wall mounted tracks. Each set shall be secured, at a minimum, by two bolts (7/16 inch diameter, grade 8) through the floor track.
- 2.23.8 All exposed metal parts and surfaces shall be chemical cleaned, applying iron phosphate; electrostatic applied black paint and baked to provide a rugged, long lasting, rust and corrosion resistant finish.
- 2.23.9 All seat frames must be made from minimum 1 inch diameter x 16 gauge (heavy duty) steel tube that meets ASTM A513 (high quality

steel). The steel structures must be jig welded, and utilize a heavy duty wire mesh grid for seat support. The back rest must have steel straps for back support; plastic strips are not acceptable.

- 2.23.10 All seats must include a "Knee Saver" backrest design.
- 2.23.11 All cushions must be high quality polyurethane to ensure maximum individual passenger comfort and durability.
- 2.23.12 All upholstery must use plastic extruded "J" clips to fasten the cover to the frame. No special tools must be required to remove or replace covers.
- 2.23.13 All seats must have a piece of automotive chipboard inserted between the outside back and the seat frame to insulate the passenger from the knees of the passenger behind him/her.

#### **2.24.0 DRIVER SEAT**

- 2.24.1 OEM driver seat with right arm rest shall be standard. Seat shall be fully adjustable type and shall include shoulder and lap restraining belt with retractor and right armrest. The seat shall be vinyl and shall be color keyed to the passenger seats.
- 2.24.2 Provide Freedman CL 67 air suspension driver's seat as an option **(See Part 3: Options)**.
- 2.24.3 Provide Freedman Sport with Relaxor driver's seat as an option **(See Part 3: Options)**.

#### **2.25.0 FLOOR COVERING**

- 2.25.1 Floor covering shall be slip resistant rubber flooring. Step and ramp shall have a yellow edge or nosing to pronounce the presence of the step. A cove molding shall be installed in the body to the floor corners to aid in floor cleaning. The floor covering shall meet the requirements of FMVSS-302. At the step well(s), there shall be no lip or nosing overhang, the step tread flange shall be flush with the vertical riser to eliminate any tripping condition. Samples and a description of the standard and optional floor covering material, available patterns, and colors, shall be submitted with proposal.
- 2.25.2 There shall be a 2" wide white "Standee Limit" stripe set into the aisle covering located to the rear of the driver's section. The Standee Line shall meet the requirement of 49CFR section 393.90 and include a notice to passengers "*Law Prohibits Passengers Standing Forward of the White Line While Bus in Motion*", or approved equal phrase, posted

in an area adjacent to white line and in clear view of passengers facing forward.

- 2.25.3 Provide Altro Transflor slip resistant sheet vinyl flooring as an option **(See Part 3: Options)**.

### **2.26.0 INTERIOR FINISH**

- 2.26.1 The interior walls and ceiling surface finish shall be reinforced plastic of sufficient thickness adequately supported to prevent buckling and provide a washable surface. No Luan plywood shall be utilized in the vehicle construction. Samples of the interior material, available patterns and colors shall be submitted with proposals.

- 2.26.2 All interior materials must comply with FMVSS-302.

- 2.26.3 Install driver safety partition as an option **(See Part 3: Options)**.

### **2.27.0 GRAB RAILS & STANCHIONS**

- 2.27.1 Handrails and stanchions shall be provided in the entrance of the vehicle and elsewhere in a configuration as specified in 49 Code of Federal Regulation, Part 38, Subpart B, and Section 38.29.

- 2.27.2 There shall be a continuous ceiling-mounted grab rail on both sides of the aisle (except over doorways), vertical stanchions from floor to ceiling or seat back grab handles to provide a passenger with secure holding areas from front of the vehicle to the rear. In the positioning of stanchions and grab handles, there shall be no more than 38 inches between one holding device and the next, from one end of the aisle way to the other. The 38-inch dimension can be figured longitudinally of the body, across the body or diagonally from one to the other.

- 2.27.3 Ceiling grab rails shall terminate into vertical stanchions or turn up into the ceiling. No exposed ends will be accepted.

- 2.27.4 A modesty panel shall be positioned at the rear side of the entry door. Panel shall be mounted with 1½ - 2 inch spacing between the bottom of the panel and the floor to facilitate cleaning the floor. Fastening of the panel shall be by bolts or rivets, screws will not be acceptable. The forward side of this panel shall include a handle for boarding and alighting passengers in line with the door grab handles described above.

- 2.27.5 Grab rails and stanchions shall be made of 1¼ inch diameter stainless clad tubing, stainless clad shall be 0.02 inches thick. Fitting ells, tees, flanges and bolts shall be stainless steel. Ceiling grab rail support

brackets shall be stainless steel or anodized cast aluminum. Grab rails/handles shall be mounted on both sides of the passenger door entry. Propose other available material options for stanchions and hand rails.

- 2.27.6 Provide Powder-Coated handrails and stanchions as an option (**See Part 3: Options**).

#### **2.28.0 CONTROLS AND SWITCHES**

- 2.28.1 All controls and switches shall be mounted within easy reach of the driver. They shall be permanently labeled for quick and unmistakable identification. Glued identification decals are not acceptable. All controls and switches shall be lighted for night time operation in such a way as to prevent glare in the windshield or driver's side windows. The gauges and alarms required are further described in **Part 2, Exhibit 2: Instruments**.

#### **2.29.0 HEATER/DEFROSTER**

- 2.29.1 The OEM and passenger heater unit(s) must achieve a 65 degree interior temperature with an empty coach when the ambient temperature is "0" degrees Fahrenheit within 30 minutes (measured at front mid-vehicle and rear in the vehicle). Additional passenger compartment heater(s) shall be mounted to the floor under seats at the manufacturer's standard location to produce an even interior temperature. The blower motors for the passenger compartment heater system(s) shall be easily accessible for servicing and controlled by a three-position switches having *HIGH*, *LOW*, and *OFF* positions. All passenger compartment heaters shall be shielded to prevent blowing hot air onto the passenger's legs. Interior heating must meet performance standards described above. Manufacturer must submit testing results with the proposal.
- 2.29.2 There shall be vacuum/electric shut-off valves in the heater piping. A booster pump may be required to meet the above performance standard with gasoline engines and shall be standard with diesel engines.
- 2.29.3 Heater hoses shall be of top quality silicon material. Hose clamps shall be stainless steel constant torque type. Hoses will be insulated with wrap-around foam pipe insulation.
- 2.29.4 Hoses shall be protected and supported by approved clamps in all locations where they are close to or pass through metal frame members to prevent chafing. Hoses shall be shielded against heat at

any location where they pass over or near any part of the exhaust system.

