MISSOURI DEPARTMENT OF TRANSPORTATION
ADULT PASSENGER NON-SCHOOL BUS TYPE VEHICLE SPECIFICATIONS
NARROW BODY CUTAWAY

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 for ambulatory and non ambulatory adult passengers.

2. Chassis types - Cutaway Vans, Commercial Cutaways or R.V. Cutaways, 2015 or 2016 model year, General Motors 11,500 GVW, Ford Super Duty 11,500 GVW (60% minimum domestic content, final assembly process in USA) or approved equal (Approximately 138" w.b.). Floor Plan QQ will be on a 158" W.B. and have a GVW of 12,500. If for any reason a 2015 model cannot be supplied a 2016 model must be furnished at quoted bid price, (when the successful bidder failed to order a chassis in time).

   These vehicles shall be tested at the FTA's Altoona Bus Testing and Research Center and the testing report submitted to the Missouri Department of Transportation with the bid. These vehicles will also meet all current Federal Motor Carrier regulations at time of manufacture.

   MoDOT reserves the right to conduct in-plant inspections.

3. 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. Drip rails will be 3/4" or more in width. Each vehicle will be thoroughly water tested before delivery. Maximum exterior width when measured from outside body edges will NOT exceed 88" (not including flares) Decals and all forms of dealer advertising will not be allowed.

   Wheel flairs - Wheel flairs shall be of metal construction or thick reinforced fiberglass to resist breakage from ice and snow thrown off tires and from the wheelwell.

   Vehicle shall be warranted against any paint rust-through for minimum three years from the date of delivery to the end user.

Vehicle will have a complete application of undercoating that will not interfere with OEM requirements.

4. Body Interior Construction - The inner construction must provide protection to passengers regardless of where they are seated. Interior height shall be minimum of 70”

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).

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 vibration.

Side and End Panels - To be complete on all doors, sidewalls and rear end.
Panels shall conform to Federal Motor Vehicle Safety Standards and meet all static load test requirements. All materials used in the interior of the vehicle shall meet or exceed all aspects of FMVSS 302.

Floor and Floor Covering - The entire floor except driver area shall be made level with marine grade plywood or fiberglass re-enforced 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 floor covering. All seams will be heat welded. Heat welding only applies when mating of similar surfaces. There will also be an aluminum polyethylene or galvanized steel, belly pan located under the floor to prevent moisture entrance. Fiberglass re-enforced plywood is also acceptable.

The floor may have exposed rear wheel wells. 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 will meet ADA requirements 49 CFR 38.25. Flooring in securement area will meet ADA 49 CFR 38.25 for slip resistance (anti-skid throughout).

There will also be a standee line in aisleway that meets Federal Motor Carrier Safety Regulation 49 CFR 393.90.

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

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 with a molding securely attached or quality waterproof seal.

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

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. Some portion of this handrail / stanchion system must be able to be grasped from the outside of the vehicle to assist persons as they start to board. Door-mounted grabhandles are not necessarily required as long as a person can grasp the handrail / stanchion system when standing outside the bus.

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 side wall by a guardrail approximately 30" above the floor. The stanchion and guardrail shall not impair the driver's seat adjustment. Two stanchions with modesty panels behind the driver’s seat are also acceptable.

A solid material modesty panel shall be provided with the entry door stanchion and guardrail (right hand front seat only).

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

There will also be two overhead grabrails mounted securely above the passenger aisleway. These grabrails will meet ADA requirement 49 CFR 38.29 (one grabrail is acceptable if there is overhead storage).

Stepwell Grabrails-There will be two parallel mounted grabrails located along the entire length of the stepwell. The left side grabrail will be mounted to the entrance door frame, or floor, on the lower end and to the floor to ceiling stanchion on the upper side. The right side grabrail will be mounted to the door frame, or floor, on the lower end and then securely mounted to either a floor to ceiling stanchion or mounted to steel on the upper windshield frame. These grabrails shall be approx. 18” in length. All handrails, grabrails, and stanchions will meet ADA requirement 49 CFR 38.29.

All stanchions guardrails, grabhandles, and grabrails will be mounted to the floor or ceiling with at least four screws, or with at least two screws that are attached to steel mounted backing plates.

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)]

Seating - See Floor Plans MM,OO,PP,QQ and SS. The arrangements shall provide seating as shown on the appropriate floor plan.

