



**MISSOURI DEPARTMENT OF TRANSPORTATION**  
**ADULT PASSENGER NON-SCHOOL BUS TYPE – MEDIUM DUTY**  
**VEHICLE SPECIFICATIONS**

1. The intent of these general specifications is to describe a commercial non-school bus type vehicle that will be manufactured, structured and assembled by using best quality materials, components and workmanship in accordance with sound engineering principles and manufacturing practices to provide safe and reliable transportation. The completed vehicle will meet all applicable required Federal Motor Vehicle Safety Standards, at time of delivery.

MoDOT reserves the right to conduct in-plant inspections.

Chassis types – Navistar, Freightliner, or Ford (if final assembly processes in the USA and contains at least 60% domestic content) or approved equal 2014 or 2015 model year 16,500 or 19,500 GVW chassis. If a 2014 model can't be supplied, a 2015 will be substituted for the same price. This will only be exercised in the event the successful bidder receives a purchase order in time to order a 2014 model, but fails to do so. Wheelbase will be appropriate for body length. Bus must meet FMVSS weight requirements for anticipated passenger load.

2. Body Exterior, Construction - The materials used and the assembly method of the roof, side panels, and floor will be the manufacturer's standard construction, uniformly connected, lapped and sealed providing a weather and dust proof body. Drip rails shall be installed above all doors to prevent water leakage into bus. Each vehicle will be thoroughly water tested before delivery.

Exterior Color –. Base color is white. No bus is to be painted school bus yellow.

Advertisements- Decals and all other forms of dealer advertisements will not be allowed.

3. Body Interior Construction - The inner construction must provide equal protection to passengers regardless of where they are seated.

The inner frame, at the floor, front and rear ends shall be heavy steel construction that will provide solid support for inner crash shield and exterior panels. The frame shall be securely anchored to adequately spaced steel floor cross members.

The entire structure must provide maximum resistance to impact and collision and meet or exceed the rollover protection requirement of all federal regulations. FMVSS 220.

Interior Color - The interior trim, upholstery, seat belts, visors, and etc., will be color keyed to exterior color.

Headliner - Shall be full length for driver and passenger area. This headliner shall have longitudinal and cross member supports where needed to prevent flexing and vibrations. The headliner above the driver's area shall provide sound deadening qualities.

Side and End Panels - To be complete on all doors, sidewalls and rear end.

The body exterior and interior shall conform to Federal Motor Vehicle Safety Standards and meet all static load test requirements.

Floor and Floor Covering - The entire flat floor except driver's area, wheelwells, and stepwells shall be made level with marine grade or fiberglass reinforced plywood a minimum of 3/4 " thick securely installed by glue, screws or a combination of methods that will assure a permanent fitted floor. The plywood floor shall be covered with a minimum of 2.2 mm thick vinyl transit type anti-skid floor covering. All seams will be heat welded when mating similar surfaces. There will also be an aluminum, polyethylene or galvanized steel belly pan located under the floor to prevent moisture entrance.

Aisles, steps, and floor areas must be slip resistant. [49 CFR Part 38.25(a)]

The entranceway and aisle will be non-skid type and under the seats it will be smooth with anti-skid properties. The driver area and wheelhouse covering may be either smooth or anti-skid type. All floor coverings shall meet ADA requirement 49 CFR 38.25. Include a white standee line meeting Federal Motor Carrier Safety Regulations, 49 CFR 393.90.

Step edges, thresholds, and the boarding edge of ramps or lift platforms, when equipped, must have a band of color that contrasts with the step/floor surface. Typically, white or bright yellow is used to contrast against dark floors. [49 CFR Part 38.25(b)]

All exposed edges around the wall, doors and entranceways shall be trimmed in a manner to eliminate moisture entry to the sub-floor. There will be no exposed interior wheel wells. Any quality waterproof seal between floor and wall junction is acceptable.

Insulation - The interior dash firewall, lower panels, doors, floor, sidewalls, roof headliner, etc. shall be insulated.

4. Grabrail, Grabhandle, Guardrails and Stanchions - A floor to ceiling stanchion shall be installed near the aisle and immediately left of the entrance door. This stanchion shall be connected to the vehicle right side by a guardrail approximately 30" above the floor.

A floor to ceiling stanchion shall be installed in close proximity to the rear, right side of the driver's seat. This stanchion shall be connected to the vehicle's left hand sidewall by a guardrail approximately 30" above the floor. The stanchion and guardrail shall not impair the driver's seat adjustment. There will also be a floor to ceiling modesty panel mounted to this stanchion. This barrier will not interfere with driver's seat adjustment.

A guardrail approximately 30" above the floor shall be installed on the vehicle's left and right sides between the two passenger front seats.

Solid material modesty panels shall be provided with the entry door stanchion and guardrail, and the left and right hand front seat guardrails.

Spacing of these guardrails and panels must provide adequate passenger knee room.

A grabrail a minimum of 18" in length shall be installed to the left of the right hand front entrance door within easy reach of boarding passengers.

There will be two overhead grabrails mounted securely above the passenger aisle. These grabrails will meet ADA requirement 49 CFR 38.29. Only one is necessary if overhead storage compartment option is utilized.

There shall be two passenger grabrails mounted parallel along both sides of the stepwell. These handles are to be approximately 18" in length and securely mounted to the vehicle to provide a secure handhold for boarding passengers.

