

State of North Carolina
TYPE A SCHOOL / ACTIVITY BUS

CHASSIS REQUIREMENTS

The school / activity bus furnished shall comply with all current State and Federal Motor Vehicle Safety Standards in effect at time of bid. Additionally, the State is requiring the following additional supplementary specifications.

- CHASSIS:** New chassis, not over 12 months old at time of delivery to end-user.
- ACCEPTABLE ENGINES:** Gasoline engine, V-8, minimum 5.4 liter
Diesel engine, 6.0-liter minimum.
- All engines, gas or diesel, must meet 2007 Federal Emission Standards
- Speed control to be set at 45 MPH for school buses, 55 MPH for activity buses.
- Diesel engines must be B20 compatible.
- GVWR:**
- | | | | |
|------------------|--------------|--------------|-----------------|
| Basic pupil load | 14-passenger | 21 passenger | 26/30 passenger |
| Minimum GVWR | 10,000 lbs | 12,000 lbs | 12,000 lbs |
- The GVWR stated above are minimums and apply to values set by the chassis mfr.
- ALTERNATOR:** Minimum 105 AMP
- FUEL TANK:** To be located between frame rails for safety. Fuel filter-plastic strainer in fuel tank, replaceable fiber element in fuel line.
- OIL FILTER:** Disposable or cartridge type
- STEERING:** Manufacturer's standard power steering
- FRAME:** Integral body frame, heavy duty "C" frames with internal cross member or equivalent construction approved for school bus application use.
- EXHAUST:** Aluminized, unitized muffler - tailpipe, converter equipped, single exhaust. Must meet 2007 Federal Motor Vehicle Emission Standards
- DRIVER'S SEAT:** High back adjustable type or equal as supplied by chassis manufacturer.
- COOLING:** Heavy duty cooling required on radiator and transmission oil coolers. Radiator coolant to be extended life type.
- AIR FILTER:** Engine manufacturer's recommended standard filter.

BATTERY: 12-volt negative ground system with two minimum 600 CCA batteries supplied maintenance free type. Batteries to be mounted in an external accessible, lockable compartment on bus body.

BRAKES: Power, self-adjusting. Parking-cable to rear wheels, foot operated.

REAR AXLE RATIO: 4.10 or 4.11-axle ratio.

SUSPENSION: Front - independent
Axle rear - Hypoid drive, semi-floating type:
Front springs - coil, capacity manufacturer's standard capacity.
Rear springs - Two stage, multi-leaf.
Shock absorbers - front and rear.
Front stabilizer bar.

TIRES: Dual rear drive wheels, total six wheels, tires to be machine balanced, to be all season steel belted radial B/W sized for GVWR of vehicle. Unit furnished with wheels painted white (rims).

TRANSMISSION: 4 Speed automatic with overdrive

FUEL/WATER SEPARATOR: Diesel engine to have a fuel/water separator installed, Racor Model 490R or equivalent, that shall be fully compatible with the Racor 490 element, with clear bowl, water sensor and primer pump. Complete unit to be approved at pilot model inspection.

CONSTRUCTION: It is the intent of these specifications to describe a Type – A school/activity bus that shall be basically of all steel construction or of some other material which has at least equivalent strength of all steel construction as certified by the bidder. All parts not specifically mentioned, which are necessary in order to provide a complete bus shall be furnished by the successful bidder and shall conform in strength, quality of material and workmanship to which is usually provided by the engineering practice indicated in these specifications. The completed school bus shall meet all Federal Motor Vehicle Safety Standards (FMVSS), requirements of the State of North Carolina, and requirements of the 2005 "National School Transportation Specifications and Procedures" in effect on date of manufacture except as noted. Dealer modification may be required and must be of OEM quality where OEM equipment will not meet specifications.

All parts not specifically mentioned, but necessary to provide a complete school bus, shall be furnished by the contractor and shall conform in strength, quality of materials and workmanship to those provided by engineering practices indicated in these specifications.

BODY REQUIREMENTS

BODY FLOOR

Loads - The floor shall be designed to support all fixed and changeable loads. Fixed loads shall consist of all parts of the body supported by the floor system. Changeable loads are live loads determined on the basis of 120 pounds per passenger with three passengers per seat. The weights of the passengers and seats may be estimated at 70 pounds per square foot of floor area. To allow for vibration and shock, all loads shall be doubled. (Openings should be made only when required such as a wheel housing.)

Floor Sills - All high strength steel floor joist are to be 16 gauge or heavier. All sills shall extend the full effective width of the floor without splicing so the floor will support the roof load imposed by the side posts. There shall be a main joist sill at each post or bow-frame, except in the wheelhouse area. Maximum spacing of the joists shall be 36". The bus body's transverse and longitudinal frame members should allow stress to flow evenly throughout the bus body. Upon request, the manufacturer should substantiate the strength integrity of any joint or gusset connection of these members to prove they are of equal or greater than a continuous constructed member.

Step well - A step well, having two steps, shall be built into the front assembly and completely enclosed with doors extending to bottom step. Each step shall be 14-gauge steel construction with replaceable step treads. Each step tread shall be .05" aluminum and covered with ribbed rubber as per the 2005 National Specifications and Procedures. Entrance step shall extend below skirt line to such depth as necessary to make the distance to the ground from the bottom of the step no less than 10" and no more than 14".

Floor Covering - The floor under seat area, including wheel housings and driver's compartment, shall be covered with a smooth-finish rubber covering at least 1/8" inch thick. The aisle and entrance area shall be covered with a ribbed pattern rubber, or an approved equal covering at least 3/16" inch thick. The adhesive for laminating the covering to the floor shall be a water-resistant type of trowel or spray consistency. An approved rust proof-molding strip shall be applied over all edges and joints of the covering. If the chassis is equipped with transmission cover, the cover shall be placed on top of floorboard and securely fastened and sealed. Transmission cover fasteners shall be of the hexagon head, cap screw type.

