FTA 24 Ambulatory Passenger Bus

Must be Altoona Certified

**Note:** All specifications shall be considered **MINIMUM** unless stated otherwise

Section 1 – Chassis Capacity, Dimensions, & Related Information:

1. Capacity & Dimensions;
   a. Capacity: 1 driver, 24 ambulatory passengers
   b. Length overall: 294” (+/- nominal)
   c. Interior width: 80” to 95”
   d. Interior height: 75” minimum
   e. Top of first step height from ground: 12” maximum
   f. GVWR: 14,050 minimum
   g. Rear axle width: 92.2” minimum
   h. Wheelbase: 176”
   i. All items advertised by manufacturer and modifier as standard shall be included.

2. Engine & Associated Items
   a. Engine: 8 cylinder, gas, 6.0 liter or OEM Standard
   b. The State prefers a V8 engine with the highest horsepower and torque rating. Additionally, the 6.8 liter V-10 shall be offered as an option in the optional components section.
   c. Engine compartment: Shall be insulated from the passenger compartment to minimize noise level and heat.
   d. Additional items: Engine shall be furnished with a large capacity full flow oil filter and engine oil cooler.

3. Cooling System
   a. Radiator: Heavy duty shall be highest capacity available from Mfg.
   b. Coolant system shall be designed to prevent engine overheating during prolonged idling at high ambient temperatures.
   c. Coolant Recovery System: Required to return expelled coolant to the system.
   d. Coolant system shall be equipped with a hot engine warning indicator in addition to the water temperature gauge.
   e. All water hoses shall be protected from excessive heat from the engine and/or transmission.
   f. Protection: Vehicle shall have permanent ethylene glycol antifreeze providing protection for ambient temperatures from -20 F to +100 F while vehicles are used for prolonged transit purposes.

4. Electrical System
   a. System Voltage: 12V
   b. Alternator:
      i. 225 AMPS minimum
      ii. Solid state
      iii. Single belt type
      iv. 14 volt regulator and all other components shall be selected and integrated to function in an environment characterized by low engine (alternator) speeds and high amperage demands.
c. Horn: Dual note or OEM standard, heavy duty, 12V, protected from the wheel wash.
d. Batteries: Dual, 1275 CCA total, lead acid premium construction, maintenance free.
e. If not wired to OEM standard, all accessories and electrical equipment with the exception of head lights, tail lights, parking lights, emergency flashers, and interior lights, shall be wired thru the vehicle ignition switch so as to be operative only with switch in the “on” or “accessory” position. Otherwise, OEM standard will be accepted.
f. Chassis mfr’s vehicle wiring shall remain unchanged to the greatest extent practicable consistent with requirement of these specifications.
g. A separate fuse panel for all add-on components located in an accessible area within the vehicle shall be provided.
h. Wiring and terminals shall meet or exceed current Federal and vehicle requirements and shall be amply sized for both, mechanical strength, as well as to carry required currents without significant voltage drops.
i. Wiring shall be continuously enclosed in non-metallic loom meeting current SAE standard J5662A and be adequately supported for protection from heat, moisture, solvents, corrosion, road debris, abrasion and tension.
j. Wiring shall be of sufficient length to permit positioning as well as replacement of terminals twice without excessive tension.
k. Protective grommets shall be provided at points where wiring penetrates metal or other materials.
l. OEM wiring enclosed in Packard conduit or equal is acceptable.
m. OEM and all other wiring not protected must meet above specifications.
n. Any wiring including OEM that is routed over exposed, jagged metal shall be enclosed in non-metallic loom as described above.
o. All wiring, including chassis mfr’s, located in the roof shall be enclosed in non-metallic loom as described above.
p. Grounding of components shall be thru polarized, shielded terminals wired to main structural ground points.
q. Grounding thru hinged doors or covers of any type is not acceptable.
r. Ground points shall be bolted to main structure free of paint, oil or rust, and coated with silicone grease after fastening.
s. Electrical components which may require servicing or replacement shall be readily accessible thru access panels or covers.
t. Installation of after-market electrical components and system in the engine compartment shall be eliminated to the greatest extent possible.
u. Complete wiring diagrams shall be provided with each vehicle.
v. All wires to be function and color coded as indicated in wiring diagram for ease of service.

5. Fuel System
   a. Fuel Tank Capacity: 55 gallons minimum
   b. System Design: Design shall not permit fumes from entering passenger compartment.
   c. Fuel system shall meet all applicable federal safety standards.
   d. A fuel filter with replaceable elements is required.