The driver's seat shall be a power adjustable (vertical and horizontal) high-back bucket type with full depth foam padded seat cushion and backrest covered with a high-quality level 3 cloth material. There will be an armrest on the right hand side and the back shall be adjustable. The co-pilot’s seat can be manually adjustable and vinyl covered.

If the driver's seat must be passed by a wheelchair user, the pedestal shall not extend into the aisle or vestibule beyond the wheel housing, to the maximum extent practicable. [49 CFR Part 38.29(e)]

The conventional type two-passenger seats shall be a minimum width of 35" and spaced on a minimum of 29" centers.

All one-passenger seats shall be 17" wide and shall be on 29” centers. (Mid back height). No exceptions will be allowed in seat spacing or width.

All two-passenger seats shall be a minimum depth of 16", the backrests shall be a minimum thickness of 2". All seats frames will be painted or powder coated.

All two-passenger seat cushions and backrests shall be covered with a minimum level 3 grade vinyl materials. 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. Mid-back style seats manufactured by the Freedman, C. E. White Seating Company, American Seating, (or approved equal) will be preferred type. All seats will meet or exceed the requirements of FMVSS 210.

All passenger seats will have folding armrests on the aisle sides.

The walk-through aisle between right and left hand seats shall be a minimum of 14 inches.

Interior components shall be of a neutral color or color keyed to the vehicle’s exterior color.

The driver and all passenger seats shall have best quality seat belts and retractors properly located and easily accessible. The driver's seat belts shall have minimum usable length of 60" measured from the seat cushion to the buckle. All seat belts on the vehicle will have the same size male and female ends. The passenger seat belts will have to be designed to encircle the largest of individuals (minimum usable length of 60"). All seating positions will have 60" seat belts with under seat retractors (no traveling retractors). The permanent front seats will be designated as priority seating. Include three (3) 12” (minimum) seat belt extenders that will connect to at least two of the belt styles installed on ambulatory seating.

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)] The priority seating sign may be shipped “loose” from the factory bus must be affixed prior to delivery to the end-user.

Fold-A-Way Type Seat Requirements: (If required)

Fold-A-Way seats shall meet all dimensional, structural and testing requirements of the standard seat specification. All fold-a-way seats will be two passenger design.

All fold-away seats shall be forward facing and fold against the wall when wheelchair space is required. Any hardware used to attach these seats to the floor shall be recessed to prevent stumbling and tripping.

In the folded position, the seat may extend into the bus aisle 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, mounted maximum 12” from wall.

Fold-a-way seats shall be Braun Series 5, Freedman 3 step Fold Away, C. E. White model 35, American seating E-Z fold, or approved equal.

Floor plans MM through SS will have one integrated child seat that will accommodate children between 20 and 60 lbs in weight. For floor plans, MM, and OO this seat will be of a fixed two-passenger design and for floor plans PP QQ and SS it may be on a fixed single seat. Child seats on all vehicles will be placed toward the rear of the vehicle, but not on the back row. Freedman ICS, American seating ICS, or approved equal will be acceptable.

Floor plans MM through SS will have at least two seating positions that meet the FMVSS 225 latch system requirement for child safety seats. They may be located on fixed seats and must be designated safety seat locations. The preferred location of these positions will be on the aisle side of two-passenger seats. All FMVSS 225 seating positions will have 60” non-retractable lap belts for each position.

Standard fold-a-way seats are acceptable over wheelwell.

Fold-A-Way seats mounted over wheelwells may have non-retractable seat belts in lieu of retractable seat belts.

Floor Plan Descriptions-

> FLOOR PLAN MM-this plan will provide ambulatory seating
> For 12 passengers, including front seat. (Four 2-passenger
> seats on driver’s side and three 1-passenger seats curb side) .

FLOOR PLAN OO-this floor plan will provide one wheelchair position and seating for 9 ambulatory with an occupied securement location. The wheel chair securement floor track will run the width (laterally) of the securement position. There will be a fold-away seat located in the wheelchair position to be used if there is no mobility aid. Passenger capacity will be 11 if the securement location is unoccupied. Lift and lift door will be located curbside at the rear of the vehicle. (Note location of entrance door)

FLOOR PLAN PP-this floor plan will provide two wheelchair positions with four 2-passenger fold away seats located along the driver's side. The passenger side will have two one-passenger seats and a lift door. Total capacity with 2 wheelchairs is 5 ambulatory, for a total of 7. Total capacity with no wheelchair is 11. This floor plan may only accommodate 3 ambulatory and 2 wheelchairs if the wheelchairs are of a larger size. Note location of the entrance door on diagram.