All stanchions and guardrails will be mounted securely enough to eliminate vibrating loose. All handrails and stanchions will meet ADA requirement 49 CFR 38.29.

Interior handrails and stanchions should not interfere with the path of travel of a common wheelchair from the accessible entrance to the securement areas. [49 CFR Part 38.29(a)]

Handrails and stanchions shall be provided in the entrance area and through the fare collection area to assist persons with disabilities as they enter and pay a fare. Some portion of this handrail/stanchion system must be able to be grasped from outside the vehicle to assist persons as they start to board. Handrails shall have a cross-sectional diameter of 1 1/4 to 1 1/2 inches, shall provide a minimum of 1 1/2 inches of "knuckle clearance," and shall have eased edges with corner radii of not less than 1/8 inch.

On vehicles 22 feet in length or longer which have fare collection systems, a horizontal assist shall be provided across the front of the vehicle to allow a person to lean against the assist while paying a fare. [49 CFR Part 38.29(b)]

Handrails and stanchions shall also be provided to assist with on-board circulation, sitting and standing, and exiting the vehicle. [49 CFR Part 38.29(b)]

For vehicles longer than 22 feet, an overhead handrail or handrails shall be provided which are continuous from front to back except for a gap at the rear doorway. [49 CFR Part 38.29(c)]

For vehicles longer than 22 feet that have front door lifts or ramps, vertical stanchions immediately behind the driver shall either terminate at the lower edge of the aisle-facing seats or be "dog-legged" so that the floor attachment does not impede or interfere with wheelchair footrests. [49 CFR Part 38.29(e)]

5. **Seating**

**Driver's Seat**

The driver's seat shall be ergonomically and orthopedically designed to give the driver maximum comfort. Driver's seat will be of best quality, fully adjustable air ride seat with two chamber air lumbar supports in the seat back and meet all applicable Federal Motor Vehicle Safety Standards including Nos. 207, 209, 210 and 302. Headrest will be vinyl covered. Seat will be a high back design with an adjustable headrest.

The driver's seat shall be adjustable so that persons ranging in size from the 95th-percentile to the 5th percentile may operate the coach. The driver's seat cushion shall have a minimum width of 18 inches, a length of 16 to 18 inches, and adjustable rearward slope of 5+ or -5 degrees. The seat to have a stamped steel high back. Folding armrests will be on the left and right side of the seat.

The angle formed between the seat back and the seat cushion shall have a minimum adjustment range of 95 to 110 degrees. The angle of both the seat back and seat cushion shall be independently adjustable. Height of the seat shall be adjustable so that the distance between the top of the uncompressed seat cushion and the floor may vary between 17 and 21 inches. The seat shall be adjustable forward and rearward for a minimum distance of nine (9") inches. While seated, the driver shall be able to make all of these adjustments by hand without excessive effort. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.

The seat shall be upholstered in transit quality cloth type fabric materials and be of a neutral color. The seat shall have a manual lumbar support integrated into the seat back. The top area of the seatback shall be vinyl for easy cleaning. The driver's seat shall be equipped with a back retracting seatbelt meeting FMVSS requirements. All seat belts on the vehicle will have the same size male and female ends. Seat may be a USSC Model 9100 ALX3, Recaro, Ergo Metro 2-Point, Freedman CL 67 air suspension or approved equal.

**Passenger Seats**

All one-passenger seats shall be approximately 17" wide.

Forward facing seats will have padded grabhandles and folding armrests on the aisle sides.

All two-passenger seats shall be a minimum depth of 16"; the backrests shall be a minimum thickness of 2". Mid back style. These seats will be the individual bucket style. All seats will have seat belts (with under seat retractors) for each location. Belts will have a minimum 60" usable length measured from the seat cushion to the buckle. Include 3 (three) 12" lap belt extensions with each vehicle. All seat belts on the vehicle will have the same size male and female ends.

All seat cushions and backrests shall be covered with a high quality vinyl material. Seat cushions and backrests shall have full depth foam padding. The seat cushion padding shall have a density (4" minimum) sufficient to support occupants without bottoming. All seat cushion colors will be co-coordinated or neutral with exterior color scheme.

Seats will have vertical stitching and will have foam and vinyl cover material that will ensure at least a 7-year useful life. (At least a level 3 vinyl)

All bolts used in attaching the seats, seat belts, wheelchair securement devices and seat accessories will be a grade 5 rating or higher. All attachments will utilize either lock washers or lock nuts to prevent loosening due to vibration.

Walk-through aisle between right and left hand seats shall be a minimum of 14".

At least one set of forward-facing seats must be designated as priority seats for persons with disabilities. Signs identifying these as priority seats must be provided. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 5/8 inch. Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with the sign's background color. [49 CFR Part 38.27(a), 49 CFR Part 38.27(c)]

Include 2 CRS seats (latch system) that meet FMVSS 225 and one integrated forward facing child seat. The child restraint system CRS (latch system) positions and the integrated child seat will be in non-folding seats so that the child seating positions are available when the folded seats area in the up position to accommodate passengers with wheelchair(s) in all available securement positions. These CRS and integrated child seat positions will be located adjacent to the center aisle. All FMVSS 225 seating positions will have 60" non-retractable lap belts for each position. All seat belts on the vehicle will have the same size male and female ends.