6. Steering:
   a. Steering: Heavy duty, power steering required
b. Tilt Wheel: Required, chassis mfg. supplied.

7. Transmission:
   a. Heavy duty, automatic, 6 speed with overdrive
   b. Auxiliary Transmission Oil Cooler: OEM Chassis mfr’s Required
   c. Back up Alarm: Required, shall be activated when transmission is in reverse.

8. Drive Train:
   a. Rear axle ratio shall be appropriate for the engine and transmission.
   b. Rear axle ratio shall be such that a highway cruising speed of 65 can be accomplished
      at an engine speed providing a good economy, minimum wear and noise to the
      engine, and retain reasonable acceleration.
   c. Each section of the drive shaft shall be equipped with a guard to prevent it from
      striking the ground of vehicle floor if it should break.
   d. Guard shall be ¼” x 2” flat steel and shall be welded or bolted to the chassis steel sub
      frame.

9. Mud Flaps:
   a. Vehicle shall be equipped with front and rear mud flaps.
   b. Mud flaps shall be fastened into a steel support that should be a part of the steel sub
      frame with mechanical fasteners.

10. Bumpers:
    a. Front bumper: Chassis OEM bumper
    b. Rear bumper:
       i. Bumper shall be constructed of 14-gauge 2” X 6” steel tube, wrap around
          channel, or 10-gauge formed bumper.
       ii. Bumper shall be attached to chassis frame.
       iii. Bumper color shall be black or white.

11. Brakes
    a. Service brakes shall be Power assisted, hydraulically operated, and self-adjusting.
    b. Operation shall be free of noise and squeal.
    c. Brakes shall be 4-wheel disc front and rear.
    d. Brakes shall be largest and heaviest duty available from the chassis mfr for the
       GVWR specified.
    e. Parking brake shall be the chassis mfr’s standard mechanical type, located at left of
       driver for activation of rear brakes.

12. Wheels:
    a. Dual Rear Wheels: Required
    b. Wheels: Heaviest duty available, ventilated, pressed steel, 16” x 6”, white,
       interchangeable, to meet GVWR.
    c. Single front wheels, dual rear wheels, and spare are required.
    d. All wheels shall be completely identical and interchangeable.

13. Tires:
    a. 7 Ea: LT225/75 R 16E BSW all season
    b. Tires shall be balanced
    c. All wheels shall have tires mounted on them and shall be inflated to the proper
       pressure.

14. Suspension:
    a. Heavy duty suspension required on front and rear.
15. Exhaust:
   a. Exhaust pipe must be mounted in such a manner that exhaust gasses and soot does not
      mar the exterior surface of the bus.
   b. Exhaust fumes must not enter the passenger compartment.
   c. Exhaust must exit the left side of bus behind the rear wheels.
   d. Engine must meet or exceed all applicable federal and state exhaust emission
      requirements.

16. Required Instruments & Controls and Features:
   a. Ammeter or Voltmeter.
   b. Speedometer and Odometer.
   c. Oil pressure gauge.
   d. Water temperature gauge.
   e. Fuel gauge.
   f. Sun visor that can be positioned at the windshield or to the left of the driver.
   g. Headlight high beam actuator and indicator.
   h. Turn signal lever on column.
   i. Emergency flasher control.
   j. Clearance lights, controlled by headlight control switch.
   k. Driver coat hook shall be provided in driver’s area.
   l. Audible back up alarm required.
   m. Visible and audible warning devices shall be installed to inform following vehicles
      and pedestrians of reverse operation including back up alarm.
   n. Master exterior light switch and auxiliary switches for any clearance or marker light.
   o. Switches and temperature controls for passenger compartment air conditioning and
      heater.
   p. Separate switch and temperature controls for driver’s compartment air conditioning,
      heater and defroster.
   q. Windshield wipers;
      i. Shall include low, high, and intermittent speed settings.
      ii. Must be able to clean each side of the windshield and meet FMVSS 102.
      iii. Wiper arms shall be a parking type.
      iv. Windshield wiper blades shall be the refillable type.
      v. Windshield washer system shall be included meeting FMVSS 102.
      vi. Washer system shall have dual nozzles capable of spraying cleaning solution
      on the right and left side of the windshield.
      vii. Washer fluid reservoir and nozzles must be easily accessible.
   r. Passenger compartment courtesy lights and step well lights.
   s. Am/FM push button stereo radio
   t. Chassis mfg. equipped cruise control
   u. All gauges shall be clearly visible to the driver from a seated position.
   v. All switches shall be within reach of the seated driver and allow him/her to continue
      safe operation of the vehicle while engaging or disengaging switches.
   w. All instruments shall be grouped on a single panel in full view of the driver with no
      instruments obstructed by controls, trim panels, or other appurtenances and arranged
      in a consistent and uniform manner.