FLOOR PLAN QQ- Three one passenger fixed seats are located behind the stepwell. This floor plan will provide two wheelchair positions with ambulatory seating for 11. There will be four two-passenger fold away seats located at The wheelchair positions. The lift will deploy out the rear of the bus. (Note location of entrance door on diagram)

FLOOR PLAN SS-This floor plan will provide two wheelchair positions with four 2-passenger fold-a-way seats located along the driver's side. The curbside will have three one-passenger seats and the lift door. Capacity with 2 wheelchairs allows 5 ambulatory, for a total of 7 passengers. Total capacity with no wheelchairs is 11. This floor plan may only accommodate 3 ambulatory and 2 wheelchairs if the wheelchairs are of a larger size. Note - No co-pilot seat by driver.

If there is a conflict between the written specification and the floor plan diagram, the written narrative controls.

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

Passenger side windows shall be provided throughout the passenger area. These windows will be a horizontal opening type that easily open and close. 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 emergency exits will be clearly marked. A full-length drip molding of at least 3/4" will be installed over each passenger window opening.

The driver position, on buses with right hand front entrance door, 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.

The emergency rear door shall have an upper and lower fixed glass.

There will be glass on each side of the emergency door, approximately 24" x 24" or 7" 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.

All side windows will have inside latches for security.

All windows, doors, and windshield will be installed to keep water and dust leakage to an absolute minimum. Proper sealing during installation is essential.

6. Doors

One door RH, or two doors LH and RH acceptable.

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

Entrance RH - Main service door may be either forward folding, in-out or out-out opening type. This door shall provide headroom with a minimum of 72" entrance height from the top of the first entrance step to the door headliners. The minimum width shall be a 24". The top of the 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.

All vehicles will have an electrically operated door. The electric door will also be forward folding, in out or out-out opening type. This door will be operated by a switch from the driver’s area. There will also be a key activated switch on the exterior of the bus so the door can be opened from the outside (RH fender mount). The door and control arms will be located above the door area, not beneath the stepwell.

Either door shall have a below floor level entrance stepwell, with a minimum of two steps. These steps shall be stationery, corrosion resistant steel adequately braced and be an integral part of the basic structure. The height from ground to top of first step of empty vehicle be a maximum of 13-1/2" and a minimum of 10". Additional step heights will be a maximum of 11", the head depth for all steps shall be a minimum of 8". All of the steps shall be level and the risers shall be vertical or may be slightly angled.

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.

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

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)]

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

A stepwell light shall be provided and automatically operated 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 lower edge.

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

<u>(If Required) REAR or RH side lift door or doors</u> (with window)- This entranceway may have either single or dual swing-out type door or doors. <u>Positive exterior latching mechanism will be provided to keep door(s) held open during lift operations.</u>

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. (56" minimum for vehicles less than 22 feet in length)

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. The lift door may have either single or dual swing-out type door or doors (double doors preferred). Positive exterior latch(es) will be provided where doors can be opened back against the body of the bus to keep lift door(s) open during lift operations. For those doors that either open past the rearmost corner of the bus or open into passenger doors, then such doors shall be held open by a gas cylinder.

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.
- For vehicles less than 22 feet, the overhead clearance must be at least 56 inches. [49 CFR Part 38.25(c)]

The entranceway shall be protected from weather and other elements and be padded to prevent head and other injuries to passengers when exiting or entering.

Rear Emergency Door - 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 will be sealed to minimize dust and moisture entry. A red light will be installed to meet Federal Motor Carrier Safety regulations 49 CFR 393.92. (this door not required on plan QQ)

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. This door shall have factory installed position hold and check arm. All doors will meet ADA requirement 49 CFR 38.25. Vehicles will have a warning buzzer that indicates a locked rear emergency door. Emergency door will have an inside lock. This warning device will meet all FMVSS requirements.

Door Lock System - The bus shall have a security door lock system for all doors.

7. Wheelchair Lift

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 load door or doors (rear door access on Floor Plan QQ).