### **Fold-A-Way Type Seat Requirements**

Fold-A-Way type seats shall meet all dimensional, structural and testing requirements of the standard seat specification.

All seats shall be forward facing for ambulatory passengers and fold against the wall when wheelchair space is required.

In the folded position, the seat may extend into the bus no further than 12" installed at 90 degrees to maximize space for wheelchair loading and positioning.

In the down, fixed position, the seat may not extend into the aisle more than 38" to preserve aisle space. (12") maximum from wall)

Fold-A-Way type seats may be Braun 125 Model High-Back, Freedman 3 step Fold Away, American Seating E-Z fold, or approved equal.

### **Seating Arrangement**

See Floor Plan Diagrams - The arrangements shall provide seating as described and as shown on the appropriate exhibit. If there is a conflict between the written floor plan specification and the floor plan diagram, then the written narrative controls.

**Floor Plan BB** – This floor plan will have two forward facing wheelchair positions located in the rear of the bus. There will be four-two passenger fold-a-way seats located at and near the wheelchair securement locations that can be utilized if there are no mobility aids transported.(as shown on diagram) The remainder of the seats will be two-passenger and located as shown on the floor plan. Total capacity – 34 ambulatory and two wheelchairs; 38 ambulatory with zero (no) wheelchairs.

**Floor Plan SC** – This floor plan has a capacity of 30 ambulatory and 2 wheelchairs or 34 ambulatory and no wheelchairs. Lift location will be behind service door and there will be two fold-a-way seats located at the securement locations.

6. Windshield, Door Glass and Window Glass - Safety plate windshield and window glass all around.

The windshield shall be fixed glass.

Passenger side windows shall be provided throughout the passenger area (T-slider). These windows will be a horizontal opening type. These windows shall meet all the latest federal regulations for retention and release. Kick-out type windows will be hinged at the top. All windows that are considered as emergency exits will be clearly marked. A full-length drip molding approximate 3/4" will be installed. The ventilation section of the window shall be located at the top so seating does not interfere with operation. Passenger windows will be approximately 40" x 29".

The driver position, on buses with right hand front entrance door only, shall have a window that can be opened for ventilation at the left side.

The dual right hand passenger entrance doors shall have full-length windows that will allow the driver to judge curb locations.

The emergency rear door shall have upper and lower fixed glass with a red light and signage denoting use as an emergency exit. The lighting and signage will meet FMCSR 393.92.

There will be glass on each side of the emergency door, approximately 6" x 30".

The windshield, driver position side window, and rear emergency door glass will be tinted. The passenger entrance door glass will be tinted in the upper part and may be clear in the lower part.

All passenger area side window glass will be tinted. An approximate tinting of 28%-30% light transfer is acceptable in side glass.

All sliding side windows will have inside latches for security.

All windows, doors, and windshield will be installed to keep water and dust leakage to a minimum. All doors and side windows will have a 3/4" drip molding installed over them.

## 7. Doors

One door right-hand (RH), or two doors left-hand (LH) and right-hand (RH) acceptable.

Entrance LH - This door shall be the chassis manufacturer's standard front side door with tinted drop glass, armrest and lock. OEM driver's door armrest is acceptable for LH side door. This door may be modified if necessary.

Entrance RH - Main service door may be either forward folding, in-out or out-out opening type. Door may be air or electric operated with emergency and out of service dumps. Air control motors to be Vapor or approved equal. Plexiglass is not acceptable for the main viewing area of the door.

This door shall provide a minimum of 72" entrance height from the top of the first entrance step to the door headliners. The minimum width shall be 24". The top of this door entrance shall be fully enclosed and protected from weather and other elements. It shall have protective padding to prevent head injury when entering or exiting.

The height of doors at accessible entrances and the interior height along the path of travel between accessible entrances and securement areas shall be as follows:

For vehicles 22 feet or longer, the clearance from the raised lift platform or the ramp surface to the top of the door must be at least 68 inches. [49 CFR Part 38.25(c)]

A switch in the driver's area will operate the door. Switch will be located at or below shoulder height in a location easily accessible to the driver and suitable for frequent cycles. The door and control arms will be located above the door area.

The main service door will be designed to cycle at least 30 – 60 per hour. Door frames and hinges/pivot post are to be heavy duty construction designed to operated the above referenced cycles 12 hours a day, 7 days a week for the design life of the vehicle without failure.

The service door shall have a below floor level entrance four-step stepwell, with three steps, no turns. These steps shall be stationary; corrosion resistant steel adequately braced and an integral part of the basic structure. The height from ground to top of first step of a vehicle be a maximum of 13 ¾" and a minimum of 10". Additional step heights will be a maximum of approximately 9"; the head depth for all steps shall be a minimum of approximately 8". All steps shall be level and the risers shall be vertical or slightly angled. These steps will be equipped with steel reinforced protection to lessen curb damage.

Each step will be covered with molded rubber or vinyl. The step covering will be non-skid type tread with white or yellow nosing. The riser shall be covered or coated with scuff resistant material.

Steps will be fully recessed, enclosed and protected from weather and other elements.

Stepwell lights shall be provided and operated automatically by door control.

The entire door shall be weather stripped to provide a water and airtight seal. The door edge seals will be the over-lapping type to provide maximum sealing ability. Door sweeps or flaps will be installed on the lower edges of the doors.