17. Floor Deck:
a. Floor construction shall be 3/4” fiberglass reinforced plywood or exterior grade plywood with sealed, heavy duty covering above.
b. Floor shall be installed on top of the steel sub frame and adhesive shall be applied between the plywood and all steel floor framing members. Floor shall be fastened with grade 5 floor bolts or Tek screws with a minimum of six bolts per cross member.
c. Floor track/seat rails and wheel wells shall be sealed with an adhesive to prevent leaks.

18. Interior:
   a. Grab or guard rail shall be installed on both left and right sides of entrance door.
   b. Grab rails shall be 1-1/4” diameter and be constructed of stainless steel clad tubing.
   c. Vertical stanchions and grab handles shall be mounted to the left and right of aisle, behind the driver and beside the step well.
   d. All interior panels and seats shall be white or gray and shall harmonize with exterior vehicle color.
   e. All protruding hazardous surfaces shall be eliminated. All interior panels, materials and treatments, shall be flame retardant in conformance with FMVSS 302 and treated to be easily cleaned.
   f. Interior shall be scuff resistant.

19. Windows
   a. Driver’s window shall be AS-1 and tinted and be part of the OEM chassis.
   b. Windshield shall have a heavier tint above eye level.
   c. Modifier installed glass shall be:
      i. 1/8” tempered safety smoked glass.
      ii. Tinted to reduce light transmittance by approximately 31% with a rating of AS-3.
   d. Window size is to be 36” high x 24” wide.
   e. Drain holes shall be incorporated in the window sash frame to allow interior condensation to drain to the exterior.
   f. Body and sash construction shall be such that the sash drain will prevent entrance of backup of water into the coach.
   g. Two emergency side exit windows shall be provided on each side.
   h. Decals shall be fastened to inside of vehicle and emergency windows with instructions as to their use.
   i. Curbside transition window:
      i. Window shall be located in front of the entry door.
      ii. Window size shall be approximately: 35.5” high X 10.5” at widest point and 10.5” at the bottom.
      iii. Top 1/3 of window shall be angled to fit contour of the cab.
      iv. Total square inches of viewing shall be 300.
      v. Window glass shall be tempered safety glass with a rating of AS-3 and approximately 31% tint.
   j. Passenger Side Windows – Non-Egress:
      i. Window shall be a single or double “T-Slider” ventilation type which is designed for the top 7” to open by sliding either the front or rear 6” section toward the center.
      ii. Window shall be maintained in the closed position by mechanical latches.
iii. Total viewing area of windows shall be approximately 864 sq. in.

k. Passenger Side Windows – Egress:
   i. There shall be 4 push-out windows, 2 on each side.
   ii. Push-out windows shall be identical to the Non-Egress in construction, but shall be designed to be opened in an emergency situation by releasing 2 clearly marked red release latches located on each side of the window.
   iii. Operating instructions shall be located at and on each egress window.

l. Rear Egress Door: Shall be a rear emergency egress door with upper window.

m. All windows must meet FMVSS 205 & 217

20. Window Seals
   a. Windows shall be sealed between the body and window frame with ½” ribbed rectangle closed cell rubber seal, or using mfg’s standard method and material.

21. Doors
   a. Driver’s Door: Driver’s door shall be chassis mfg’s standard with keyed lock and manual window.
   b. Passenger Entry Door: Entry door shall be transit grade, electrically operated A & M double out type door with step well or equal. Note: Coach & Equipment MFG CORP design and built door will be accepted as approved equal provided all applicable technical specifications and dimensions are met.
   c. Door opening to be 32” wide x 77” high minimum. Tread depth shall be 11” maximum.
   d. Riser height shall be 9.5” maximum.
   e. First step to ground shall be 12” maximum.
   f. An electric door control next to the driver’s seat, within arm’s reach for a 5’2” person is required.
   g. Entry Door Step Well Frame shall consist of a modular designed, 14-gauge galvaneal or cold rolled steel formed to create a perimeter frame, step well, and the finished opening for the double-out entry doors.
   h. Step well shall be a 3-step entry.
   i. Step well shall be adequately reinforced to prevent noticeable deflection when loaded over the center half with a 300 lb. static load.
   j. Individual risers shall be the same height.
   k. Step well shall be shall be completely enclosed and weather tight when passenger door is in the closed position.
   l. All aisles, steps, floor areas where people walk and floors in securement area shall have slip-resistant surfaces.
   m. All step edges, thresholds and the loading edge of lift platforms shall have a band of color(s) running the full width of the step on edge which contrasts from the step tread, riser or lift surface, either light-on-dark or dark-on-light.
   n. All doors shall be properly sealed to prevent entry of air drafts and water into vehicle interior, including spray from commercial vehicle wash equipment and driven rain.
   o. Locks for all doors shall be supplied with duplicate keys.
   p. When the entrance door is closed, the lower step shall not protrude more than 1.5” beyond the door line.
q. Frame shall be powder coated black, galvanized steel and spray painted, or treated with a corrosion inhibitor.