BODY FRAME

Framing - Where posts or bow frames are not loaded in a plane of symmetry, they shall be braced so as to deflect without twisting. The minimum depth of member shall be at least 1½" and shall be 16 gauge or heavier. The maximum spacing shall be 30" on centers on all sections except one, which shall be no greater than 40" on center.

The section modulus of the cross section of the roof bow shall be not less than 0.22 inches³.

NOTE: All bidders shall submit with their proposal complete detailed engineering drawings detailing the size and shape of a cross section of the post or bow frame along with detailed calculations verifying that the section meets requirements.

A roof bow shall be located at each post to form a bow frame, or bow frames may be formed in one piece. When framing members are joined, the connections shall be such as to develop the full strength of the cross section of the two or more members joined. If

side post members and bow frames are not one continuous piece, bidder shall submit with their proposal a detailed drawing of the joining connection. Roof bows shall not be buckled or distorted out of cross section during the process of bending to the curved shape. Each post shall be connected to a main floor joist, either directly through gussets or indirectly through the side rails.

Roof Stringers - Two or more roof stringers or longitudinal members equal in strength to roof bows shall be provided to space the roof bows and reinforce the flattest portion of the roof skin. These stringers may be installed between the roof bows or applied externally. At all points of contact between stringers or longitudinal members and other structural material, attachment shall be made by means of welding, riveting or bolting. If stringers are applied internally, they shall be fastened to each roof bow so that the joint is equal in strength to the cross section of the weaker member. If stringers are applied externally, all joints must be lapped the full width of the roof bow and attached to each roof bow with four rivets or securely welded. After the load, as called for in the static load test, has been removed, none of the following defects shall be evident:

Failure or separation at the joints where stringers are fastened to the roof bow.

Appreciable difference in deflection between adjacent stringers and roof bows.

Twisting, buckling or deformations of the stringer cross-section or fastening.

Side Stringers - There shall be one or more side stringers or longitudinal members to connect the vertical structural members and to provide impact and penetration resistance in the event of contact with other vehicles or objects.

The side stringer shall be installed in the area between the bottom of the window and the bottom of the seat frame and shall extend completely around the bus body, except for the door openings and body cowl panel. The formed side stringer to be 16-gauge or heavier metal, 3" wide before forming.

The side stringers are to be fastened to each vertical structural member, in any one, or a combination of the following methods as long as stress continuity of the member is maintained:

Installed between the vertical members.

Behind the panels but attached to the vertical members.

Outside of the external panels.

The fastening method employed shall be such that the strength of the stringer is fully utilized. The side stringer or longitudinal member may be combined with a rub rail, or be in the form of an additional rub rail, so long as the separate conditions and physical requirements for the longitudinal rub rails are met.

Rear Framing - The emergency doorposts shall extend from the floor sill to the window header and shall be 16-gauge or heavier. There shall be installed on each side of the emergency door posts an additional post equal in strength to the side posts which shall extend from the floor sill to the window sill.

Skirt Reinforcement - There shall be installed at the bottom of the outer paneling a continuous skirt stiffener equal in strength to a 1-inch x 1/8-inch angle. If body construction is of such a design that this type stiffener cannot be used, an additional rail shall be applied externally. Rail to be equal in strength and construction to the guardrails required in the Guardrail Section. This stiffener shall be supported by extending posts or bow-frames or by 16-gauge gussets.

Window Framing - A 16-gauge formed header or stringer (not a flat strip) with a depth of at least 1½" perpendicular to the side of the body, or a 16-gauge formed header equal in strength to roof bows, shall be used at the top of the windows.

EXTERIOR PANELS

Design - Joints in roof panels should occur only at roof bows, roof stringers, and window headers.

Sheet Metal Skin - All paneling above the top of the floor, except the cowl panel and wheel housing shall be of 20-gauge or heavier. On the bus roof cap and rear end paneling ONLY, a 1/8" thick reinforced composite material overlaid on an all steel frame is also acceptable.

Wheel Housing - The wheel housing shall be attached to the floor in such a manner as to prevent any water or dust from entering the body. They shall be designed for easy removal of tires and shall be .050" thick metal or heavier. External wheel housing opening shall have a steel or rubber fenderette that extends past outermost portion of tire. Splashguards shall be mounted behind each front wheel and behind each pair of rear wheels in order to prevent debris from being thrown under the bus body.

GUARDRAILS

Number - There shall be applied to the outside of the body, three guard rails. These members to be corrugated so as to provide maximum stiffness and shall be .060" thick or heavier. Pressed-in guardrails will not meet these requirements. Guardrails shall be located at the following approximate elevations: floor, seat and windowsill.

The seat level and window level rails are to begin at the entrance door post on the right side of the body and, except for the rear emergency door, extend around the rear of the body to left first full rafter. Where design problems cause difficulty in installing one of the above guardrails, the floor level rail may be extended in its place or an additional stringer installed.

Floor level guardrails to begin at the entrance door posts on the right side of the body and, except for the wheel house and fuel filler area, are to extend to the right rear body post, and to the left first full rafter and, except for the wheel house, are to extend to the left rear body post, except where design does not permit installation. Splices, if any, to be located at post by lapping the full width of the supporting part of the posts. All guardrails are to be cleaned, primed and rust proofed underneath before being installed on body. All guardrails to be attached with rivets except in locations where rivets cannot be used.

BODY TEST

General - Throughout the construction of the body, there shall be evidence of good workmanship and engineering ability.

Body shall meet all applicable Federal Motor Vehicle Safety Standards. If requested this test information shall be furnished to the State for review.