Modifications for lift installation must not affect the structural integrity of the basic vehicle. Main power source for lift will be protected by fuses or breakers.

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

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 a minimum depth of 51".

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 wide 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)]

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)]

The lift shall have the following:

Meet all aspects of FMVSS 403 & 404 for public use lifts

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)]

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)]

A manual override to lower, to raise and an emergency platform release for use in the event of power failure. The manual handle shall be able to function without interference from seats, etc. on bus.

The lift will have nine interlocks as defined in FMVSS 403.

On lift platform operation, there will be a device that locks in an upward position acting as a curb as the platform is departing ground level and 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.

Lift 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)]

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

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

Lift 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)]

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. Manufacturer's flexible end barrier meets this requirement.

The electrohydraulic lift system shall have a monitoring device requiring no tools to allow for a quick and easy fluid level check.

The lift system 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 a S-5510, S2010, series Ricon, Maxon W-L7, Braun Millennium or Century Series 2, or approved equal.

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 <u>before</u> the lift platform leaves the ground more than 3". Either system is designed to reduce the chances of a lift passenger falling or rolling off the lift platform.
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)]

Descriptive literature and detailed specifications must be included with your bid. All lifts will meet requirements of ADA 49 CFR 38.23.

8. Retractable Wheelchair Securement System

Vehicles in fixed route transit service 22 feet and under (Floor Plan OO with ADA option package) must have one (1) securement location. Vehicles are to be measured from the front-most part to the rear-most item (including the bumpers). [49 CFR Part 38.23(a)]

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)] Note – the sign may be shipped “loose” from the factory but must be affixed prior to delivery to the end-user.

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.
- For vehicles 22 feet in length or less, the one required position can be either forward or rear facing. Note - MoDOT only specifies forward facing securement positions.

[49 CFR Part 38.23(d)(4)]

Each wheelchair tie down securement area shall be equipped with a minimum of four (4) wheelchair restraint securement belts designed to meet all ADA structural requirements and 30 mph / 20g-force impact.

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)]

The wheelchair securement tie down belts shall be retractable into a protected steel housing to eliminate the need for belt cleaning and storage. The belt housing and mechanical retractor shall be designed for a minimum five (5) year life. Belts will incorporate a S-hook or J-hook design to secure belts to the mobility aid. Include four (4) 16” "quick straps", or approved equal, for each securement location.

The location of the rear belts shall be positioned to allow the driver to secure the wheelchair frame between the rear wheelchair wheels. The retractable belts shall feature positive locking mechanisms. The belts shall be equipped with a release tab to release tension on the belts when unfastening the wheelchair and to take up the excess belt when securing the wheelchair.

The retractable belts shall feature positive locking mechanisms. All belts shall have automatic tensioners. Once the front belts have been attached to the wheelchair frame, a hand tensioned know attached to the belt housing shall be applied to bring the wheelchair passenger and wheelchair into a state of securement. All belts shall be designed for a minimum five (5) year life.

All belts may also utilize a flush floor mount L-Track with flanged edges for securement to the floor. There are to be four tracks running the entire length of the securement area. The spacing of these tracks shall provide a safe and efficient anchor point for the retractors. Sure-Lok Titan or Q Straint Deluxe tie-downs are an "approved equal".

The wheelchair occupant restraints shall be FMVSS Type II (combination lap and shoulder belt) with an adjustable height shoulder belt featuring a single-point release buckle for quick release. This system will also be fully retractable. Include one 20" lap belt extension for each wheelchair position.

On Floor Plans PP, QQ and SS the shoulder L-Track mounting will run the entire length of both wheelchair securement locations.

The restraint system shall be designed, configured and installed to accommodate the greatest possible variety of wheelchair designs and sizes. There will be wall-mounted pouches for storing all belts and tie-downs.

Use of the restraint system under normal conditions shall not cause any damage to the mobility aid.

Include one set of the following (or combination of to make one complete occupant restraint set) Sure-Lok AL700842, FE 200637-020-05 and FE 200732, Q-Straint 6325AT or approved equal for one wheelchair position.

All belts and belt anchor points shall comply with FMVSS 210 and FMVSS 222.

Easy to secure and release torso pads which encompass both the wheelchair and occupant shall be included for each wheelchair position. All securement devices and lift area designs will meet ADA requirement 49 CFR 38.23.