r. Outer skin of the door shall be 1/8” or 3/16” tempered safety glass rated AS-1.

s. A butyl tape seal shall be placed between the glass and the steel frame to create a weather tight seal.

t. The outer edge shall be trimmed with aluminum “L” molding which shall be mechanically fastened.

u. Door assembly shall be installed in the entry door frame by the following method:
   i. There shall be 2 steel pins per leaf, one located at the top (3/4”) and one at the bottom (1/2”) which create the pivot points that allow the doors to open.
   ii. The bottom pin shall be inserted into a bushing.
   iii. The step well frame shall have a grease if available fitting so this pin can be lubricated. The top pin shall be fitted into a sealed, self-aligning roller bearing that is located in the door header.
   iv. A self-aligning control rod with a safety spring shall control the opening and closing.

22. Exterior Mirrors
   a. 2 each
   b. Mirror Type: Rosco Euro, Lucerix or equal.
   c. Driver’s side mounting bracket shall be wing mount type.
   d. Co-pilot side mounting bracket shall be fender mount, fender mount quad design or front quarter panel mounted.
   e. Mirrors and mounting brackets shall have a black finish with a 2-in-1 mirror head.
   f. Upper flat glass shall measure 6 ¾” wide x 9 ¾” high.
   g. Lower convex mirror shall measure 6” wide x 3 ½” high.
   h. Mirror configuration may also be upper flat glass mirror with separate lower convex mirror.

23. Fuel Fill
   a. A fiberglass, ABS plastic, or OEM mfg’s standard fuel fill shall be recessed into the body on the driver’s side so the chassis fuel fill pipe and fuel cap does not protrude beyond the body sides.

24. Heat Shield
   a. A heat shield shall be installed over the exhaust pipe and muffler. Shield shall be constructed from .040 aluminum or galvanized steel and fastened to the bottom of the sub frame cross members with mechanical fasteners.

25. Undercoating
   a. The entire underside of the bus shall be undercoated with 2-Tech ZPG20060B, 2500, or equal except the areas directly above the chassis exhaust pipe, muffler, and tailpipe.
   b. Undercoating shall be 12” from exhaust pipe and 2” from fuel tank.
   c. Undercoating shall meet all mil specs C-62218A.
   d. Undercoating of Tectyle 127CG will also be acceptable.
   e. Undercoating of Pure Asphalt will also be acceptable, provided the product and undercoating process meet Ford QVM standards.

26. Skirts, Fender Flares, Transition Panel, Anti Ride, and exterior Finish
a. Side skirts shall be .020 pre-painted galvanized steel, aluminum, or composite formed with a 90-degree break on the lower edge providing a mounting point for the skirt brackets.

b. Fender flares and transition panel shall be fiberglass components and shall be constructed with a gelcoated surface of 15 mil thickness. A layer of resin and fiberglass shall be skin coated at a thickness of 110 mils. The fiberglass content of this layer will be 31%. A TPO thermoplastic molded fender flare, ABS fender flare, or rubber fender flare of the same thickness may be used in lieu of fiberglass fender flare. **NOTE**: Fender flares are not required if rear wheels do not extend outside the width of the exterior sidewall and fender well.

c. Exterior finish shall be bright white matching OEM chassis white.
   a) Anti ride shall be fabricated from 14-gauge steel, powder coated black, and mechanically fastened to the rear bumper. (Or Anti-Ride must be accomplished by combination of bumper and body design.)

27. Cab Liner
   a. Mfg’s standard. Must match the remainder of interior with respect to framework, colors, and materials used.