INTERIOR PANELS

Sheet Metal Lining - The roof section of the body is to be entirely lined with 20-gauge perforated sheet metal. Lining panels to have a minimum of at least 2" unperforated steel at appropriate location for attaching to roof bows or an acceptable equivalent design. Panels must be designed and fastened to minimize vibration and to be installed for easy removal. Panels from windowsill to seat rail to be either (a) 22-gauge textured and embossed stainless steel, (b) 22-gauge clear-coated galvanized steel sheet, or (c) 22-gauge textured aluminum.

Moldings - At the junction of the interior paneling and the floor, there shall be installed a galvanized, aluminum, or other corrosion resistant molding of approved design. All interior lining shall be secured with sheet metal screws or rivets.

SEATING

Description - Seats shall be forward facing and be spaced with the maximum knee room available within standard body lengths. All seats should be 39" or 30" wide and 15" deep and 28" seat back height. Width of seats may vary to accommodate the desired rated capacity. Seats are to be arranged in rows of two or staggered with a minimum 12" center aisle. The number of passengers on each seat shall be based on 13" rump room per passenger. All material used in the seat cushions and backs shall meet the requirements of Federal Motor Vehicle Safety Standards #302. All seat upholstery material to be of the type known as fire-block. All seats shall meet the requirements of Federal Motor Vehicle Safety Standards #222. Seats shall be spaced for maximum knee room. Last row seat spacing may vary to ensure maximum knee room.

Seat Cushion Pad The top of the seat crown should be approximately 16 inches above the floor. The cushion material should be a minimum thickness of 3-½ inches front, 2 inches rear, excluding plywood base. The cushion shall have a ½-inch thick mounting board and shall be secured to the seat frame to meet the cushion retention requirements of FMVSS 222. Seat cushion is to be covered with an approved (fire block type) upholstery fabric. The cushion pad is to be secured by a positive locking mechanism (see picture for approved locking mechanism) that requires the removal of a securing device, such as a second bolt or pin, before latch mechanism can be operated to release seat cushion from frame.



Seat Back Pad - All seat backs shall have reinforcing material equivalent to 24-gauge metal between the front and rear padding and it shall be properly fastened to the seat frame. The back pad and cover shall meet requirements FMVSS 302 and 222. The seat back is to be covered with fire block type upholstery fabric.

Fire Block Upholstery Fabric - The upholstery material used to cover all seat cushions and backs shall conform to requirements of the following product specifications and testing:

The base fabrics shall be undyed and the minimum finished weight per square yard shall be 25 oz., lock stitch knit backing. The breakdown of the material shall be as follows:

Mfg.: Prevail, Kevlar Mfg or Spradling Mfg.

Weight of Film: 38-oz linear yd.

Finish Weight of Material: 25-oz/sq. yd.

Product Specifications/Testing:

Grab tensile (lbs.) ASTM-D751

Tongue tear (lbs.) Fed 191A-51334

Tack tear (lbs.) ASTM D751-79 mod.

Trapezoid tear (lbs.) ASTM D1117

Adhesion (lbs./in.) ASTM D751

Seam breakage - AMC method

Flex testing (1 hr.) CFFA-10

Blocking-Fed Standard 191-5872

Low temperature (-20) #5 roller Fed STD 191A-5872

Abrasion (Wyzenbeek) Fed standard 191A-5304 240 grit-1000

Puncture Test 28 lbs.

Minimum 6 stitches per inch using Tex 105 30/6 Spun Kevlar or higher thread.

Flammability Testing:

FMVSS - 302

FAR 25.853

Boston bag

National School Bus Standards fire block material.

All sewing on cushions and backs to be securely stitched with all seams lock stitched or double stitched with Tex 105 30/6 Spun Kevlar or higher thread count or equal fire block thread. Seam ends should be backstitched to prevent unraveling. Cushion and backs with welt cord to be of same material as upholstery and properly stitched. The same grade of material and construction shall be used in all activity buses. Seat color is to be blue. Welt of 42-oz. upholstery on passenger seat backs, seat cushions, and barriers shall have same fire blocking properties as seat and barrier upholstery.

ASSIST RAIL AND CRASH BARRIER

Assist Rail - Two safety assist handles or rails shall be provided at the front entrance, located on the right and left, securely mounted inside of body and should extend to bottom step to be within approximately 28" of ground. Assist handle shall be made from 1" OD round stainless architectural tubing or 1" OD anodized aluminum.

Crash Barrier - Crash barrier shall meet FMVSS No. 222 and 302 and shall be constructed and covered as per seat backs with blue seat material. Crash barrier material shall be fire-block type. Crash Barrier on left and right side of bus shall have a modesty panel between the stanchion bars of crash barrier from floor level to bottom of crash barrier.

ELECTRICAL SYSTEM

Daytime Running Lights - Low beam headlights, taillights, parking lights, and marker lights operate at full voltage with the ignition on and the headlight switch off. The lights shall not engage while the starter is engaged.

Wiring - All wiring shall conform to the standards of the Society of Automotive Engineers. It shall be color and number coded, insulated and protected by a covering of fibrous loom, or equal covering. All fuse/circuit breaker blocks shall have circuit identification decals.

Wiring should be in circuits as follows: dome and step well lights; flasher lights and stop arm lights if equipped; emergency door buzzer; windshield wipers; heaters and defroster, and turn signal system. Body wiring shall be enclosed in removable metal covers extending from front to rear of body, or durable non-metallic material extending from front to rear of body. All electrical connections between body and chassis should be made at the connection furnished on the chassis. Wires will not be spliced into existing chassis wiring unless required by certain options such as lift interlocks and vandal locks, and in those cases only if the connections are completely weather-sealed against corrosion. 100-amp manual-reset type breaker located under hood to allow bus body electrical disconnect from chassis electrical circuit is required.