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

Heating and Defrosting - The heating system shall consist of front units to provide heat to the driver's, entranceway, and surrounding area. Underseat unit will provide for passenger comfort in the rear. It shall be floor mounted and provide a minimum of 30,000 BTU's. Rear unit will be floor or wall mounted and mounted near the center of the passenger rear compartment behind rear wheel wells. No non-OEM heaters will be mounted in front of the passenger compartment. The rear heater is to have a two-speed fan switch (off, low, high). Mounting will not interfere with any wheelchair or occupant securement devices.

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 (single or dual) shall be provided and easily access from under the hood or body and be clearly labeled.

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 42,000 BTU's. All system components (body and chassis) will be compatible with R-134A Refrigerant. All bolts used in mounting and securement of the compressor will be a grade 5 or higher. Refrigerant hoses clamps and fittings will be constructed to meet or exceed SAE specification J2064 Type D. Type C hoses, fittings and clamps are acceptable as long as they meet or exceed SAE specification J2064. The clamps will be of a quick click or flex click design (or approved equal) to ensure coupling integrity. All aftermarket air-conditioning lines will be nylon coated. The roof mounted unit will be positioned lengthwise on floor plan QQ.

Free-blow cool air distribution shall be mounted overhead of the passenger seats. Adjustable air outlets to control and direct the flow of air shall be installed for the comfort of passengers. The rear-cooling unit shall have a capacity of approximately 30,000 BTU's. This rear-cooling unit will have a 3-speed fan control switch (off, low, medium, and high). Unit will be roof mounted and located at the rear of the passenger compartment. Air circulation ducts will be provided to give passengers in rear of bus full comfort. Free blow units may be utilized provided they do not interfere with lift area headroom.

Chassis manufacturer's 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.

The skirt-mounted condenser will be protected from debris thrown from tires by rustproof shields. There will be two shields, one located at the front and one located at the rear of the condenser.

All controls for fan speed and temperature shall be installed in a panel easily accessible to the driver.

For increased circulation in the driver area, a two-speed fan (off, low, high) with a minimum diameter of 6" shall be mounted on the dash. The three-position control switch will be located on the dash panel. This fan will be mounted in dash area and will not block driver’s view.

Roof Ventilator/Emergency Exit - A dual purpose manually operated roof hatch ventilator/emergency exit shall be installed in the roof of the vehicle at approximately the center of the passenger compartment. The hatch shall be 23" x 23" minimum and shall be installed so that when it is open and the vehicle is in a motion fresh air will be provided inside the vehicle. The hatch shall be a Transpec, Inc. Model 1000 regular profile Dual Purpose Safety Vent, Transpec Model 1075 Low profile or an approved equal. Econo Model not acceptable.

Heating and Cooling Certification - The supplier must certify that the heating and cooling system he proposes to use will be adequate for passenger and driver comfort based on interior dimensions and anticipated passenger load regardless of any temperature extreme encountered in Missouri. These comfort levels will also be maintained when the vehicle is operated in either rural or urban service.

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

10. 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' gross axle weight rating.

Front Section, Exterior - Manufacturer's standard grill; grill frame, lamp moldings, etc.

Front Section, Interior - All items regularly furnished as standard by the manufacturer.

Wheel flairs - Wheel flairs shall be of metal construction or thick reinforced fiberglass to resist breakage from ice and snow thrown off tires and from the wheelwell.

Color-Base color to be white. No bus will be painted school bus yellow.

Lights and Signals

Exterior - High and low beam 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.

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)]

Stop, tail, and turn lights will be of 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 and red emergency exit lights that meets FMCSR (Federal Motor Carrier Safety Regulations) 49 CFR 383.92.

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 38.27.

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)]

There will be two red strobe type lights mounted on the upper rear end cap of the vehicle (not roof mounted). They will be 6" minimum in diameter.
These two red strobe lights will be activated only by a dash-mounted switch with a pilot light to indicate activation.

All interior wiring shall be insulated and covered.

Instrument Panel and Instruments - Standard panel with gauge instrumentation for fuel, engine temperature, oil pressure, alternator, speedometer and odometer. All switches installed by body manufacturer will be a heavy-duty type. (push pull or rocker)

Horns - Dual electric.

Mirrors, Rearview - Interior, adequate size to provide the driver a full view of the passenger area (approximate 6" x 12", 8" convex is acceptable).