**2.30.0 SUN VISOR**

2.30.1 Sun visor shall be padded type, fully adjustable, to provide sun glare protection at the windshield or the driver's side window. A friction device shall hold it securely in either location and in any position during travel over rough road surfaces.

**2.31.0 MIRRORS**

2.31.1 Two (2) exterior rear view mirrors shall be provided; one (1) at the driver's left side mounted in the OEM location, one (1) on the right/curb side. The mirrors shall have a minimum of 60 square inch reflective area. The mirrors shall be mounted out of the driver's normal driving line of vision to prevent "blind spots". Mirrors shall be break-away type mirrors produced by Rosco, or approved equal.

2.31.2 One interior view mirror shall be located above the windshield and shall be a C & J Mirror BDS Dead Angle Mirror, or approved equal. One OEM rear view mirror shall be windshield mounted.

2.31.3 All mirror mountings will be sufficiently rigid to prevent viewing distortion due to vibration. Exterior mirror mountings shall permit moving out of position to prevent mirror damage from automatic bus washers.

2.31.4 Provision shall be made for a minimum 5 inch convex mirror on each side of the vehicle attached permanently to the exterior view mirrors.

2.31.5 Provide right and left side exterior remote controlled mirrors, adjustable from the driver's seat. **(See Part 3: Options).**

**2.32.0 EXTERIOR FINISH**

2.32.1 All welds shall be chipped to remove slag. All metal parts shall be degreased and properly cleaned and sanded in preparation for painting. All metal surfaces shall be sprayed with primer. Parts and surfaces that will be covered in the finished vehicle shall be given a second coat of primer to prevent corrosion as much as possible. If any parts are pre-primed prior to assembly and should any welding be done during assembly then the weld shall be chipped. The weld and the surrounding area shall be primed again.

2.32.2 All surfaces that will be exposed on the finished vehicle shall be properly sanded prior to finish color paint application. Finished color

paint brand and description shall be proposed. The proposals shall also include a description of the manufacturer's painting procedure.

- 2.32.3 Proposals shall include samples of the manufacturer's most popular paint schemes with pricing, as noted in **Part 6, Paint Schemes**.

### **2.33.0 RUST PROOFING**

- 2.33.1 The entire underbody, including wheel housings shall be rust proofed with Primer. Provide the product manufacturer and the process of application.

- 2.33.2 Proper care shall be taken to prevent any coating from being deposited on grease fittings, moving parts, brake hoses, and drive shaft.

### **2.34.0 BUMPERS**

- 2.34.1 Bumpers shall be provided at both front and rear of the vehicle. The front bumper shall be OEM chrome. Rear bumper shall be steel and painted black. The rear bumper shall be installed using heavy duty brackets bolted to the frame or frame extensions (not welded). The bumper shall be bolted directly to the bumper brackets with a minimum of 8 bolts (4-each side). Bolts shall be a minimum 7/16 inch grade 8 or approved, and must have a flat transition panel from the body to the bumper.

- 2.34.2 Provide Reverse Assistance System bumper as an option (**See Part 3: Options**).

- 2.34.3 Provide Reverse camera and monitor backing system as an option (**See Part 3: Options**).

### **2.35.0 INSULATION**

- 2.35.1 Proposals shall include type of insulation to be applied in or on roof, side walls, front cap and rear cap surfaces. Documentation of R-Value for each area shall be provided.

### **2.36.0 AIR CONDITIONING**

*Only an FDOT approved supplier is qualified for installation on TRIPS Contract vehicles. Current FDOT approved suppliers are ACC Climate Control and Trans AIR.*

- 2.36.1 The air conditioning equipment **must** be capable of cooling buses to meet or surpass the minimum requirements of **Part 2, Exhibit 9: Air Conditioning Pull-Down Test Procedure**.

- 2.36.2 Vehicles shall have a totally split system. No “Add-On Systems” shall tie into OEM System in any way.
- 2.36.3 Air circulation shall be high volume with low velocity to provide draft-free passenger comfort.
- 2.36.4 All hoses shall be routed and secured in such a way that they will not rub or chafe. Routing of these hoses shall not interfere with the access of routine maintenance items such as dip-sticks, air filters, or access doors. When routing hoses under the coach the hoses shall be run in a straight line and shall be secured with rubber or plastic coated p-clamps every 12 inches. Refrigerant hoses shall be a refrigerant type double braided barrier construction. Refrigerant fittings shall be “Quick Click” or equivalent. Hoses and fittings must be qualified to SAE specification J2064.

**2.37.0 WHEEL CHAIR RAMP**

- 2.37.1 The wheel chair ramp, its design, installation and operation shall comply with the Americans with Disabilities Act (ADA), Regulations and Requirements, as amended (Title 49 Code of Federal Regulations, Part 38, Subpart B, Section 38.23) and 49 CFR Part 571, and Florida Rule Chapter 14-90 [Equipment and Operational Safety Standards Governing Public-Sector Bus Transit Systems]. *General guidelines for the ramp are provided below. Omission in this guidance does not relieve proposer from compliance requirements of the ADA or Florida Statue – Chapter 14-90.*
- 2.37.2 Vehicle shall be equipped with a Braun RA300-3255 Commercial wheelchair ramp system, or approved equal, ramp shall be of modular steel frame construction requiring no pre-assembly or complex vehicle interface. The frame design shall provide rigidity for ramp alignment and ramp operation.
- 2.37.3 Provide Lift-U model LU-11 wheel chair ramp as an option (**See Part 3: Options**).
- 2.37.4 Provide Ricon “Expressramp” wheel chair ramp as an option (**See Part 3: Options**).
- 2.37.5 A strip of 2-inch reflective red and white checkered tape shall be added to the outer edge of the ramp platform side barrier and shall run the full length of the side barriers.

2.37.6 All ramp manufacturers or installers shall legibly and permanently mark each wheelchair lift assembly with the following minimum information in a location easily visible without deploying the ramp:

1. The manufacturers name and address.
2. The month and year of manufacture.
3. A certification that the wheel chair ramp and installation conforms to State of Florida requirements applicable to accessible vehicles.