28. Headliner
   a. Headliner shall be made of 3.6 mm underlayment with a vinyl face laminated to the substrate or plastic reinforced fiberglass. It shall be inserted into an extruded track system secured to the underside of the ceiling and mechanically fastened or by using a vacuum process and automotive grade adhesives.
   b. Headliner may be metal in lieu of plywood or plastic reinforced fiberglass.
   c. A formed aluminum or mfg’s standard transition panel that is covered with vinyl or headliner material captured in dual “J” rail and providing easy access to hoses and wiring in the unit cavity between the sidewall and ceiling will be used or; 3/8” plywood wrapped in vinyl will be used at the roof to sidewall intersection point to provide access to A/C hoses as well as wiring within the roof envelope.
   d. Panel shall be securely fastened into place with mechanical fasteners.

29. Hose Drain
   a. Rear A/C drain hoses shall be routed between the rear wall and the rear cap facia or surface mounted and covered with a decorative panel.

30. Body Seam Trim
   a. After all the above components are installed, an aluminum trim, secured by mechanical fasteners, and placed over the body seams. Trim shall be covered with a vinyl insert. Aluminum trim will not be required for over body seams if not available from OEM.

31. Finished Floor
   a. Finished floor shall be Altro Meta Dark Grey TMM22421, Tarabus Sirius Dune medium grey, or equal with a minimum thickness of 2.2 millimeters.
   b. The whole floor shall be a uniform thickness throughout the vehicle, eliminating the need for ribbed surfaces, while exceeding the ADA minimum slip resistance standard rating of .06 static coefficient of friction under dry or wet conditions.
   c. Seams shall be heat welded to provide a permanent waterproof seal against water penetration leading to premature sub-floor failure or curling leading to possible tripping hazards.
32. Rotocast or Mfg’s Standard Trim Panels
   a. A rotocast or mfg’s standard trim panel shall be installed at the floor to sidewall
      seam. Over the wheel wells there shall be a molded piece of the same material which
      shall follow the wheel contour.
   b. Trim panels will not be required at the floor to sidewall seam if mfr’s std trim panels
      are not available. In this case, the wheel wells shall be covered in molded ABS
      material or mfr’s standard.
   c. The “B” pillar and curbside transition window shall also utilize a rotocast or mfg’s
      standard panel to cover the unfinished areas of the OEM chassis.

33. Entry Door Trim
   a. Areas surrounding the entry door frame shall be trimmed with padded vinyl which
      matches the interior color scheme.

34. Stanchions, Modesty Panels, & Assist Handrails
   a. There shall be 2 ea. 1 ¼” O.D. stainless steel stanchion poles constructed in the
      following manner.
      i. Behind the driver’s seat, a vertical stanchion will run from floor to ceiling
         connecting with a horizontal stanchion secured to the wall.
      ii. All fittings and fasteners shall be stainless steel clad type with no exposed
          threads.
      iii. In addition, a rectangular modesty panel shall be attached to this assembly.
      iv. The modesty panel shall be constructed of a ¾” or 5/8” substrate and covered
          with a gray or white laminate finish or vinyl padding or modesty panel may be
          a light gray ABS panel framed with aluminum trim or color-coordinated
          plastic edge around the perimeter.
   b. Grab or guard rail shall be installed on both left and right sides of entrance door
      constructed from the same materials for safety and to assist entering and exiting the
      bus.
   c. An overhead grab rail shall be mounted to allow passengers to move throughout the
      bus while maintaining a hand hold.

35. Interior Mirror
   a. A 2 ½” x 9” fully adjustable mirror located in the top center portion of the windshield
      and shall be provided by the chassis mfg.
   b. In addition to above, a 6” x 9” convex mirror with a full range adjustment shall be
      located above the driver’s area, on the interior front cab liner for viewing the
      passenger area.
   c. 6” X 9” mirror must be mounted in such a manner as to prevent the driver from
      accidentally hitting the mirror.

36. Wall Track
   a. A unistrut type channel shall be welded or monobolted every 8’ to a 1” x 2” 16-gauge
      steel tube that is part of the interior side wall structure or a steel seat rail buried within
      the sidewall may be substituted.
   b. Seat frames shall be bolted to the seat channel with 2 ea. 7/16” grade 8 bolts, threaded
      into two 1 ¼” x 7/16” channel nuts.
   c. Installation must meet FMVSS 207 & 210 requirements.

37. Driver’s Seat
a. Driver seat pedestal shall be mounted in the holes provided by the OEM chassis mfg. Seat is to be a high back recliner with a right hand arm rest. Seat shall meet FMVSS 207 & 210 requirements.

38. Wiring
   a. All wiring added by the final stage mfg. must meet one of the following standards:
      i. SAE specification J1128-SXL high temperature wire (8 to 14-gauge);
      ii. SAE specification J1128-GXL high temperature wire (8 to 14-gauge);
      iii. SAE specification J1128-SGX high temperature wire (battery cable);
      iv. In addition to the above specifications, all wiring shall be color-coded and function designated every 12” to enable identification and circuit trace ability.