The door openings shall be structurally reinforced to have the same structural integrity as the vehicle body.

Rear Emergency Door (with window) - This door shall be outward opening type, clearly marked as an exit. The dimensions of this door will be approximately 32" wide and 50" high. This door shall have an open door warning buzzer and be sealed to minimize dust and moisture entry.

This door opening shall have protective padding to prevent head injury when exiting.

The rear emergency door must have an inside latch and release mechanism and outside handle. Vehicles will have a warning device (buzzer) that indicates a locked rear emergency door. This door shall have factory installed position hold and check arm. All doors will meet ADA requirement 49 CFR 38.25 and all FMVSS requirements.

Lift Door – RH side lift door or doors –(with window) This entranceway may have either single or dual swing-out type door or doors (double doors preferred). Positive exterior latch(es) will be provided to keep lift door(s) open during lift operations.

The door(s) height extended from the floor to the top and side-to-side of the entranceway shall provide adequate clearance for the ramp and wheelchair entry (68" minimum).

This entranceway will be located forward in the right hand side of the body, across from the wheelchair securement area or in the rear of the bus, along the curbside. Please note lift position in each floor plan.

Lift door will meet all requirements of ADA 49 CFR 38.25. For vehicles 22 feet or longer, the clearance from the raised lift platform or the ramp surface to the top of the door must be at least 68 inches.[49 CFR Part 38.25(c)]

## 8. WHEELCHAIR LIFT

All lifts must meet all requirement of FMVSS 403 & 404 for public use lifts. All lifts will meet requirements of ADA 49 CFR 38.23.

The lift shall be an electro hydraulic type providing power-up, power or gravity down and power automatic fold. The power source shall be the vehicle 12-volt electrical system. The lift will be mounted within the body with access through the right hand side door or doors. Modifications for the lift installation must not affect the structural integrity of the basic vehicle.

The lift will have 9 interlocks as defined in the FMVSS 403

The lift shall have a minimum rated working load capacity of 800 lbs.

The lift will have no dirty or greasy surfaces that will contact the wheelchair occupant during normal operation.

The lift platform shall be constructed of expanded metal with a minimum usable width of 33" and minimum depth of 51".

The lift shall have the following:

A manual override to lower, raise and an emergency platform release for use in the event of power failure. Manual override handle will be able to function without interference from interior obstructions.

On lift platform operation, the lift platform shall have a device that locks in an upward position acting as a curb as the lift platform is departing the ground. This device also pivots downward upon ground contact, acting as an entry ramp. There will also be a similar safety barrier on the inboard side of the lift platform. Both barriers shall be a minimum of 6" in height.

The lift must provide either a safety belt occupant restraint system inter-locked to lift operation or an outside end barrier that locks in place before the lift platform leaves the ground more than 4". System is to reduce the chances of a lift passenger falling or rolling off the lift platform during lift operation.

Door activated power cutoff device to prevent movement of the lift when the vehicle doors are closed.

Two handrails for use by the wheelchair occupant. These rails shall automatically fold up or down with the platform movement and shall fold flat against the platform during transport.

An automatic down pressure cutoff device shall stop downward movement of the platform upon contact with any obstruction or the ground.

The lift shall have automatic controls to perform all functions. The control shall be hand held, cord mounted console control, with sufficient cord length to allow operator to control the lift from inside or outside.

Any part of the lift assembly protruding into the body that could be hazardous must be properly padded for passenger protection. Flexible end barrier meets padding requirements.

The electro hydraulic lift system shall have a monitoring device to allow for quick and easy fluid level check.

Lift systems and mechanisms must be easily accessible for repair and maintenance without dismantling and removal from body. The lift circuit breakers or fuses will be mounted near the second battery and in the battery box.

The lift will be either a S-5510, S 2010 Series Ricon, Maxon WL-7, Braun Millennium or Century Series 2, or approved equal.

The following ADA requirements apply to the Wheelchair Lift:

The design load of a lift must be at least 800 pounds, per MoDOT specifications. Working parts must have a safety factor of at least six Non-working parts shall have a safety factor of at least three [49 CFR Part 38.23(b)(1)]

Controls must be interlocked with the brakes, transmission, or door so that the vehicle cannot move unless the interlock is engaged. [49 CFR Part 38.23(b)(2)(i)]

Controls must be "momentary contact type" (meaning they require constant pressure) and must allow the up/down cycle to be reversed without causing the platform to "stow" while occupied. [49 CFR Part 38.23(b)(2)(i)]

Lifts must be equipped with an emergency backup system. The emergency backup system shall be capable of being operated both up and down without the platforms "stowing" while occupied. [49 CFR Part 38.23(b)(3)]

Must be designed so that in the event of a power failure, the platform cannot fall faster than 12 inches per second. [49 CFR Part 38.23(b)(4)]

Must have an inner barrier or inherent design feature to prevent the mobility aid from rolling off the side closest to the vehicle until the platform is in its fully raised position. [49 CFR Part 38.23(b)(5)]

Side barriers must be at least 1 1/2 inches high. [49 CFR Part 38.23(b)(5)]