**2.38.0 SECUREMENT DEVICES**

2.38.1 Securement devices, their design, installation and operation shall comply with the Americans with Disabilities Act (ADA), Regulations and Requirements, as amended (Title 49 Code of Federal Regulations, Part 38, Subpart B, Section 38.23) and 30 mph/20G impact Test Criteria per SAE J2249. *General guidance for securement devices is provided below. Omission in this specification does not relieve the bidder from compliance requirements of the ADA and SAE J2249.*

2.38.2 In vehicles with securement device or system for mobility aid devices shall face toward the front of the vehicle.

2.38.3 Retractors shall be heavy duty with heat treated components and a metal or impact resistant plastic housing. Q'straint QRTMAX is the preferred product for retractors.

2.38.4 The retractor shall be complete with combination retractor straps with height and vertical adjustment for securing the wheelchair or mobility aid and two retractors for the occupant restraint system.

2.38.5 The wheel chair mobility aid retractors shall be equipped with self-adjusting tension controllers for tightening and have the ability for quick release.

2.38.6 The wheelchair or mobility aid retractors shall be equipped with "S" or "J" hooks to simplify operation.

2.38.7 The wheel chair or mobility aid retractors shall be capable of being mounted directly to the vehicle structure using a retractor mounting kit. Q'Straint retractors, with the Slide N' Click system, is preferred.

2.38.8 The occupant restraint system shall be equipped with a height adjuster for the shoulder belt, having a vertical adjustment of approximately 12 inches.

- 2.38.9 The tie-down system shall be able to secure a standard wheelchair or mobility aid in less than 10 seconds. A set of four (4) “webbing loops” is to be provided at each station.
- 2.38.10 The retractor securement system shall meet the following requirements:
1. 30MPH/20G impact test criteria per SAE J2249; and
  2. 49 CFR Part 38 Americans with Disabilities Act (ADA).
- 2.38.11 The occupant restraint system shall meet the following requirements when used in conjunction with the retractor system:
1. Federal Motor Vehicle Safety Standards (FMVSS209 & MVSS302);
  2. 49 CFR Part 38 Americans with disabilities Act (ADA); and
  3. 30MPH/20G impact test criteria SAE J2249.
- 2.38.12 Storage containers for restraint system belts and instructions for use of restraint system shall be included and mounted in safe and convenient location.
- 2.38.13 Manufacturer shall install all restraint hardware provided (including under floor backer plates) by the sub-component supplier and by the instructions provided by the sub-component supplier. All securement stations must be ADA compliant.
- 2.38.14 Provide Q’Pod Wheelchair Passenger Securement Station by Q’STRAIN as an option **(See Part 3: Options)**.
- 2.38.15 Provide a stretcher securement system in the rear aisle of the bus as an option **(See Part 3: Options)**.
- 2.38.16 Provide a stretcher bed (only) as an option **(See Part 3: Options)**.

**2.39.0 SAFETY EQUIPMENT**

*Each vehicle shall be provided with the following equipment as standard:*

- 2.39.1 Provide a Zee Deluxe Medical Truck Kit, or approved equal, (see **Part 2, Exhibit 3: ZEE Medical Kit Supplies**), mounted in an accessible location.
- 2.39.2 Provide a Fire Extinguisher, 5 pound rechargeable ABC type, with charge status gauge and decal noting most recent charge date. This

- unit shall be mounted in an easily accessible interior location near the driver's position and/or vestibule areas.
- 2.39.3 Provide Warning Triangles, reflective type, three (3) unit kit, secured in a location readily accessible to the driver.
- 2.39.4 Provide two (2) Seat Belt Cutters, mounted in an accessible location, one near the wheelchair ramp and the other accessible to the driver.
- 2.39.5 Provide a Blood Pathogen/Bodily Fluid Spill Kit, secured in a location readily accessible to the driver, and manufactured by the First Aid Only Company, or approved equal. The Kit must meet federal OSHA regulation 29CFR1910.1030(d)(3)(i).
- 2.39.6 Provide a Jones Oxygen Tank Holder, MOR/ryde International MR56-141, shipped loose inside each bus at delivery. Dealer to install at a location selected by Purchaser.
- 2.39.7 Provide a G-force accelerometer monitor and recorder as standard, configured with 2 Accelerometer devices allowing it to detect and record G-forces in 3 axes, front/rear – left/right – up/down. System should also provide the following inputs: reverse, brake and left and right turn signals. Data shall be recorded and retained for a maximum of 60 seconds before and 15 seconds after an event.
- 2.39.8 Provide a Jomarr Vehicle Thematic Fire Suppression (VTS) Clear Agent System as an option **(See Part 3: Options)**.
- 2.39.9 Provide Amerex Small Vehicle System (SMVS) Fire Suppression system as an option **(See Part 3: Options)**.
- 2.39.10 Provide 247 Security, Inc. video/audio camera system, or approved equal as an option **(See Part 3: Options)**.
- 2.39.11 Provide camera (only) as an option **(See Part 3: Options)**.
- 2.39.12 Provide “Mentor Ranger”, an in-vehicle computer, manufactured by Mentor as an option **(See Part 3: Options)**.

#### **2.40.0 PA & ENTERTAINMENT SYSTEMS**

- 2.40.1 Standard bus contains no PA or Entertainment System.
- 2.40.2 Provide Radio Engineering Industries (REI) public address system as an option **(See Part 3: Options)**.

2.40.3 Upgrade the standard vehicle AM/FM Radio as an option (**See Part 3: Options**).

**2.41.0 DESTINATION SIGN**

2.41.1 Standard bus contains no Destination Sign.

2.41.2 Provide a manually operated destination sign as an option (**See Part 3: Options**).

2.41.3 Provide Twin Vision Elyse software Electronic Destination system as an option (**See Part 3: Options**).

2.41.4 Provide Twin Vision Mobi-Lite electronic destination sign as an option (**See Part 3: Options**).

2.41.5 Provide Transign LLC 2-digit incandescent backlight as an option (**See Part 3: Options**).

2.41.6 Provide Transign LLC 3-digit incandescent backlight as an option (**See Part 3: Options**).

2.41.7 Provide a "STOP REQUESTED" sign as an option (**See Part 3: Options**).

**2.42.0 OTHER MANUFACTURER/DEALER OPTIONS**

2.42.1 **See Part 3: Options.**

# **EXHIBITS**

## Exhibit 1

### TRIPS Database Dealer Requirements

The Florida TRIPS (Transit- Research- Inspection- Procurement Service) Database is managed by the Florida Department of Transportation (FDOT) and administered by the Center for Urban Transportation Research (CUTR) in Tampa. The TRIPS Database is an online application developed to record the vehicles purchased through the TRIPS Program. Type of information collected include: Purchase Order data, Vehicle Description, Vehicle Status, Pre-delivery Vehicle Inspections Defects and Warranty issues.