Mirrors, Rearview Exterior (RH & LH) – One piece or two-piece. Power adjustable heated type, approximate size 7" x 10". The mirrors must be mounted so as not to obstruct the driver's front or side vision. Convex mirrors of 5" in width will also be installed (RH and LH). Also include an 8" convex mirror mounted on the left-rear corner of vehicle to allow for a view directly behind bus. Mirror bolts will be grade 5 or higher. These mirrors will not vibrate during operation. OEM mounting is acceptable.

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

Tilt Steering Wheel and Cruise Control - Include in your bid price.

Sun Visor - For driver.

Storage Compartment – For personal items and/or valuables, a key-lockable storage compartment will be located immediately above the driver's seat.

Radio - Chassis manufacturer's standard.

Engine - Gasoline V-8 or V-10 engine acceptable as long as minimum of 275 hp, providing necessary horsepower and torque at governed R.P.M. for road speed and grade ability. The engine shall have a full flow replaceable or spin on type oil filter. The air filter shall be a dry type. The engine shall be equipped with oil cooler. Ford Chassis to include Super Duty service package and will have the V-10 engine

Vehicle will be equipped with a Pentax or InterMotive fast idle control solenoid, or approved equal. Fast idle will activate during low voltage conditions with or without the parking brake activation.

Exhaust System - Exhaust to be discharged out driver's side on Floor Plans OO, PP, QQ and SS.

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 F below zero.

Transmission - Automatic, 4-speed or 5-speed with an electronic shift control, auxiliary exterior oil cooler and overdrive.

Alternator(s) - Minimum of 220 Amps cold. All mounting bolts will be grade 5 or higher. (May require dual alternators)

Batteries (2) - HD with adequate CCA and reserve capacity (Minimum 600 CCA) each for operating chassis and wheelchair lift components. One battery will be relocated so access can be gained through a door on the passenger side of the bus. Battery will be mounted on a slide out-tray to allow easy access. This tray will be sealed to prevent road debris from entering but also vented well enough to allow gases to escape. Stepwell mounted batteries are also acceptable.

Steering - Power.

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

Axle, Front - Minimum of 4,000 lbs. capacity.

Axle, Rear - Minimum of 5,500 lbs. capacity, ratio 4.10/1 or 4.56/1 with Mor Ryde suspension system (or approved equal)

Drive Shaft Guard(s) – One for each section. (FMCSR 393.89)

Springs, Front - Heavy-duty coil or leaf with a stabilizer bar.

Springs, Rear - Heavy duty, leaf type, with stabilizer bar.

Shock Absorbers- Heavy duty, front and rear.

Fuel Tank or Tanks - Minimum capacity 33 gallons with outside fill spout.

Tires and Wheels - The tires and wheels will conform to the tire and rim association standards. They will be factory installed by truck manufacturing assembly. Acceptable tire makes will be those listed as being available in the tire section of manufacturer's Truck Data Book on specification date.

Mud Flaps - For both front and rear wheels.

Tires - Tires will be a major brand (not Firestone), factory installed, metric sized, and meeting manufacturer's specifications. Seven (front, rear and spare), approximate size 225/75R 16E blackwall tubeless or tube type highway tread. Spare tire and wheel will be furnished. Spare tire is to be permanently mounted under vehicle (unless crash standards, vehicle weight limits or fuel tank placement are issues). All tires including spare to meet or exceed GVW requirements, and be of radial design. A jack (rated for vehicle GVW) and all tire changing tools will be included with vehicle. Tire changing tools may be securely mounted anywhere in the passenger compartment, as long as they do not impede operation or safety. The jack and tire tools may be chassis supplied OEM. Tire size may be 225/75R 16D, 8 ply rating. Tires will be mounted so air pressure can be easily checked on ALL tires. Tire valve stem extenders will be installed so operators can check tire pressure on BOTH rear duals with gauge while kneeling by rear tires.

Wheels- Seven (7) disc with size and capacity to match load-carrying requirements of tire to vehicle.

Bumpers - Front and rear. The rear bumper ends will be positioned close to the body to minimize catching fixed objects as the bus moves forward in turns.