Relays - There shall be provided one (two if equipped with eight light system school bus only) approved constant service, heavy-duty master relays that are to be actuated by the ignition switch and through which all electrical body accessories are to be wired. Wiring from the chassis to the relays and from the relays to the fuse block shall be number 10-gauge wire. The other master relay to supply current for the flashing stoplights, stop arm light and flashers for school bus application only.

Interior Lighting - Interior lights shall consist of at least four flush mounted ceiling lights and an adequately protected inside step well light. All interior lights, including the step well light, shall be activated when door is opened and engine switch is on. All interior lights are to be activated by a single switch.

Clearance and Marker Lights - Combination clearance and marker lights shall be installed as required and shall be Weldon 5000 series or approved equal. The lights are to have a base of non-rusting metal. The lens for the front lights to be amber in color and the lens for the rear lights shall be red in color. Lights are to be wired to operate from the headlight switch.

Eight Light Warning Systems - (School Bus Only) – Each school bus shall be equipped with four (4) flashing stoplights. The lens shall be red polycarbonate and designed to give illumination throughout 180 degrees. They shall also be clearly visible for a minimum of 500 feet. Lens shall be at least seven inches in diameter and the light assembly shall be of a flat back design.

Bulb shall be a replaceable quartz halogen type. (Invertec Model 1-500-00 or equivalent) The ground wire shall be attached to a roof bow or stringer. Location of lights and direction of beam are to be approved. The circuit shall be wired so that one front, one rear, and stop arm light shall flash alternately with the other front, rear, and stop arm light. The switch to operate flasher lights is to be located in the control panel in the closest location to the driver seat and adjacent to the air door switch and will actuate the relay from the ignition switch (location to be approved). The flasher light activation switch is to be red in color. The flasher shall be electronic (Weldon 7000 or Inpower model SBF94).

In addition to four red lamps described in the above section, four (4) 7 inch amber quartz halogen lamps with polycarbonate lens shall be installed as follows: one amber lamp shall be located near each red signal lamp at same level, but closer to vertical centerline of bus. (Invertec Model 2-500-00 or equivalent) A system of red and amber signal lamps shall be wired so that amber lamps are energized manually, and red lamps, and stop arm are automatically energized (with amber lamps being automatically de-energized) when bus service door is opened.

Note: Deactivation of eight-light system must occur by closing the entrance door. Eight light warning lens shall be covered with black hoods.

Flashing Stop Arm - School bus only There shall be installed on the left outside of bus body an electric operated stop arm, Specialty (Model 6900) that has two flashing lights. The blade for stop arm shall be octagonal in shape and shall be at least 18" diameter across flats. Lens for lights shall be red in color, fastened in approved manner, and shall be at least 4" in diameter. Lights shall be double-faced and the "S T O P" shall be placed on the stop arm on both sides in white enclosed retroreflective high intensity or approved equal letters 6" high on a red enclosed retroreflective high intensity or approved equal background.

Directional Turn Signals - There shall be installed on the rear of the body, in an approved location, two amber lens direction turn signal lights. These two lights shall have a 7" diameter lens. Rectangular-shaped lenses of minimum 12 square inches each are also acceptable. Rear directional turn signal lights shall be wired to hazard warning switch. In addition, a side directional light is to be installed on the body to work in conjunction with the turn signals. Location to be approved.

Strobe Light - A strobe light is to be mounted on top of the bus body centered above the rear emergency door approximately 12 inches from rear edge of roofline. The lens shall be made of clear glass with an aluminum base. The bulb shall be a replaceable double flash (10 Joules minimum) low amp draw/ high light output bulb. A replaceable remote power pack is to be mounted inside the rear 1/3 of the bus body behind an accessible panel (location to be approved at pilot model). The light is to be wired in conjunction with the ignition switch and be activated only when the ignition switch is in the "on" position. The light shall meet SAE J1318 and J575 standards. Strobe light is to be Specialty Model 205 or equivalent. (See picture for approved light location.) Light shall be grounded to structural support.



Stop/Tail Lights - Buses shall be equipped with four combination stop/tail lamps. (1) Two combination lamps at least 7 inches in diameter or if a shape other than round, a minimum of 38 inches of illuminated area, shall be mounted on the rear of the bus just inside the turn signals. Lens material is to be acrylic plastic and the lamp shall comply with applicable SAE standard. These lamps are to be Weldon 1010 or approved equal. (2) Two combination lamps with a minimum diameter of 4 inches, or if a shape other than round, a minimum of 12 square inches of illuminated area, shall be placed on the rear of the body between the belt line and the floor. The rear license plate lamp may be combined with the lower tail lamp. All lens material is to be acrylic plastic and the lamp shall comply with the applicable SAE standard. These two lower lamps are to be Signal-Stat #2103 or Grote Model #5085, 4-inch.

License Plate Lights – Each school and activity bus shall have two license plate lights. These lights shall be installed on the left and right rear of the bus.

Backup Warning Alarm - An automatic audible alarm shall be installed behind the rear axle and shall comply with the Society of Automotive Engineering Standard (SAE 994b). The alarm shall be activated when the transmission is placed in reverse gear only.

Backup Lights - The backup lights (2 required) shall have 4" diameter lens, or, if a shape other than round, a minimum of 12 square inches of illuminated area, meeting FMVSS No. 108. Backup lights will be wired to switch on transmission.

Backup Warning Alarm - An automatic audible alarm shall be installed behind the rear axle and shall comply with the Society of Automotive Engineering Standard (SAE 994b). The alarm shall be activated when the transmission is placed in reverse gear only.