The TRIPS Database can be found at [www.cutr.usf.edu/fvpp2](http://www.cutr.usf.edu/fvpp2) .

The Dealer is required to enter their vehicle information into the database. The type of data that needs to be entered includes the DO number for a 5310 vehicle and the Purchase Order information if the vehicle is a Non-5310. For both 5310 and Non-5310 the dealer is required to enter data into the Chassis order form (vehicle body serial number and VIN number), the vehicle description form and vehicle status update form.

***All vehicle data must be entered into the TRIPS database prior to its delivery to TRIPS Springhill Bus Inspection & Testing facility, located in Tallahassee, FL. VIN#'s must be entered into the TRIPS database within 10 days after issuance of the PO. Any vehicles arriving at the TRIPS Springhill facility without the VIN# in the database will not be inspected until this information is complete in the TRIPS Database.***

After the vehicle has been inspection, the dealer is required to enter all actions taken to correct defects found on the vehicle during the TRIPS vehicle inspection in the Action Taken Form.

The Dealer is also required to report warranty issues with the vehicle after the vehicle has been delivered and report the actions taken to fix these issues during the entire warranty period.

The Dealer page also provides reports for individual vehicle and reports for all vehicles sold by the dealer. Description of the forms and reports on the dealer page are provided below.



*Welcome to the TRIPS Program*

*Transit—Research—Inspection—Procurement Services*

Formerly Florida Vehicle Procurement Program (FVPP)

Hello CUTR,

[Change Password](#) [Logout](#)

Dealer Main Menu

<u>Forms</u>		<u>Inspection Reports</u>	<u>Reports/Pull-Ups</u>
<u>5310</u>	<u>Non 5310</u>		
<a href="#">FDOT DO</a>	<a href="#">Agency PO</a>	<a href="#">Vehicle Status</a>	<a href="#">Inspection Report</a>
<a href="#">Chassis Order</a>	<a href="#">Chassis Order</a>	<a href="#">Vehicle Description</a>	<a href="#">All Vehicles</a>
<a href="#">Chassis Update</a>	<a href="#">Chassis Update</a>	<a href="#">Situation/Action</a>	<a href="#">All Vehicles/Year</a>
<a href="#">Vehicle Description</a>	<a href="#">Vehicle Description</a>	<a href="#">Weekly Status</a>	<a href="#">Warranty Issues</a>
<a href="#">Status Update</a>	<a href="#">Status Update</a>		
<a href="#">Add Action</a>	<a href="#">Add Action</a>		
	<a href="#">Warranty Issue</a>		
	<a href="#">Report Situation</a>		

**DEALER FORMS**

**FDOT Form**

Applicable only to 5310. This form submits the Agency Name, PO#, DO# and DO Issue date.

**Agency PO Form**

Applicable only to non-5310, this form submits information on the vehicle purchased.

**Chassis Order Form**

Common to both 5310 and non-5310 vehicle, this form requires the Body Serial number and VIN number of the vehicle.

**Chassis Update Form**

This form allows the dealer to update or correct an already entered VIN number or Body Serial number.

**Vehicle Description**

This form describes what is on the vehicle; seats, engine type, wheelchair lift etc.

**Vehicle Status Update Form**

This form allows the dealer to update the current status of the vehicle's production.

**Add Action Form**

Reports the Action Taken on an already existing situation such as defects found during the inspection or warranty issues.

**Warranty Issues**

This form is used to report vehicle warranty-related issues.

**New vehicle situation form**

For a vehicle that has not been put into the database using any of the forms above, a situation could be reported using this form.

**DEALER REPORTS**

**Vehicle Status Report**

The Vehicle Status report contains purchase order information about the selected vehicle.

**Vehicle Description Report**

The Detailed Vehicle Record report contains information about the selected vehicle.

**Vehicle Inspection Issues Report for a Selected Vehicle**

The Vehicle Inspection Issues Report provides information about the selected 'Situation' and it's 'Action Taken' for a selected vehicle.

**Vehicle "Weekly Status" Report for a Selected Vehicle**

The Weekly "Vehicle Status" Report provides the status of the vehicle and date updated.

**Inspection Report**

This report pulls up all the inspection-related information of a vehicle

**Comprehensive Vehicle List**

This list pulls up the details of all vehicles under your dealership.

**Chassis Year Pull Up**

Almost similar to the comprehensive list, this list allows the dealer to view the list of vehicles during a specific year.

**Warranty Issues Pull Up**

This option generates a list of all vehicles which have been reported to have warranty issues.

## Exhibit 2

### Instruments

DISPLAY	GAUGE	LIGHT(S)	AUDIBLE
VOLTMETER	X	X	
HIGH ENGINE WATER TEMP	X	X	X
LOW ENGINE OIL PRESSURE		X	X
FUEL GAUGE	X	X (Low fuel warning)	
GENERATOR/ALTERNATOR NOT CHARGING	X	X	X
REAR EMERGENCY DOOR OPEN or UNLATCHED		X	X
DIRECTIONAL / HAZARD SIGNALS		X	X
HEADLIGHT HIGH BEAM		X	
PARKING BRAKE ON		X	
SPEEDOMETER WITH ODOMETER	X		

**NOTE:** The instrument package above shall be provided by the chassis manufacturer. After market substitutes will not be accepted.