39. Installation & Securement
   a. All wiring under the body or hood shall be protected by high temperature (125 degree) nylon convoluted tubing and shall be high temperature heavy gauge wire ties or insulated rubber coated “P” clamps.
   b. All wiring shall be routed no closer than ¾” from any sharp edge or a minimum of 4” away from any heat source.
   c. No wiring shall be routed thru the wheel well unless protected by a metal shield and convoluted tubing.
   d. A minimum of 1 ½” clearance shall be maintained between any wiring and the engine to compensate for engine roll.
   e. No wiring shall be secured to brake or fuel lines.

40. Connectors
   a. All wiring shall be connected in the under-body or under-hood areas by one of the following connectors or methods: 1) Sealable insulated eyelet; 2) Sealable insulated butt connector; 3) Sealable insulated quick disconnect; 4) Sealable insulated ring connector; 5) Where it is not possible to install a sealable insulated electrical connector, the insulated connector shall be protected by heat shrink tubing with a sealable glue inside.
   b. Remaining wire located inside the bus shall be connected by one of the following connectors: 1) Standard insulated eyelet; 2) Standard insulated butt connector; 3) Standard insulated quick disconnect; 4) Standard insulated ring connector.

41. Gauge of Wire
   a. All wiring shall be sized to carry the load for length of bus.

42. Exterior Lighting
   a. Lights in this section shall be installed meeting FMVSS 108 requirements (lamps, reflective devices and/or associated equipment). Lights B thru H shall be LED.
   b. Identification Lamps:
      i. Three (3) amber round or rectangular lights centered and recessed or surface mounted in armored protectors in the front cap;
      ii. Three (3) red round or rectangular lights centered and recessed or surface mounted in armored protectors in the rear cap.
   c. Clearance Lamps:
      i. Two (2) amber round or rectangular lights located and recessed or surface mounted in armored protectors at each edge of front cap;
      ii. Two (2) red round or rectangular lights located and recessed or surface mounted in armored protectors at each outer edge of the rear cap.
d. Side Marker Lights: Two (2) red round or rectangular lights located one on each side of the side wall just in front of the rear cap in line with the rear clearance lights.

e. Stop/tail lamps, turn signal lamps, and back up lamps.

f. There must be a center, high mounted brake light.

g. There shall be 3 ea. 4” round light assemblies located and recessed in each side of the rear cap.

h. Rear license plate bracket with lighting shall be provided to meet Federal and State regulations.

i. Headlights, chassis front turn lights, and hazard flashers shall be provided by chassis mfg. Chassis system shall be tied into the bus system by the final stage mfg/modifier.

43. Interior Lighting (may be L.E.D.)

a. Driver’s Courtesy Lights: Driver’s courtesy light shall be installed just above the driver’s seating area. Opening the driver’s door or turning the headlight switch counter-clockwise activates the light.

b. Step Well Entry Lights:
   i. 2 ea. 2” flush mount lights or surface mount lights not extending above the surface more than ¼” shall be installed, one on each side of the step well.
   ii. Step well lights shall be activated when the double-out entry doors are opened.
   iii. Step well light strength shall be no less than 2 foot candles of illumination on the step treads with the door open.

c. Overhead Courtesy Lights:
   i. Four (4) overhead courtesy lights shall be installed in the ceiling of the bus or six (6) lights (3 on each side) shall be installed on the sides near the ceiling to provide lighting for safe passenger movement.
   ii. Turning on the switch in the driver’s console or opening the double-out entry door shall activate the lighting.

d. Dash instrumentation lighting shall be provided by the chassis mfg. and shall be activated by the headlight switch.

44. Master Distribution Panel

a. A master distribution panel shall be installed in an aluminum cabinet or ABS panel located by the front entry door or in driver area.

b. Master distribution panel shall supply all power to the bus except those functions related to the OEM chassis.

c. A #2 cable connected to a solenoid or relay located under the hood or in driver’s panel shall power this panel.

d. These circuits shall be protected by automatic circuit breakers or in-line fuses.

e. The solenoid or relay shall be activated when the ignition is turned on.

f. In addition to the power supplied by the ignition hot solenoid or relay circuit, there shall be two (2) circuits in the panel that are battery hot and protected by circuit breakers or in-line fuses. These circuits shall be for the radio and electric door operator options.