Emergency Door Buzzer - On the rear / side emergency door post at the emergency door lock there shall be installed a switch which is actuated by a maximum of 1/4" travel of the lock bolt. The switch shall be covered and wired to an approved buzzer and panel light system, which meets FMVSS #217 The buzzer and panel light, shall be activated to warn the driver when the emergency door is not properly fastened.

Accessory Power Point Hookup – Panel location must be approved and located in driver's area.

HEATING AND VENTILATING

Ventilation - The body shall be equipped with an effective ventilation system, which is capable of providing an adequate supply of outside air and of properly ejecting inside air under all conditions of operations. This system shall be adequately weather and dust proof. Static type exhaust roof ventilator shall be used and installed in the front area of roof.

INSULATION

Material and Location - The inside of the skirting from the floor to its bottom edge shall be completely coated with an asphalt base undercoating material conforming to the Federal Specifications No.TT-C-520 (1), latest amendment. Underside of wheel housing shall be coated with same material. The space between the exterior and interior perforated roof panels shall be completely covered with a 1½" thick layer of fiberglass or equivalent. Insulation must be installed above the perforated roof panels in such a manner as to prevent any insulation from filtering through the perforations into the passenger compartment. The space from the bottom of the side windows to the floor level shall be completely covered with a 1 ½" thick layer of fiberglass insulation or equivalent.

DOORS

Entrance Door - The entrance door shall be located at the front of the bus and on the driver's right. Entrance door shall be manually operating, panic free, outward opening under control of driver, and so designed as to prevent accidental opening. Door shall seal against a stationary rubber and bottom step edge. Entrance door shall be a double wall, metal, split type with a minimum of 2" safety gap sealed with a flexible material. It shall be securely hinged with approved piano type greasable hinges, bearing hinges, or pivots, fastened to the adjoining member in an approved manner, and shall be provided with suitable weather stripping at top and bottom to prevent leaks. Doors shall extend to bottom step. Minimum horizontal clearance shall be 24". Minimum vertical clearance shall be 68". A suitable safety pad shall be installed on interior of door header. Front and rear entrance door leafs to be sealed where door shafts extend into body to prevent dust and contamination from entering door actuator area.

Emergency Door - An emergency door shall be located in the center of the rear of the body. It shall have a minimum horizontal clearance of 24" and a minimum vertical clearance of 48". Door shall be hinged on the right side (when facing bus from rear) with an approved type of hinge meeting FMVSS #217 requirements. It shall open outward and shall be designed to open from both inside and outside of bus. Door should be equipped with a metal or approved strap doorstop, which shall limit its opening to 120 degrees. A suitable safety pad shall be installed on interior of door header that will provide padding for vertical and horizontal surfaces. The words "Emergency Door" shall be lettered on or above door on inside. Rear emergency door must be equipped with a hold open device, which complies with FMVSS 217. The emergency door is to be equipped with a gear-and-rack fastening device or approved equal. Rack shall be 1¼" x 5 ½" x 3/8" steel and shall be designed for 1¼" of travel in locking. Rod for operating lock should be a minimum of 1/2" x 4 ¾" long with non detachable handles.

Rear scope Lens - All buses shall be equipped with a 3M Vangard 11" x 14" Fresnel lens, Part # 07955, and this lens is to be mounted on the rear door, upper glass area with adhesive backing.

Safety Roof Vents - All buses shall be equipped with one roof hatch-type emergency exit located in the approximate center of the body. The hatch must meet the following:

Shall comply with all requirements of FMVSS #217 for emergency exits.

Simple release handles shall be provided permitting operation as emergency exit(s), accessible inside and outside the vehicle.

All emergency exits shall be marked with instructions for proper use and all emergency exits must be outlined with reflective tape which meets FMVSS #217.

Hinged low profile roof escape hatch shall include an internal and external release mechanism and a buzzer which alerts the driver when the hatch is open. Hatch to be secured with adhesive to eliminate leaking. Specialty Model 9245-0200 or Transpec Model 1975.

WINDOWS AND WINDSHIELD

Side Windows - There shall be installed on each side of the body an adjustable split sash window between each framing post. Bottom sash shall be stationary with a minimum clear vertical opening of not less than 9". The 9" clear vertical opening is to be accomplished by lowering top sash. An approved finger-touch-type opener shall control window opening.

All push out windows must be marked with reflective tape which complies with FMVSS #217, and shall be of the side-hinged design.

Instructions to operate emergency exit windows shall be permanently affixed to both the inside and outside of the window glass, and both sets of instructions must be easily readable from the inside of the bus. Instructions shall be clear and concise for the operation of the emergency window handles.

The words "Emergency Exit" to be lettered on inside at top of windows. Glass for window shall be set in an approved galvanized steel channel or extruded aluminum with black finish and shall furnish ample protection from weather and must be guaranteed against leakage from rain. Window visors of approved design are to be provided for all side windows. All side passenger windows shall be tinted glass per requirements Glass Section.

Rear Door Windows - There shall be installed in the rear door, two windows, which are set solid in a suitable and waterproof manner. The upper window shall have a minimum glass area of 400 square inches and the bottom window shall have a glass area of approximately 350 square inches. Exact location of windows and quality of sashes is to be approved and tinted same as side passenger windows.

Rear Windows - There shall be installed at the rear of the body on each side of the emergency door, a window set solid in a suitable and waterproof manner. The size and location of the window and quality of window sash is to be approved and tinted same as side passenger windows.

Entrance Door Windows - There shall be installed in each section of the entrance door one or two glasses.

GLASS

Quality - All glass used in the body shall be of the "Safety Glass" type conforming to requirements of the American Safety Code for Safety Glazing Materials. All glass should be legibly and permanently marked with safety code.

Window and Door Glass - The glass used in the doors and windows shall be of the AS-2 or AS-3 quality meeting FMVSS #205. Glass shall be high quality tinted safety glass.