## Exhibit 3

### *ZEE Medical Kit Supplies*

<u>Contents</u>	<u>Amount</u>	<u>“ZEE” Number</u>
Deluxe Kit, Metal, Empty	1 box	#0106
Clean Wipes 50/Bx (Zee)	5 each	#0203
Antibacterial Towelettes	20/box / 1 box	#0225
Tape, ½” X 5 Yd. Spool (Zee)	1 each	#0301
Eye Wash, Sterile	1 each 4 oz.	#0606
Sheer Strip 1”	100 per box	#0731
QR Wound Seal	2 per package	#0795
Sterile Dressing 5” X 9”	1 each	#0910
Elastic Roller Gauze N/S	2” X 4.5 YD, 1 each	#0943
Pain-Aid	100 per Box (Zee)	#1417
First Aid Pocket Guide	1 each	#2331
Small Instant Ice Pack	1 each	#2353
Bandage, Triangular 40” N/S	1/Un, 1 each	#2605
3-in-1 Antibiotic Ointment	6 per unit, 1 each	#2611
Fingertip Bandages	10 per unit, 1 each	#2620
Gauze Pads, 3” X 3”	1 each	#2626
Knuckle Bandages	10 per unit, 1 each	#2627
Water-Jell Burn Jell	6 per box, 1 each	#2651
Eye Pads w/Adhesive Strips	2 per unit, 1 each	#2695
Nitrile Gloves, Large	2 pairs, 1 each	#3044
Disposable Tweezers, Sterile	1 each	#3538

## Exhibit 4

FLORIDA DEPARTMENT OF TRANSPORTATION

# BRAKE TEST PROCEDURE

VERSION PJ

*Prepared for:* The Florida Vehicle Procurement Program

*By:* Robert E. Westbrook, Paul E. Johnson Jr., Cecil H. Carter, Leroy E. Edwards

## OVERVIEW

This test is the brake performance standard for all transit equipment purchased through Florida Vehicle Procurement Program contracts. The FDOT will test one or more vehicles from each contract within the first year of a contract agreement. If a bus fails to meet the performance test, the FDOT reserves the right to suspend placement of further orders or terminate the contract. The FDOT also reserves the right to randomly test new buses at any time during the contract period, to ensure compliance.

## TEST CONDITIONS / EQUIPMENT

The test will be performed on a level asphalt parking lot or street in dry conditions. The test will be performed using a Safe Brake Pro, Fraser Gauge that records acceleration, test speed, brake efficiency and stopping distance. The test will be performed at a speed of 20 miles per hour. The test will be performed with 150 pounds in each seat position and 250 pounds in each wheelchair position to simulate the bus loaded to maximum passenger capacity.

## TEST SET-UP

1. Using the Safe Brake Pro Fraser Gauge, ensure the battery is charged sufficiently.
2. Choose a safe test area in the vehicle that is level as possible.
3. Place the Brake check in the vehicle with the arrow pointing in the direction of travel.
4. Press MENU until the current mode is service brake test.

5. Press enter once; the display will indicate whether or not the unit is level enough to perform the test.
6. Press ENTER again; the unit is now ready to perform the test and the display will show: 0.00.

## TEST PROCEDURE

1. With vehicle in stopped position, driver will accelerate to 22 miles per hour;
2. Without causing the vehicle to skid, apply heavy and consistent pressure to the service brake until the vehicle comes to a complete stop as quickly as possible.
3. The test is now complete. Unit will calculate 20 miles per hour stopping distance.

Perform the test at 20 miles per hour. Record the stopping distance of each test using a Frasier Gauge to record brake performance, speed and stopping distance. Perform the test without passenger load, and then perform the test with the vehicle fully loaded to seating capacity. The test without passenger load is for FDOT information purposes only.

## SYSTEM TEST RESULTS

Each test at 20 miles per hour will be performed 3 times in a rapid succession and recorded. From the time the brakes are applied the bus must stop within 22 feet without brake fade.

The bus will fail the test if;

- a. The vehicle fails to stop all 3 times, from 20 miles per hour in 22 feet.
- b. The brakes fade or overheat during the test.

## INVALID TEST

The test will be deemed invalid if;

- a. Surface conditions change due to rain;
- b. Recordings are checked and any conditions are not met

## Exhibit 5

### FDOT Parking Brake Test

FLORIDA DEPARTMENT OF TRANSPORTATION

# EMERGENCY/PARK BRAKE TEST PROCEDURE

VERSION 1

*Prepared for:* The Transit Research Inspection Procurement Services program  
*By:* Robert E. Westbrook, Paul E. Johnson Jr., Cecil H. Carter, Leroy E. Edwards

## OVERVIEW

This test is the park brake performance standard for all transit equipment purchased through Transit Research Inspection Procurement Services program contracts. The FDOT will test one or more vehicles from each contract within the first year of a contract agreement. If a bus fails to meet the performance test, the FDOT reserves the right to suspend placement of further orders or terminate the contract. The FDOT also reserves the right to randomly test new buses at any time during the contract period, to ensure compliance.

## TEST CONDITIONS / EQUIPMENT

The test will be performed on a 15 degree incline ramp in dry conditions. The surface angle will be verified using a Johnson Angle Locator. The test will be performed with 150 pounds in each seat position and 250 pounds in each wheelchair position to simulate the bus loaded to maximum passenger capacity.

## TEST SET-UP / PROCEDURE

1. Perform a complete system check assuring the emergency/park brakes are in proper working condition, tires are in good condition and properly inflated, minimum of  $\frac{1}{4}$  tank of fuel.
2. Install and secure correct testing ballast weight in each seating and wheelchair position;
3. Verify that ramp angle is at 15 degrees;
4. Position bus on ramp in forward position (front end up);

5. Place wheel chocks two inches behind right side and left side rear tires;
6. Place indicator marks on both rear tires and ramp surface;
7. Set parking brake to the fully on position;
8. Place transmission in the neutral position;
9. Monitor and record any movement of the bus for 30 minutes;

After 30 minutes, reposition bus to be in a rearward position (front end down);  
Repeat the above procedure.

## SYSTEM TEST RESULTS

The bus will fail the test if;

- a. There is more than one inch of movement in the 30 minute time period in either position;
- b. The brakes display any signs of slippage during the test.

## INVALID TEST

The test will be deemed invalid if:

- a. Any of the specified procedure steps are not followed;
- b. Surface conditions change due to rain.

## Exhibit 6

### Alternator Output Test

FLORIDA DEPARTMENT OF TRANSPORTATION

# ALTERNATOR OUTPUT TEST PROCEDURE

VERSION 1

*Prepared for:* The Transit Research Inspection Procurement Services Program

*By:* Robert E. Westbrook, Paul E. Johnson Jr., Cecil H. Carter, Leroy E. Edwards

## OVERVIEW

This test is the alternator output test for all transit equipment purchased through Florida Transit Research Inspection Procurement program contracts. This test will be performed on all aftermarket alternators that are recommended by bus manufacturers to replace the OEM alternators. FDOT desires to have this test replicate an environment that simulates severe duty transit operations. The FDOT will test one of each type of alternator to be used on the transit vehicles and could include OEM alternators.