The "loading-edge" (or outer) barrier shall be sufficient to prevent a power wheelchair from riding over or otherwise defeating it. If this barrier is automatic, it must close when the platform is no more than 3 inches off the ground. If the outer barrier is to be driver operated, it must have an interlock or inherent design that prevents the platform from being raised until the barrier is closed or other system is engaged. [49 CFR Part 38.23(b)(5)]

The platform surface must be slip resistant with no protrusions over 1/4 inch. [49 CFR Part 38.23(b)(6)]

The platform must be at least 33 inches wide (note - 28 1/2-inches wide is ADA minimum) measured at the platform surface and at least 33 inches wide (note – 30 inches is ADA minimum) measured from 2 inches above the platform surface to 30 inches above the surface. It must also be at least 51 inches long (note - 48 inches long is ADA minimum) measured from 2 inches above the surface to 30 inches above the surface. [49 CFR Part 38.23(b)(6)]

Gaps between the platform surface and any barrier can be no more than 5/8 inch. Semi-automatic lifts can have a handhold in the platform that measures no more than 1 1/2 inches by 4 1/2 inches. [49 CFR Part 38.23(b)(7)]

When in the fully raised position, the platform surface must be vertically within 5/8 inch of the finished floor and horizontally within 1/2 inch of the finished floor. [49 CFR Part 38.23(b)(7)]

The ramp from ground to platform (often the lowered outer barrier) must have a slope of no more than 1:8 for a maximum rise of 3 inches (i.e., if platform is 1 inch off the ground, ramp must be at least 8 inches long). If the threshold from ground to ramp (i.e., the thickness of the ramp material) is more than 1/4 inch, it must be beveled with a slope no greater than 1:2. [49 CFR Part 38.23(b)(8)]

The platform must not deflect more than 3 degrees in any direction when a 600-pound load is placed on the center of the platform. [49 CFR Part 38.23(b)(9)]

The platform must raise or lower in no more than 6 inches per second. The platform must be stowed or deployed in no more than 12 inches per second. Horizontal acceleration can be no more than 0.3 g. [49 CFR Part 38.23(b)(10)]

Components of a lift must be designed to allow boarding in either direction. [49 CFR Part 38.23(b)(11)]

Must be equipped with two handrails that move in tandem with the lift platform. Handrails must be 30-38 inches above the platform surface and must have a useable grasping area of at least 8 inches. Handrails must be capable of supporting 100 pounds, must have a cross-

sectional diameter of 1 1/4 to 1 1/2 inches, and must have at least 1 1/2 inches of "knuckle clearance." [49 CFR Part 38.23(b)(13)]

Lifts may be marked to identify the preferred standing position. [49 CFR Part 38.23(b)(12)]  
Note – these standing position markings are not specified by MoDOT, but are acceptable, if provided.

Step edges, thresholds, and the boarding edge of ramps or lift platforms, when equipped, must have a band of color that contrasts with the step/floor surface. Typically, white or bright yellow is used to contrast against dark floors. [49 CFR Part 38.25(b)]

## 9. Wheelchair Securement Area

Positive fastening retractable wheelchair lock-in devices shall be provided for each wheelchair position.

Each securement device will consist of a four point, retractable belt hold down system complete with all belts, hardware and fittings required to make a complete wheelchair securement device.

The four belts will attach to the wheelchair frame and to a series of “L” tracks securely attached to and recessed in the floor of the vehicle. Each track will allow spacing for adapting to any size wheelchair. Features of the retractors are:

- A. Single or dual steel hand-tensioning knobs on each retractor.
- B. Interchangeable between all positions.
- C. Equipped with “J” or “S” hooks.
- D. Equipped with tension release levers.
- E. Heavy-duty automatic retractors providing automatic self-tensioning and adjustment for tie down belts.

Four L-tracks shall be attached to the floor with 3/8" diameter bolts. These bolts will have adequate washers to make a secure attachment. These tracks will run the entire length (except Floor Plan BB which will run the width) of the securement location and will allow the retractors to slide to any position within the length of the track. On Floor Plan SC the shoulder mounting L-Tracks will run the entire length of the securement stations. Spacing of these tracks shall provide a safe and efficient anchor point for the retractors. Securement system will be a Q'Straint Deluxe Max, Sure-Lok Titan or approved equal.

There shall be provisions for a storage compartment for the hardware and retractors inside the bus.

Each securement area will be designated as such.

Include four 16” “Quick Straps”, or approved equal for each wheelchair location.

Easy to secure and release fully retractable seat belts and shoulder harnesses which encompass both the wheelchair and occupant shall be included for each wheelchair position. Easy to secure and release torso pads which encompass both the wheelchair and the occupant shall be included with each wheelchair position. All securement devices and lift area designs will meet ADA requirement 49 CFR 38.23. A single point quick release buckle (at hip point) shall be provided. Include one 20" lap extension for each wheelchair position.

Include one set (or combination of to make one complete occupant restraint set): Sure Lok AL 700842, FE 2000637-020-05 and FE 200732. If Q'Straint is bid, include one 6325, or approved equal.