45. Electronic Switch Panel Control

a. A switch panel shall be located within easy access of the driver to control all the functions necessary to operate the bus except the OEM chassis functions. Any electrical devices requiring a switch will be provided as needed.
46. Windshield Wipers and Washers
   a. Two (2) heavy-duty, electric, self-parking, two-speed intermittent windshield wipers shall be furnished.
   b. Windshield washers with ample reservoir shall be located for easy inspection, maintenance, filling, and removal.

47. Heating and Defrosting Systems
   a. Heating system shall consist of at least two (2) units, one front unit located in the driver’s area and one unit located as to uniformly heat the bus.
   b. Heaters shall have a fan switch for driver’s heater and a separate switch for passenger heater with thermostat controls for each as well.
   c. Front unit;
      i. Front unit shall have one large heater core and heavy duty blower to provide sufficient heated air for defrosting the windshield and bus’s heat.
      ii. Front unit blower motor shall be controlled by a 3-position switch on the driver’s control panel.
   d. Combustion type heaters shall not be permitted.
   e. Completed bus shall have sufficient amount of permanent all-weather coolant to protect the cooling system to as low as -20 degrees F tested at normal engine temperature.
   f. Front heating system shall be 20,000 BTU’s and shall distribute air to direct sufficient heat into step well to prevent the accumulation of ice and snow.
   g. Auxiliary Heater;
      i. Heater output for the passenger area shall be 65,000 BTU.
      ii. 2-speed switch for the auxiliary heater is required.
      iii. Isolation valve for auxiliary heater shall is required in an accessible location.
   h. All heater hoses and wires that pass within 12” of exhaust system shall be shielded in a manner to prevent heat damage to them.

48. Air Conditioning and Ventilation
   a. Total air conditioning output shall be 67,000 BTU minimum and shall consist of front and rear evaporators
   b. Front (or driver’s area system) shall be chassis mfg’s dash installed system, 12,000 BTU minimum.
   c. Rear system evaporator:
      i. Ceiling mounted near rear wall.
      ii. 55,000 BTU minimum.
      iii. Condensate drain system shall be designed in such a manner that there is no spillage or leaking into the passenger area at any time including turns or stops.
      iv. Construction shall be copper tube with aluminum fins.
      v. Condenser to be skirt mounted with two (2) fans.
      vi. Low pressure switch required
      vii. 1200 CFM minimum
      viii. 2 fans minimum
   d. Condenser;
      i. Skirt mounted, road side
      ii. 2200 CFM rated
      iii. 2 fans minimum
iv. Installation shall facilitate easy access for maintenance but shield condenser from road splash.
v. High pressure switch required.
e. **NOTE**: Roof top mounted equipment is not acceptable.
f. Compressors, dual, tie-in system **not** acceptable
g. All A/C related tubing and wiring that pass within 12” of exhaust systems shall be shielded in a manner to prevent heat damage to them.
h. Warranties:
   i. Front/dash mounted unit - mfg’s standard.
   ii. Rear/ceiling mounted unit – 24 months from delivery date.
i. Required information from successful bidder upon delivery;
   i. Operators, maintenance, parts manual.
   ii. In-State warranty and service provider contact information.
j. Acceptable brands/models shall be, ACT, Mobile Climate Control, Transair, ACC or equal.

49. Seating Arrangement/Floor Plan
a. All seating shall comply with FMVSS 207 & 302.
b. Seating arrangement/floor plan of bus shall accommodate 24 forward facing passengers.
c. Passenger seats shall be mid-back contoured seats with 16-gauge tubular steel frames.
d. Mid-back non-reclining seats to have 10 to 15% angle to provide comfort for passengers.
e. Vinyl seat covering shall be required.
f. Front of bottom cushion shall be foam rolled and contoured.
g. Standard width should be between 16 ¼” to 18”.
h. Back height should be 22” from top of seat cushion.
i. Seats shall be upholstered with a commercial grade, heavy duty expanded automotive approved vinyl meeting the following requirements:
   i. 32 oz. per sq. ft.
   ii. Must meet FMVSS 302 requirements for fire retardance.
   iii. Shall show no change at 20,000 cycles of the Wysenbeed abrasion test.
   iv. Shall pass the test for ultraviolet, aging, and mildew proof.
   v. Cold crack-resistance shall meet ASTM D-1790 for -20 degrees.
   vi. Seat upholstery shall be sewn using high quality ultraviolet ray resistant thread.
   vii. Colors shall be selected from mfr’s standard gray to harmonize with other interior colors.
   viii. Seat backs shall be of same material as the seat cushions.
j. Aisle seat will have a padded or molded armrest that flips up for easy access.
k. Aisle seats will have anti-vandal grab handles.
l. A USR (under seat retractor) seat belt is required for each passenger.
m. All seat belts shall be standard buckle type.
n. Seat belts and anchorages shall meet the requirements of FMVSS 209 & 210.
o. **NOTE**: A traveling retractor is not acceptable.
p. Driver’s seat shall be 4-way adjustable deluxe high back seat equipped with an automatically retractable lap and shoulder harness.
q. Color of seat will match other passenger seats.