## TEST CONDITIONS / EQUIPMENT

This test will be performed at the FDOT Bus Inspection, Testing and Research facility in Tallahassee, FL. The subject alternator is tested using a Crumbliss 2115 Alternator test machine. It is encased in an aluminum heat-shroud containing a thermometer. Heat is provided by a 500 degree heat gun attached to the heat-shroud. This set-up provides a simulation of under-hood operating conditions. During testing, a 12 volt battery is used to maintain the charging system. DC *on/off* switches control two 12" DC condenser fan motors to prevent the battery from overcharging.

## TEST SET-UP

1. Install subject alternator into testing machine vise;
2. Determine appropriate size alternator pulley to be used;

3. Determine tester pulley size to drive alternator at correct engine idle RPM;
4. Install drive belt between alternator pulley and tester pulley;
5. Check that both pulleys are properly aligned;
6. Attach correct test leads to alternator being tested;
7. Connect cables to 12-volt battery;
8. Note the RPM levels to be used during test.
9. Place heat-shroud over alternator/vise assembly;
10. Position heat gun;
11. Turn on test machine cooling fans; (*switch located on left side of the tester*)
12. Turn on BATTERY switch; (*if required for particular test*)
13. Turn on START switch;
14. Set MOTOR switch to *Slow* position;
15. Set VOLT switch to 12 or 24 volt position;
16. Set PULLEY knob to diameter of pulley being used;

## TEST PROCEDURE

1. Adjust RPM to engine idle speed;
2. Turn FIELD CURRENT load control from minimum position slowly toward maximum position until VOLT gauge reads 12.4;
3. Note reading from AMP gauge;  
**This reading is Maximum Output at Idle under Full Load;**  
*Follow below, to determine SAE (hot) rating Performance Curve;*  
*Raise RPM up gradually another 500 RPM;*  
*Note reading from AMP gauge;*  
*Raise RPM up gradually another 500 RPM;*  
*Note reading from AMP gauge;*  
*Raise RPM up gradually another 500 RPM;*  
*Note reading from AMP gauge;*  
*Raise RPM up gradually another 500 RPM;*  
*Note reading from AMP gauge;*  
*The above readings can be used to plot performance graph;*
4. Take temperature reading of housing surface, starter, rotors and both

bearings;

5. Record and file all readings on each tested alternator;

During the test period, the temperature inside the heat shroud will be between 120 - 150 degrees F. The alternator will run at minimum idle speed (600 rpm) for 30 minutes and at maximum rpm speed (2000) for 30 minutes.

The alternator amperage output, minimum battery voltage and temperature condition of the alternator will be continuously monitored.

## SYSTEM TEST RESULTS

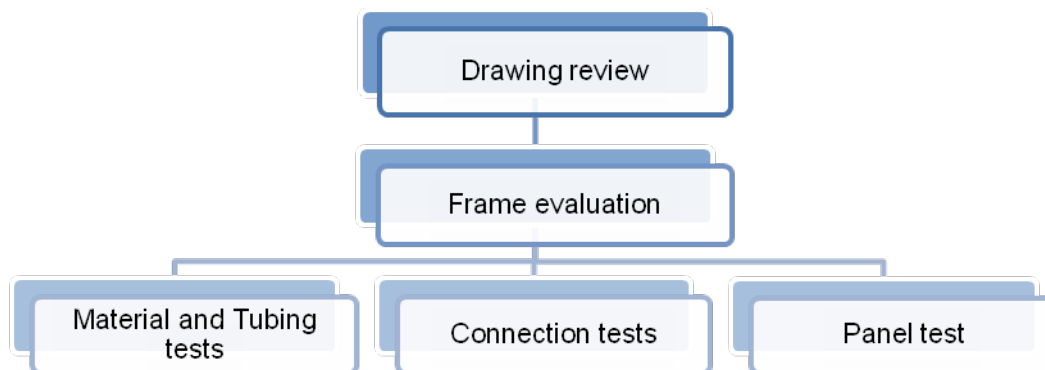
Alternator will be considered “failed” if:

- a. Amperage output falls below the maximum amperage draw for the type bus it will be used on;
- b. Amperage output falls below the advertised output curve on a “hot” rating based on RPM increments.

## Exhibit 7

### PRE-QUALIFICATION STRUCTURAL TEST PROCEDURE

The test procedures defined below are the first phase of evaluating the body structure for all paratransit buses purchased through TRIPS Program contracts. All tests must be successfully passed before a manufacturer is considered Pre-Qualified and a contract can be awarded. The test procedure hierarchy chart and a quick summary of the tests are provided below. The full test procedure may be obtained from the TRIPS website ([www.tripsflorida.org](http://www.tripsflorida.org)).



**Drawing review** – Complete assembly drawings (2-D or 3-D) will be provided for evaluation. These must include location and type of all connections (welds, bolts, etc.). After evaluation the manufacturer will receive a report, based on knowledge gained from previous evaluations, noting any structural issues.

**Frame evaluation** – A roof to wall, floor to wall and a wall section consisting of only structural tubing and plate will then be constructed and transported to FDOT Springhill Road Test Facility. The frame sections should be constructed using normal production methods. The frame sections will fail the evaluation if it is inconsistent with the assembly drawings or is not representative of normal production.

**Material and Tubing Tests** – The material and tubing tests are conducted to assess the strength of the bus structural tubing. Tensile testing will be performed to obtain the stress-strain relationship and four-point bending testing will be performed as a direct measure of the tubing performance.

**Connection Tests** – The connection test is conducted to assess the strength of the roof to wall (RTW) and wall to floor (WTF) connections. It is conducted by fixing one half of the connection and then slowly applying a force to the other half. The moment required to rotate the sample through 16.7 degrees will be measured and used to calculate the energy dissipated. To account for different column spacing this amount will then be scaled based on the panel width. The

WTF connection will fail the test if it is unable to dissipate 290 J per meter of connection length. The RTW connection will fail the test if it is unable to dissipate 140 J per meter of connection length.