Percentage of light transmission shall be as follows:

Side Windows: 28% - 31% light transmission

Driver's Window: 70% - 73% light transmission

Rear Door Windows: 28% - 31% light transmission

Rear Windows: 28% - 31% light transmission

Entrance Door Windows: 70% - 73% light transmission

REAR BUMPER

Size - The rear bumper shall be of pressed steel channel at least .1875 inch +or- .005 inch in thickness and 8" wide (high).

Attachment of Bumper - The bumper shall be attached to the chassis frame in such a manner as to be easily removed, and be so braced, as to develop the full strength of the bumper section from rear or side impact, and shall be so attached, as to prevent hitching of rides. Rear bumper shall extend beyond the rearmost part of the body surface at least 1", measured at the floor line.

ACCESSORIES

Interior Mirror - There shall be securely installed on the windshield header a 6" x 16" driver-adjustable convex rearview mirror (Model Tiger 1510??) so located as to give the driver a clear view of the entire interior of the bus and the road behind. Mirror must be mounted securely enough to prevent vibration.

Exterior Mirror System - All buses purchased shall be equipped with a mirror system complying with 49 CFR Part 471, FMVSS #111 as adopted by the National Highway Traffic Safety Administration.

The Rear View Mirror System - There shall be installed on each side distortion free glass mirrors. Mirrors shall be mounted on both the left and right side of the bus in an anodized or etched aluminum frame. Mirrors shall be fully adjustable so as to give the driver a clear view of the rear wheels of the bus and be mounted in accordance with FMVSS 111. The rear vision mirror system shall be capable of providing a view along the right and left sides of the vehicle which will provide the driver a view of the rear tires at ground level, and a minimum distance of 200 feet to the rear of the vehicle. Mirror system shall be Mirror Lite Super Double Nickels or Roscoe Open View ES mirror system (both mirror heads must be of similar size and viewing area).

The Crossover Mirror System - There shall be installed on each front fender of the chassis one quadrispherical mirror. These mirrors shall be mounted on the front corners of the hood assembly. The mirror brackets shall have sufficient supports (steel plate) located on the inside of the hood to prevent the fasteners from pulling through the hood assembly (Rosco Hawk-Eye Model 2365).

License Holder - Two license plate holders shall be located on the rear of the body with indentions on left and right sides. Hole for license plate shall be bored on the left and right sides.

Name Plates - On the inside of the bus, there shall be installed on the header, above the driver and to the left of the visor mounting bracket, a single manufacturer's name plate which can be easily read. This plate shall indicate the following information; name of body manufacturer, name of chassis manufacturer, date body built, date chassis built, serial number of body, serial number of the chassis, VIN number, GVWR, GAWR Front, GAWR Rear, unladen weight (including fuel), equipment capacity, specified tire size front, specified tire size rear, overall length, and maximum overall height. Plate to be metal with all information embossed (for fireproofing). Additional vehicle manufacturer's data plate(s) are not acceptable; all vehicle data shall be on the above single data plate.

There shall be installed on the chassis in the engine compartment a suitable chassis data plate that indicates VIN#.

Belt Cutter – A Tie-Tech belt cutter shall be installed in the safety equipment storage box on all buses. It is to be attached with Velcro within the driver's reach.

First Aid Kit - There shall be installed a Grade A first aid kit in a transparent box accessible to the driver. It shall be properly mounted and identified as a first aid kit. Kit shall contain the following contents:

- 4" bandage compress ----- 2 pkg.
- 2" bandage compress ----- 2 pkg.
- 1" adhesive compress (16 per pkg.) ----- 2 pkg.
- 40" triangular with two safety pins ----- 2 pkg.
- Non Latex Exam Gloves (1 pair med/1 pair large)

First Aid Kit to be secured in the "Safety Equipment Storage Box" and is to include breakable tamper seal.

Fire Extinguisher - One 5-pound dry chemical stored pressure type with pressure gauge meeting UL, I.C.C. and U.S. Coast Guard requirements is required. Fire extinguisher shall have an all-metal discharge head and valve (no plastic valves). The fire extinguisher is to be secured in "Safety Equipment Storage Box" in a universal mount that will accept any 5 lb fire extinguisher. In addition the fire extinguisher shall be stenciled: Property of North Carolina Public Schools (unless purchased by another agency from this contract).

Body Fluid Cleanup Kit – Each bus shall have a removable and moisture-proof body fluid cleanup kit in a transparent box accessible to the driver. It shall be properly mounted and identified as a body fluid cleanup kit.

Kit shall contain:

- 1 - 2-oz. pkg. T.I.L.S.C. powder, sanitizes-deodorizes-encapsulates
- 1 - Odor reducing mask
- 1 pr – Non-latex exam gloves (large)
- 2 - antiseptic wipes
- 2 - paper crepe towels
- 1 - scraper
- 1 - plastic disposal bag w/scoop and tie

Body fluid clean-up kit to be secured in the “Safety Equipment Storage Box” and is to include breakable tamper seal.

Reflectors - There shall be installed on the bus body two amber and four red reflectors. The lenses are to be 3” in diameter and made from acrylic plastic with six reflecting angles. Frame (if used) is to be polished aluminum or zinc plated steel. Note: Diamond grade vinyl reflectors are also acceptable.

Warning Devices - Each bus shall contain at least three reflective triangle road-warning devices that are enclosed in a storage box. These shall be mounted in an accessible location and must meet requirements in FMVSS #125.

Crossing Control Arm – (School Bus Only) An Electric operated Specialty (Model 68600) with polycarbonate crossing control arm and shall be mounted on the right end of front bumper and operated through stop arm switch in conjunction with a switch mounted on front door control. Arm shall extend approximately 5 ½ feet when in operation, with an electro-magnetic mount (or other approved retention mechanism; NOTE: approval must be requested no later than 10 days before bid opening) installed on the left side of the front bumper to secure the crossing arm stationary when the ignition switch is in the on position. Magnetic mount shall be Specialty Model 8101.