The following ADA requirements apply to the Wheelchair Securement Area:

Vehicles in fixed route transit service over 22 feet in length (Floor Plans BB, SC and CC also with ADA option package) must have two (2) securement locations. Vehicles are to be measured from the front-most part to the rear-most item (including the bumpers). [49 CFR Part 38.23(a)]

Wheelchairs and mobility aids must be oriented as follows:

For vehicles greater than 22 feet in length, at least one securement position must be forward facing. Other securement areas can be either forward or rear facing. Note – MoDOT only specifies forward facing securement positions. [49 CFR Part 38.23(d)(4)]

Securement systems must have the following design loads:

- For vehicle with a GVWR of 30,000 pounds or more: 2,000 pounds for each strap/clamp and 4,000 pounds per mobility aid.
- For vehicles with a GVWR of less than 30,000 pounds: 2,500 pounds per clamp/strap and 5,000 pounds per mobility aid.

[49 CFR Part 38.23(d)(1)]

Securement area must be located as close to the accessible entrance as possible. [49 CFR Part 38.23(d)(2)]

A clear floor area of 30 inches wide by 48 inches long must be provided for each securement area. This can include an area up to 6 inches under a seat as long as there is a vertical clearance of at least 9 inches. If flip-seats are utilized, they cannot obstruct the required floor area. The required floor area can overlap the access path (the path of travel from the accessible entrance to the securement area). [49 CFR Part 38.23(d)(2)]

The securement system must accommodate all common wheelchairs and mobility aids (any mobility aid not exceeding 30 inches in width and 48 inches in length and weighing no more than 600 pounds when occupied) and be operable by someone with average dexterity that is familiar with the system. [49 CFR Part 38.23(d)(3)]

Securement systems must keep mobility aids from moving no more than 2 inches in any direction. [49 CFR Part 38.23(d)(5)]

The securement system must be located to be readily accessed when needed but must not interfere with passenger movement or be a hazard to passengers. It should also be reasonably protected from vandalism. [49 CFR Part 38.23(d)(6)]

A seat belt and shoulder harness must be provided for each securement position. The seat belt and shoulder harness must be separate from the securement system for the mobility aid. [49 CFR Part 38.23(d)(7)]

A sign must be provided which indicates that the securement area is to be used by persons who use wheelchairs and mobility aids. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 5/8 inch. Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with the sign's background color. [49 CFR Part 38.27(b), 49 CFR Part 38.27(c)]

10. Air Conditioning, Heating, Defrosting and Cooling - Front and Rear

Heating and Defrosting - The heating system shall consist of front unit to provide heat in the driver's, entranceway, and surrounding area. Two underseat units shall provide for passenger comfort in the rear compartment. They shall be floor or wall mounted and provide a minimum of 30,000 BTU's each. One heater will be mounted behind the rear axle and the other will be mounted just in front of the rear axle. Each heater will have it's own separate two-speed (off, low, and high) fan control (Dash Mounted).

An integral defrosting and defogging system shall keep the windshield and all windows free of frost and condensation.

The system shall be supplied with hot water from the vehicle engine. Shut-off valves shall be provided and easily access from under the hood. There will also be a heater pump to assist in hot water circulation.

Diesel engine vehicles will have a Webasto Model 2010, or approved equal, heater.

A description of the system and the BTU output will be included with all bids.

All controls shall be installed in a panel easily accessible to the driver.

Cooling - The system shall be powered by the vehicle engine and have a rated total output capacity of approximately 100,000 BTU's. All system components (body and chassis) will

be compatible with R-134A Refrigerant. Two compressors will be utilized and will be driven by a serpentine belt drive. All bolts used in mount compressors and other belt driven components will be a grade 5 or higher. No compressors will interfere with access to engine fuel filter.

Cool air distribution ducts shall be of a free-blow design. Adjustable air outlets to control and direct the flow of cooled air shall be installed for the comfort of passengers. The rear-cooling unit shall have a capacity of at least 90,000 BTU's. The rear unit will have individual temperature control and a rheostat fan control switch that provides infinite or 3-speed control (off, low, medium, high).

Chassis manufacturer's optional front air conditioning will be included. Approximately 12,000 BTU's. This system will provide cooling in the front of the bus and have adjustable outlets for the driver to control and direct the flow of air.

All hoses will be of the quick click or flex click design and will be nylon lined. (Meeting SAE J20464)

The skirt-mounted condensers will have rustproof protection mounted front and rear to prevent damage from foreign objects or material thrown from tires. System will utilize at least one 2-fan and one 3-fan condenser.

All controls shall be installed in a panel easily accessible to the driver.

Heating and Cooling Certification-The supplier must certify that the heating and cooling system they propose will be adequate for passenger and driver comfort based on interior dimensions, anticipated load, rural or urban service, and any climatic condition encountered in Missouri.

For increased circulation in the driver area, a two-speed fan (off, low, and high) with a minimum diameter of 6" shall be mounted in the driver's area (not to block view).

Roof Ventilator/Emergency Exit - Two dual purpose manually operated roof ventilator/emergency exits shall be installed in the roof of the vehicle at approximately the center of the passenger compartment. The hatches shall be 23" x 23" minimum and shall be installed so that when it is open and the vehicle is in a forward motion fresh air will be provided inside the vehicle. The hatches shall be a Transpec, Inc. Model 1075 Low profile, or an approved equal.

Ignition Cutoff - An automatic ignition circuit cutoff for heaters, defroster, and air conditioning shall be provided.

#### 11. Chassis and Body - Requirements and Performance

The chassis, fully loaded and equipped body, must provide proper weight distribution. The front and rear weights must not exceed the chassis manufacturer's gross axle weight rating.