Running Boards – Vehicle will be equipped with one (1) or (2) two 11" wide by 36" long aluminum running boards mounted at OEM door locations. They will be a minimum of 1/8" thick and will have a diamond embossed or other anti-slip design on the footing area. This running board will be securely mounted with at least 3 braces that will be made of galvanized steel to resist rust. A non-skid expanded metal will be installed on the entire step surface to prevent slipping. Diamond embossed only will not be acceptable.

Safety Equipment - Unit will have all the latest 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 with contents recommended for this type and capacity vehicle shall be provided. Three reflective bi-directional triangles with 3 LED warning lights (Tri Alert or approved equal) shall also be provided. The fire extinguisher shall be mounted on the floor near the entrance stepwell. The first aid kit and blood borne pathogen kit shall be mounted to the interior front bulkhead. Also include an assortment of spare fuses used in chassis and body components along with an emergency seat belt cutter.

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

All first aid and blood-borne disease kits will be packaged in a durable hard plastic or metal case.

11. Options - Indicate pricing for these options on each floor plan.

A. Safety Vision SV 5000, Backing Vision BV 1350, Angeltrax GDA-7010 (or approved equal) backing vision system.

B. Include as an option with all floor plans. Four (4) camera video recording system, recorder with minimum 500 GB capacity hard drive storage – REI DR 40 DVR, Safety Vision SVR 4108, Apollo RR-HRH4, Angeltrax HDX, Plustek Mobile VX-C580, Seon TL4 (or approved equal). Recorder to be housed in a protective enclosure. Driver panic button to mark event(s) for retrieval and retention. Cameras mounted to record audio and video of 1) entrance steps; 2) driver area; 3) passenger area looking from front to back;

and 4) backing camera input. If the backing vision option is not ordered, then mount a camera made for external applications at the rear of the vehicle with the same view as a backing camera. Interior cameras shall be dome-type with integral microphones capable of at least 20 frames per second with lens focal length of 4.0 – 6.0 mm and a resolution of 1280 x 800 pixels or better.

C. An overhead storage shelf (with netting) that is located above all ambulatory seating on the driver's side. Street side is first choice, curbside is second choice only if street side placement interferes with securement area.

D. ADA Fixed Route Option-Include on Floor Plan OO. List as one price for the entire package.(Do NOT price out this option if the vehicle you intend to supply will exceed 22' in length.) Internal and external PA speaker system that meets ADA requirement 49 CFR 38.25. Passenger signal stop request system (audible and visual) shall be provided, easily 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 will be made of vinyl coated cable. Destination Signs-Front and side destination signs to meet ADA requirement 49 CFR 38.36. They will be 12 volt, LED design programmable, and capable of two line messages. Luminator Vista or Twin Vision Mobil Lite, or approved equals.

If destination or route information is displayed on the exterior of a vehicle (Floor Plan OO 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]

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

All bidders must describe and furnish a complete listing of the vehicle, requested drawings, modifications and literature of the equipment to be furnished.

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

A guarantee that the chassis manufacturer's warranty will be in effect at the time of delivery and acceptance (36 months, 36,000 mile minimum).

A copy of the warranty on the body air conditioning, heating, wheelchair lift, and alternator. Warranty terms on these components to be a minimum of 2 years, or 24,000 miles.

Priority seating signs that meet ADA requirement 49 CFR 38.27.

Detailed literature/specs on lift system.

Heat and cooling certification.

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The bidder must also supply <u>with the bid</u>, the following items (A. through J.):

A. An itemized list of domestic produced parts or components used in the manufacturing of the vehicle.

B. The estimated cost for each item listed.

C. The estimated total percent of domestic components used in manufacturing of the vehicle.

D. Final Assembly point and activities at that location

E. A Statement of FMVSS compliance

F. A statement of FMVSS 210 seat compliance

G. A description of A/C, heating/defrosting system and BTU output.

H. Complete Altoona Bus Test report.

I. A guarantee that the chassis manufacturer's warranty (minimum 3 years or 36,000 miles) will be in effect at time of delivery and acceptance.

J. A copy of the warranty on the body air conditioning, heating, Wheelchair lift, and alternator.(minimum of 2 years and 24,000 miles on these components)

13. **To be furnished with each vehicle at time of delivery**

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

B. A parts book and maintenance manual for add on equipment used in modification.

C. Documentation of front end alignment or alignment check

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

E. An as built schematic of any installed wiring must be furnished with each vehicle at the time of delivery.

F. A documented leak-free water test performed prior to delivery