MOUNTING

Chassis Preparation - In preparing the chassis frame for body mounting, rivet heads shall not be removed except on the extreme rear cross member and then only when necessary to move rear cross member to conform to body length. If tail pipe brackets must be removed due to body obstructions, they shall be replaced with new ones of equal strength as supplied by the chassis manufacturer.

Installation - The body shall be securely attached to each chassis side rail. At rear end of the body on each chassis side rail there shall be installed a through-bolt of not less than 7/16” in diameter. Bolts to be Grade 5 with S.A.E. threads and lock washer. All attachments shall be made at main body sills.

Rubber and fiber inserts, equal to or thicker than chassis rivet heads, shall be securely attached to each body sill and installed at all points of contact between sills and chassis. At any point where body sill sits on a rivet head, the rubber and fiber insert shall deform so that floor will be smooth.

Mounting shall be sufficient to allow for compliance with FMVSS #301 Fuel Integrity Testing. Evidence of successful completion of this test must be provided.

METAL TREATMENT AND PAINTING

Metal Treatment - All metal used in construction of bus body is to be mill applied, zinc coated, copper bearing steel, aluminum coated, or treated by an equivalent process before bus is constructed. (Included are such items as structural members, inside and outside panels, floor panels and floor sills; excluded are door handles, grab handles, stanchions, interior decorative parts, and other interior plated parts).

All structural members lighter than 12 gauge, wheelbase and step well are to be mill applied zinc coated steel or equivalent. All metal parts that are to be painted shall be, in addition to above requirements, chemically cleaned, etched, zinc-phosphate coated, and zinc-chromate or epoxy-primed or conditioned by equivalent process. Documentation to be provided upon request. In providing for these requirements, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges, punched or drilled hole areas in sheet metal, closed or box sections non-vented or non-drained areas, and surfaces subjected to abrasion during vehicle operation.

As evidence that above requirements have been met, samples of materials and sections used on construction of bus body, when subjected to Chrysler Chipping Corrosion Testing LP-463PB-52-01 Change A, or equal testing system, shall be provided. There shall be no more than 3 mils (across the scribe as a total) of creep back, based on a three-panel average. These panels are not to lose more than 10 percent of material by weight when subjected to the 1,000-hour salt spray test. This is provided for in latest revision of ASTM Designation: B117 that is the "Standard Method of Salt Spray (Fog) Testing." Test results shall be provided upon request.

Paint - - All paint shall be unleaded polyurethane paint. The hood and fenders (school bus only) shall be painted with National School Bus Yellow polyurethane paint, which meets Federal Standard No. 595a, color 13432. Bumper and wheels shall be painted with jet-black enamel (school bus only). The same brand of paint must be used on the body and chassis.

Exterior - The exterior of the complete bus body shall be painted with two coats of polyurethane per Federal Standard No. 595a. The same brand of paint must be used on the body and chassis. The applied primer and polyurethane shall yield a dry film thickness of two to three mils. Rear bumper shall be painted black.

Interior - The entire interior paneling of the bus, except the sections of aluminized steel and/or clear coated sections, shall be painted.

All other interior items such as the heater, control panel, seat frames, chassis cowl, and modesty panel may be painted a compatible color. One prime coat and two finish coats shall be required.

Floor and Structural Metal - The underside of the floor including the chassis metal fenders and cowl and all other exposed structural metal used in the body shall be painted with approved black enamel or undercoated with the approved material.

LETTERING

Type - Lettering and numbering shall conform to "Series B of Standard Alphabets for Highway Signs".

Vinyl Lettering - The material shall be a premium 2-mil high gloss cast vinyl for solvent resistance, fade resistant, and withstand severe weather and handling conditions. The vinyl will have permanent acrylic adhesive with an adhesion factor of 4/lbs per square inch and should not lose its shape or adhesion due to extreme temperatures from -40 to 100+ degrees Fahrenheit. The backing paper sheet for the vinyl should be standard #78 lb. Kraft liner.

Interior - Above the windshield or other approved acceptable location; the words "**SEATING CAPACITY**" shall be in letters at least 1 inch high. The seating capacity will be based upon 3 students per seat elementary, 2 students per seat high school and lettered accordingly.

Note: Any lift-equipped bus must reflect the seating capacities for elementary and high school plus 2 wheelchair positions. Activity Bus capacities must be adjusted for optional seating configurations.

SCHOOL BUS LETTERING (School Bus Only)

Sides - The words "North Carolina Public Schools" shall be on each side of body in letters 6 inches high. The county number assigned to bus shall be on each side of the bus in an approved place in numerals 6 inches high. The name of the county or school unit to which bus is assigned shall be placed below the words "North Carolina Public Schools" on each side in letters 3 inches high.

Front - On the roof panel of outer visor shall be the words "SCHOOL BUS" in letters not less than 8 inches high. County number assigned to bus shall be on front of body or chassis in an approved location in letters 6 inches high. "SCHOOL BUS" to be on retro-reflective high intensity material (Reflexite or 3M).

Rear - On the rear of the body "SCHOOL BUS" shall be in letters not less than 8 inches high. On or over the emergency door shall be the words "EMERGENCY DOOR" in letters 2 inches high. "SCHOOL BUS" to be on retro-reflective high intensity material (Reflexite or 3M). County number assigned to bus shall be on rear in an approved location in letters 6 inches high.

Activity Bus Lettering

Sides - The applicable school system name is to be on each side of the body in letters approximately 6 inches high; such to be designated on the purchase order or by the owner.