Front Section, Exterior - Shall have manufacturer's standard grill; grill frame, lamp

moldings, etc.

Front Section, Interior - Manufacturer's standard.

### Lights and Signals

Exterior - High and low beam halogen headlights, parking, tail, stop, backup, front and side marker lights or reflectors, license plate, hazard warning flashers and directional signals. There will also be a reverse or back-up alarm and third center-mounted brake light. Two 6" diameter (minimum) strobe lights will be located on the rear end cap of the bus and will be activated with a dash-mounted switch. A pilot light will indicate activation. Stop, turn, and tail lights will be LED design.

Interior - Instrument panel, front and rear overhead lights, and all doors. Overhead lighting activated by a dash-mounted switch, shall provide lighting intensity at a reading level. All door lights and RH front door stepwell shall illuminate automatically when doors are open. All vehicles shall have priority seating signs as required by ADA requirement 49 CFR 38.27. All body manufacturing installed switches shall be a push-pull or heavy-duty rocker type. Emergency door will have signage and lighting that meet FMCSR 393.92.

All interior lights shall be adequately recessed so as to not be a hazard to occupants. Interior light fixtures shall be operable with or without engine running. All interior and exterior lighting will meet ADA requirement 49 CFR 38.31.

Lighting of at least 2 foot-candles, measured on the step treads or lift platform, shall be provided in the step well or doorway immediately adjacent to the driver. Lighting shall activate when the door is opened. [49 CFR Part 38.31(a)] Other step well and doorways shall have similar lighting at all times. [49 CFR Part 38.31(b)]

Lighting of at least 1 foot-candle shall be provided outside all doorways to illuminate the street surface for an area up to 3 feet perpendicular to the bottom step tread outer edge. Lighting shall be located below window level and shall be shielded to protect the eyes of entering and exiting passengers. [49 CFR Part 38.31(c)]

All interior wiring shall be insulated and covered.

Instrument Panel and Instruments - Standard panel with gauge instrumentation for tachometer, fuel, engine temperature, oil pressure, alternator, speedometer, odometer, and air pressure.

Include locking overhead driver's storage compartment.

Horns - Dual electric.

Mirrors, Rearview - Interior, to provide the driver a view of the passenger area. (Approximate 8" x 20).

Mirrors, Rearview Exterior (RH & LH) - Adjustable type, approximate size 7" x 10". The mirrors must be mounted so as not to obstruct the driver's front or side vision. There will be smaller convex mirrors (RH,LH) mounted integrated. (6-8"width). Mirrors will be heated and will have power adjustment controls in the driver's area.

Windshield Wiper and Washer - Electric, two-speed with intermittent wipe and mist option.

Vehicle will also be equipped with a voltage sensitive Pentax fast idle control solenoid, InterMotive, or approved equal, manufacturer standard fast idle will also be acceptable. Application of the parking brake is not required for operation of the system.

Sun Visor

Radio – Chassis or Body Manufacturer's Standard AM-FM radio.

Other Body and Chassis Features - Include audible back-up alarm, center mounted stoplight, side turn signal indicators, front and rear mud flaps, cruise control, tilt steering wheel, and front tow hooks.

Engine – Diesel – In-line 6 cylinder or V-8 diesel 210 horsepower minimum. The engine shall be equipped with a turbo charger and electronic fuel injection, full flow replaceable spin on oil filter, and dry type air filter, external oil cooler and 1000-watt engine block heater for cold weather operation. The engine compartment will also have extra insulation to provide sound deadening qualities for additional passenger and driver comfort. This engine will meet current emission standards.

Cooling System - Heavy duty or maximum cooling radiator with overflow recovery reservoir and permanent type anti-freeze installed to protect the vehicle to at least 20 degrees below zero. This system will be capable of keeping engine within operating temperature while in transit service.

Transmission - Automatic, Allison, or approved equal manufacturer's standard, 6-speed with an exterior oil cooler, filter, and parking position.

Alternator(s) - Minimum of 270 amperes. All mounting bolts will be grade 5 or higher.

Batteries (2) – Manufacturer's Standard. HD with adequate CCA and reserve capacity (Minimum 625 CCA each) for operating bus and wheelchair lift components. Batteries to have emergency disconnect switch located in driver's area.

Steering - Power. Include factory tilt wheel and cruise control.

Brakes - HD power, front wheel disc and rear drum, or four wheel front and rear disc system.

Axle, Front - Minimum of 10,000 lb. capacity.

Axle, Rear - Minimum of 17,500 lb. capacity, ratio approximates 4.5 to one. Ratio to provide an approximate maximum road speed at 65 mph at maximum governed engine speed.

Drive Shaft Guard(s) - Minimum requirement, one for each drive shaft section (FMCSR 393.89).

Springs, Front - Heavy-duty leaf. Rated for axle capacity.

Springs, Rear - Heavy duty. Rated for axle capacity. Springs to meet GVW requirements of vehicle. Include (2) two GVW rated air bags, reservoir tank and engine mounted air compressor, and Bendix air dryer for the air system (or approved equal). Air compressor may be electric powered

Shock Absorbers - Heavy Duty front and rear

Exhaust System -To be discharged out driver's side.

Fuel Tank or Tanks - Minimum total capacity of 40 gallons with outside fill spout.