50. Rear Emergency Exit:
   a. Rear exit shall consist of a door with upper window.

51. Emergency Equipment to be Included:
   a. One 5lb. ABC fire extinguisher mounted at a location convenient to the driver inside the vehicle.
   b. One 21 item first aid kit securely mounted in an easily accessible location.
   c. Three (3) safety triangle reflector kit mounted in an easily accessible location.
   d. All emergency equipment shall be mounted in an area easily accessible by the driver and will not interfere with passengers when not in use.

52. Storage
   a. There shall be a driver’s storage compartment located over the windshield to allow for the storage of driver’s miscellaneous material.

53. Required manuals & Catalogues upon Delivery
   a. Parts manual
   b. Wiring schematic diagram
   c. Operator’s manual
   d. Any other manuals such as air conditioning, body, seats, etc. that are not included in the main parts and service manuals shall be required.
   e. Manuals listed in this section may be provided via paper, CD, or zip drive. An online Parts Store is not an acceptable equal.
   f. A Helms chassis CD is not required.

54. Tests & Testing
   a. Each completed vehicle and all working and moving parts and operating devices shall be thoroughly tested and put into operating condition by the mfg/modifier. Pre-delivery inspections performed by the dealership will also be accepted.
   b. Roofs, windows, windshields, and compartment doors of the buses shall be water tested and any leaks found shall be repaired in a workman like manner.
   c. Mfg. shall not attach any dealer identification, advertising, or similar material to the vehicle. Mfg. shall service and adjust vehicles for operation to include, as a minimum, the following:
   d. Focusing of lights
   e. Tuning of engine
   f. Adjustment of accessories
   g. Checking of electrical braking and suspension systems
   h. Charging of battery
   i. Inflation of tires
   j. Balancing of all wheels
   k. Complete lubrication of engine, chassis and operating mechanism with recommended grades of lubricants for the ambient temperature at the point of delivery.
   l. Servicing of cooling system with permanent type antifreeze and summer coolant for -20 degrees F.
   m. Servicing windshield washer with water and appropriate additives.

55. Altoona Test Results
a. Certification for the interim bus testing program (49 CFR part 665), an executive summary copy of the 7 year, 200,000 mile test report on the bus model must be provided by the bus testing facility in Altoona, Pa. prior to award.

56. Inspection
   a. Receiving agency reserves the right to inspect all material and workmanship at all times during the progress of the work.
   b. Final inspection and acceptance of the vehicles covered by these specifications shall be made by receiving agency.

57. Civil Rights and Minority Business Enterprises
   a. Successful bidder shall comply with the regulations of US DOT relative to non-discrimination in federally assisted programs of the DOT (Title 49, code of transportation relative to non-discrimination in federally-assisted programs of the DOT, Title 49, code of federal regulations, parts 21) which will be incorporated by reference and made a part of all contracts.

58. Motor Vehicle Standards –
   a. Vehicles must meet and/or comply with the following standards & requirements;
      ii. All Federal and State pollution and emission standards.
      iii. Fire safety practices – Mfr shall certify that all combustible materials used in the construction of the vehicles have been tested by a recognized testing laboratory. The vinyl seat covering shall comply with “Recommended fire safety practices for rural and specialized transit bus materials selection” published by the FTA October 20th 1993 – Docket 90A.
      iv. Certification that body mfg/modifier meets ISO 2000-9001 or QVM standards.
      v. U.S. DOT safety standards for bus applicable as of the date of mfg. and complies with all ICC requirements for motor buses operated in interstate commerce.
      vi. Buses shall be in complete compliance with all requirements of the laws of the State of Tennessee as to lighting equipment and all warning and safety devices.
      vii. Buses must comply with ADA requirements that went into effect January 26, 1992.

59. Warranty (minimums)
   a. Chassis: 36,000 miles or 36 months including all parts & labor.
   b. Body & Roll Cage: 75,000 miles or 60 months including all parts & labor.
   c. All Other Items: 25,000 miles or 12 months including all parts & labor.