**Sidewall Panel Test** – The sidewall test is conducted by dynamically impacting the sidewall using a large impact hammer. The maximum panel deflection is measured after impact. To account for different column spacing the hammer's potential (initial) energy is scaled based on the panel width and equals 600J per meter of panel width. The panel will fail this test if after its maximum deflection exceeds 150mm with after impact

## **Exhibit 8**

### **FDOT Crash and Safety Test Approval Process (Full Scale)**

This document is a summary of the “Crash and Safety Testing Standard for Paratransit Buses Acquired by the State of Florida”, called STANDARD later on for brevity. All references here are made to the full document of the STANDARD which can be obtained from the Florida Transit Research Inspection Procurement Services website ([www.tripsflorida.org](http://www.tripsflorida.org)).

#### **APPROVAL**

1. Full scale crash tests include:
  - Side impact test (Appendix 6), and
  - Rollover test (Appendix 7).

Successful performance of both tests is required for the approval of the paratransit bus.

2. An uncompromised residual space concept (Appendix 1) is adopted in this standard as a pass/fail criterion, see Figure 1.

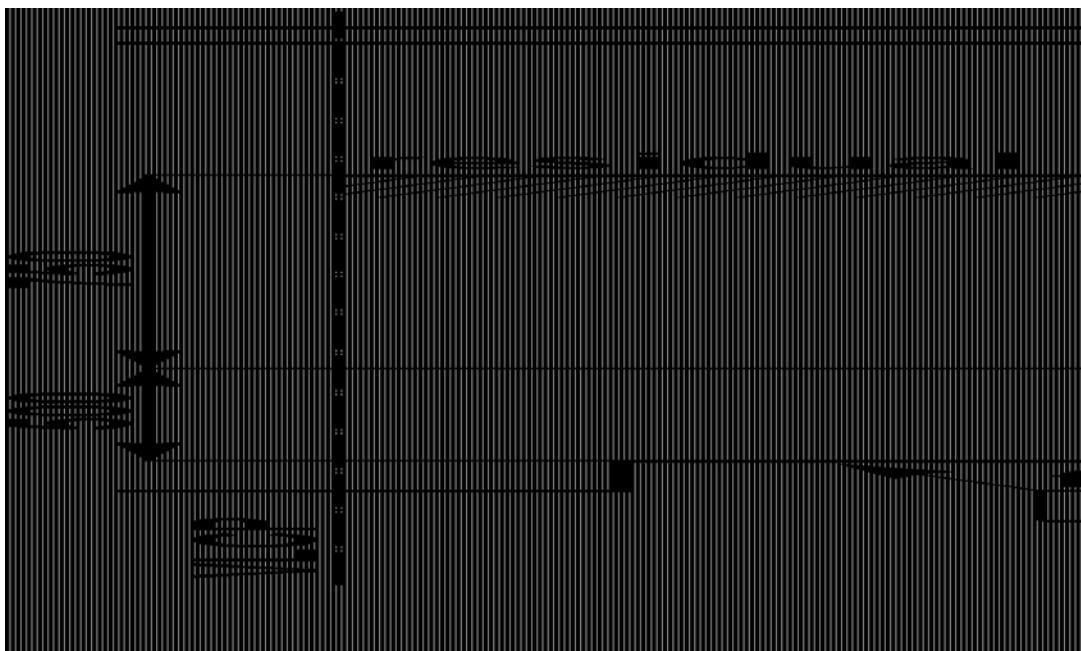


Figure 1. Specification of residual space in cross section of the bus.  
Dimensions in mm.

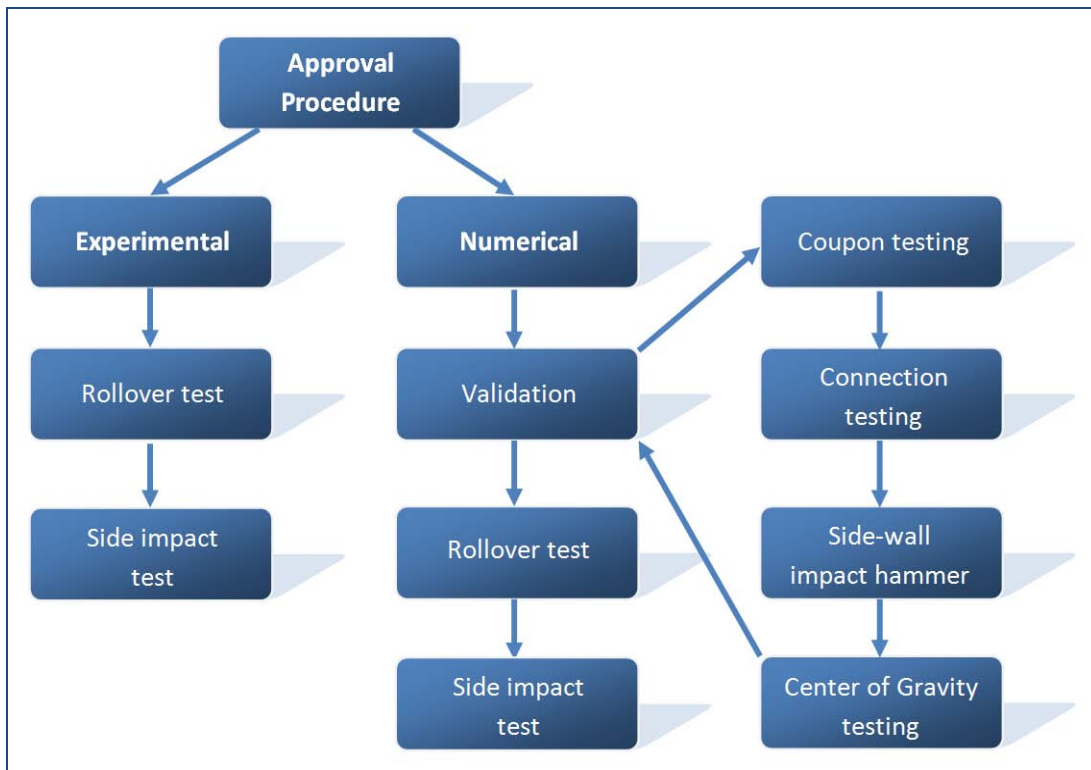
3. Performance of a paratransit bus in side impact and rollover tests shall be assessed by either:
  - Experimental, full-scale crash tests (Appendices 6 and 7), or
  - Computational analysis using FE method (Sections 3, 4 and 5).

Both methods are considered equivalent and either one may be selected by the bus manufacturer for the bus approval. The paratransit bus is considered to be crashworthy and safe if its residual space (as defined in Appendix 1) is not compromised through either intrusion (Section 5.3.1) or projection (Section 5.3.2).