Tires and Wheels - The wheels will conform to the tire and rim association standards. Wheels to be covered with stainless steel covers. The bus shall be equipped with a single piece molded, ventilated type disc wheel with 8-hole stud mounting. All wheel rims shall have the same offset and shall be fully interchangeable with all wheel positions on the bus. One spare wheel rim and tire will be provided with each vehicle delivered. Spare tire and wheel will be mounted under vehicle unless weight or fuel tank location is an issue. Wheel size will be 22.5 x 7.5. Tires will be mounted so ALL air pressure can be easily checked. Tire valve stem extensions will be installed so operators can check tire pressure of BOTH rear dual tires with gauge while kneeling by rear tires.

Bumpers - Front and rear heavy-duty chrome, stainless steel, or painted. The rear bumper ends will be positioned close to the body to minimize catching fixed objects as the bus moves forward in turns.

Undercoating - The entire body understructure and chassis shall be covered with a long lasting undercoating material. Automotive quality undercoating will not be acceptable. Undercoating not interfere with OEM requirements.

Safety Equipment - New unit to have all standard safety equipment required by laws and regulations.

Emergency Equipment - A fire extinguisher certified for this type vehicle (minimum 5 lb. 10-BC type) and a 16-unit first aid kit shall be provided as well as an emergency seat belt cutter. Three reflective bi-directional triangles shall also be provided. (Tri Alert or approved equal). These emergency items shall be securely mounted (can be shipped loose) in the

driver area and easily accessible. Vehicle will also have an assortment of fuses used in vehicle body or chassis electrical.

Each vehicle will have a blood borne disease kit including the following items:

- A. Latex gloves
- B. CPR mask
- C. Goggles
- D. Apron
- E. Disinfectant wipes
- F. Absorbent and scoop
- G. I.D. tag and red plastic bag

First aid kits and bloodborne pathogens kits will be provided in durable metal or plastic and weather tight boxes.

12. Options:

Include as an option on all floor plans. Safety Vision SV 5000, Backing Vision BV 1350, (or approved equal) backing vision system.

Include as an option an overhead storage compartment (with netting) located on the driver's side above the ambulatory seating. Streetside is first choice, curbside is acceptable if streetside location interferes with securement area.

ADA Option-Include pricing for the following items List as one price for the entire package- Internal and external PA speaker system that meets ADA requirement 49 CFR 38.35, Passenger signal system (audible and visual) that shall alert the driver to a stop request. This system will be accessible to ambulatory and non ambulatory passengers on each side. This system will meet ADA requirement 49 CFR 38.37. If pull cords are used, they shall be made of vinyl coated cable. Destination Signs-Front and side destinations that meet ADA requirement 49 CFR 38.36. They shall be 12 volt, LED design, programmable and capable of 2-line messages. Luminator Vista, Twin Vision Mobil Lite, or approved equal.

Vehicles in excess of 22 feet used in multiple-stop, fixed route service (Floor Plans BB and SC with ADA option package) must be equipped with a public address system. [49 CFR Part 38.35(a)]

For vehicles in excess of 22 feet where passengers are permitted to exit at multiple stops at their option (Floor Plans BB and SC with ADA option package), a "stop request" control must be provided adjacent to the securement locations. The system shall provide both auditory and visual indications that the stop has been requested. Controls shall be located from 15 to 48 inches above the floor, shall be operable with one hand, shall not require tight grasping, pinching, or twisting of the wrist, and shall be activated by a force no greater than 5 lbf. [49 CFR Part 38.37]

If destination or route information is displayed on the exterior of a vehicle (Floor Plans BB and SC with ADA option package), illuminated signs shall be provided at the front and boarding side of the vehicle. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 1 inch for signs on the boarding side and 2 inches for front "head signs." Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with background color. [49 CFR Part 38.39]

13. The following must be furnished and included with your bid:

A complete detailed listing of the vehicle, requested drawings and modifications of the equipment to be furnished.

A detailed drawing, showing interior floor plan, dimensions and seating arrangements.

A guarantee that the chassis and body manufacturer's warranty will be in effect at the time of delivery and acceptance. Chassis and body warranty to be minimum 2 years, 50,000 miles.

A copy of the warranty on the air conditioning, heating, alternator, and lift. These warranties shall be minimum of 2 years, 24,000 miles

Descriptive literature and detailed specifications for the lift system.

Priority seating signs that meet ADA requirement 38.27

The bidder will also supply with the bid:

- Complete Altoona Federal Bus Testing Report
- An itemized list of domestic produced parts or components used in the manufacturing of the vehicle.
- The estimated cost for each item listed
- The estimated total percent of domestic components used in manufacturing of the vehicle.
- Final assembly process & activities at assembly point.
- A statement of FMVSS compliance
- A statement of FMVSS 210 seats
- A description of heating/defrost /air conditioning and BTU output.
- A certification that heating/cooling is adequate

14. The following shall be furnished with each vehicle at time of delivery:

A parts book and a maintenance service manual for all add-on equipment used in

modification

An operator's manual for the basic chassis and other systems.

A detailed body manufacturer's Owner's manual, including all wiring diagrams will be supplied at delivery of each vehicle.

A schematic of any installed wiring shall be furnished with each vehicle delivered,

MSO and title application will be provided at delivery. MoDOT will be shown as the lien holder and the end user agency will be shown as owner.

A documented leak-free water test performed prior to delivery

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