If the manufacturer chooses computational analysis as the testing method, the following information shall be supplied to the technical service:

- A description of the applied simulation and calculation method which has been utilized,
- Clear precise identification of the analysis software, including at least, its producer, its commercial name, the version used and contact details of the developer,
- Information about model validation process.

4. The experimental full-scale crash test becomes mandatory if the paratransit bus fails either one of the computational analysis tests, as listed in Section 6.2.
5. All major elements of the crash and safety assessment program are presented schematically in Figure 2 and are described in detail in the STANDARD.



## Exhibit 9

FLORIDA DEPARTMENT OF TRANSPORTATION

# AIR CONDITIONING PULL-DOWN TEST PROCEDURE

VERSION 8

*Prepared for:* The TRIPS Program (Transit-Research-Inspection-Procurement-Services)

*By:* Robert E. Westbrook, Erin Schepers, Cecil H. Carter, Leroy E. Edwards,  
Carlton C. Allen

## OVERVIEW

This test is the air conditioning and performance standard for all transit equipment purchased through Florida Transit Research Inspection Procurement Services contracts. The FDOT desires to have the test performed in an environment that simulates severe duty transit operation. To do this, the FDOT must test in a non-controlled environment. The FDOT will test one or more buses from each contract within the first year of a contract agreement. If a bus fails to meet the performance test, the FDOT reserves the right to suspend placement of further orders or terminate the contract. The FDOT also reserves the right to randomly test new buses at any time during the contract period, to ensure compliance.

## TEST CONDITIONS / EQUIPMENT

The test will be performed on an asphalt parking lot in direct sunlight. The vehicle will be surrounded by a wall five (5) feet high, fifteen (15) feet wide and the length adjusted to the length of the bus. The minimum ambient temperature must be 94 degrees plus or minus 3 degrees Fahrenheit with a minimum 60% relative humidity. All temperature measurements will be recorded in degrees of Fahrenheit using a Measurement Computing, MCC Data Acquisition Software TracerDAQ configuration. MCC Data Acquisition is calibrated using InstaCal Software. Pressure readings are taken using a Yellow Jacket 686800 Manifold gauges. Voltage readings are taken using a Fluke model 78 automotive multi-meter. Amperage readings are taken using a Fluke model 336 True RMS Clamp Meter.

## TEST PROCEDURE

Perform a complete ultrasonic leak detection test of the air conditioning system. If the system fails the leak detection test do not proceed any further.

Check to see that all windows and doors are closed properly, with no gaps or leaks. Check interior engine cover for a proper seal. Connect all test equipment. Heats soak the bus under test conditions for a minimum of two hours. Record the date, time of day, vehicle identification number and location.

The test reading locations are as follows:

C0 Ambient air temperature; take outside of the vehicle, away from mechanical and radiant heat sources, using an Omega Engineering J-Type 5 Position Fine Wire Thermocouple.

C1 Bus interior temperature; take reading 48 inches to 52 inches from the rear wall, four feet above the floor surface, using an Omega Engineering J-Type 5 position Fine Wire Thermocouple.

C2 Bus interior temperature; take reading at the center line of the bus interior, four feet above the floor surface, using an Omega Engineering J-Type 5 Position Fine Wire Thermocouple.

C3 Bus interior temperature; take reading at the first row of seats, four feet above the floor surface, using an Omega Engineering J-Type 5 Position Fine Wire Thermocouple.

C4 Rear evaporator core temperature; take reading near the center of the core, using an Omega Engineering J-Type ICSS Thermocouple.

C5 Bus engine compartment temperature; take reading above engine near the fire wall, using an Omega Engineering J-Type 5 Position Fine Wire Thermocouple.

C6 Condenser core temperature; take reading near the center at the air in side, using an Omega Engineering J-Type ICSS Thermocouple.

C7 Condenser air temperature; take reading near the center at the air out side, using an Omega Engineering J-Type 5 Position Fine Wire Thermocouple.

Take pressure readings at the service ports of add on/second stage A/C system, using a Yellow Jacket 686800 manifold gauges.

Take voltage readings at the battery or batteries using a Fluke Model 78 automotive multimeter.

Take amperage readings at the positive cable from the battery or batteries using a Fluke model 336 True RMS Clamp Meter. Amperage draw of the A/C system will be checked after the pull down test is complete.

With the vehicle in park, all doors and windows closed, start the engine, turn on the air conditioning system; set a/c system to maximum cooling positions; turn on all interior and exterior lights and let it run with the high idle on, (approximately 1200 RPM on diesel engines and approximately 1500 RPM on gasoline engines). If the high idle is designed to automatically turn off after the first 15 minutes the driver's door will be opened and the high idle turned back on for the last 15 minutes, this will not make the test invalid. All temperature readings shall be recorded every 15 seconds.

Pressure readings and voltage readings shall be recorded at the start of the test and every 10 minutes.

## SYSTEM TEST RESULTS

During the test, the interior temperature of the bus should lower uniformly throughout and should lower the interior temperature within the given time limit.

The vehicle will fail the test if;

- a. The temperature difference between C1, C2, and C3 varies more than two (2) degrees during each 15 second reading during the last 15 minutes of the test.
- b. The system fails to lower the interior temperature to 70 degrees Fahrenheit + or - 2 degrees (measured at C1), or lower, by the end of the 30 minute test while maintaining an ambient temperature of 94 degrees Fahrenheit + or - 3 degrees (measured at C0) with 60% relative humidity.
- c. The voltage readings at the batteries fall below 12.9 volts at any time during the test.
- d. In addition to pass or fail, systems will be given a star rating (\*\*\*\*) for systems that achieve 70 degrees in the quickest amount of time, with the lowest amperage draw.

The remaining readings are taken for informational purposes only and do not indicate a pass or fail status. These readings are used in system comparisons. This information enables FDOT to determine each tested systems fastest pull-down time, lowest head pressure reading, highest voltage output, and lowest amperage draw.

## INVALID TEST

The test will be deemed invalid if;

- a. If at any point during the test a temperature probe is detached from its measuring point.
- b. If a refrigerant leak is detected prior to, or during the test.
- c. If the ambient temperature is not maintained at the required setting or if the specified test conditions change.
- d. If at any point during the test, a door or window is opened, with the exception, if the high idle is designed to automatically turn off after the first 15 minutes, the driver's door will be opened and the high idle turned back on.