Front - On the roof panel of outer visor shall be the words "ACTIVITY BUS" in letters 8 inches high. County number assigned to bus shall be on front of body or chassis in an approved location in letters 6 inches high. "ACTIVITY BUS" to be in retro-reflective high intensity or equal material (Reflexite or 3M).

Rear - On the rear of the body, "ACTIVITY BUS" shall be in letters 8 inches high. On or over the emergency door, shall be the words "EMERGENCY DOOR" in letters 2 inches high. "ACTIVITY BUS" to be on retro-reflective high intensity material (Reflexite or 3M). County number assigned to bus shall be on rear in letters 6 inches high.

NOTE: Any particular bus number and/or color lettering will be designated on the purchase order or by the owner. Bus bodies to be painted standard one solid color with appropriate lettering from manufacturer's standard body color selections.

Body Options

AIR CONDITIONING – Air conditioning installation shall be optional. OEM must install if A/C option is selected. Air conditioning should be capable of reducing inside bus air temperature by 20 degrees F within a 20-minute time frame. Test results shall be provided by request. Air conditioning installations shall be of the free-blow type.

- 52,000 BTU minimum
One compressor
One condenser

Air Conditioning Warranty:

Air conditioning system shall be provided with a two-year/unlimited mileage warranty. Warranty is to commence on date the respective vehicle is placed in service by the State. DPI will notify bidder of such date. All parts (including related cleaners, fluids, filters etc.), labor, and environmental fees, to correct defects covered under warranty shall be the responsibility of the bidder. By execution of bid, bidder agrees that sample or specimen warranties which may be included with the bid are provided for informational purposes only and are NOT intended to take exception to the above warranty requirement.

POWER LIFT (when requested)

All lift-equipped buses shall be equipped with Braun NL917FIB or Ricon S5010 lift that meets all ADA regulations. All lift equipped vehicles provided under this contract must meet FMVSS 403 and FMVSS 404.

1. Lifting mechanism shall be able to lift minimum payload of 800 pounds and shall have been successfully tested by the manufacturer, to a minimum static load of 2400 pounds. Lift to be of the gravity down power-up type.
2. When the platform is in the fully up position, it shall be locked in position mechanically by means other than a support or lug in the door.
3. Controls shall be provided that enables the operator to easily open and close the lift door from inside the bus. The door control mechanism and handle shall be located adjacent to the lift door in a readily accessible location. The handle shall be padded. The lift mechanism must be operable from either inside or outside the bus. There shall be means of operating the lift in the event of power failure.
4. Power lifts shall be so equipped that they may be manually raised and lowered in the event of power failure of the power lift mechanism.

5. Lift travel shall allow the lift platform to rest securely on the ground.
6. All edges of the platform shall be designed to protect the wheelchair, wheelchair occupant's feet and operator's feet from being entangled during the raising and lowering process.
7. Platform (minimum size of 33 inches in width and 51 inches in length) shall be fitted on both sides and rear with full width shields (which extend above the floor line of the lift platform).
8. A restraining device shall be affixed to the outer edge (curb end) of the platform that fully extends to ground level.
9. A self-adjusting, skid-resistant plate (ramp) shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designated, may also suffice as the restraining device described in the above item. The lift platform must be skid resistant.
10. A circuit breaker or fuse shall be installed between the power source and lift motor.
11. The lift mechanism shall be equipped with adjustable limit switches or by-pass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position.
12. Extra lights shall be provided in the wheelchair area, over lift mechanism and exterior position (location to be approved upon inspection of pilot model). Doorways in which lifts are installed shall have, when a lift is to be used, illumination sufficient to light the entrance, and on the lift, when deployed at the vehicle floor level or at ground level.
13. All sharp edges in power lift area, including door, shall be properly padded.
14. All upholstery material used on seats in buses with lifts shall be of the type known as fire block and shall be blue in color.
15. All buses equipped with a wheelchair lift shall include shoulder belt reinforcement tubing above all passenger windows and between bow frames to allow for mounting of wheelchair occupant securing system shoulder belt anchor in the field (e.g. in a school parking lot, by bus drivers or attendants. Written instructions for mounting of shoulder belt anchorage shall be provided.
16. All school/activity buses equipped with a power lift shall provide a 30-inch aisle leading from any wheelchair/mobility aid position to at least one emergency door and the lift area.

17. Disability Identification Symbol – Buses with power lifts used for transporting individuals with disabilities.

Shall display below the window line the International Symbol of Accessibility.

Such emblems shall be white on blue background, shall be approximately six (6") inches in size, and shall be of high-intensity reflective material meeting U.S.

Department of Transportation's Federal Highway Administration (FHWA) FP-85

Standards. Location of symbols to be as follows: (1) on the rear center portion of the rear emergency door; (2) on the right and left lettering belt, adjacent to the entrance door; and (3) aft of the stop arm.

18. Support Equipment – Support equipment, not applicable to be housed in the under- skirt storage compartment shall require a securement system that would retain securement when a force of 20G's is applied in any direction.

Belt Cutter - A belt cutter shall be installed on all lift-equipped school buses (Tie-Tech).

Fire Blanket - Each lift-equipped school bus shall be equipped with Tietech Model # 1007 fire blanket.

It shall be a 62" x 80" wool blanket. Tietech Model # 1007 shall be enclosed in a non-metallic pouch. It shall be identified on the front as to the contents. The pouch shall be mounted on the left side interior wall in the buffer zone, behind the left rear seat as close to the rear entrance door opening as practical on a horizontal and vertical line no higher than the horizontal metal portion of the seat frame.



Power Lift Door - The door shall be located on the right side (when facing bus from the rear) of the bus. It shall have a minimum horizontal clearance of 42 inches and a minimum vertical clearance of 60 inches. Door shall be hinged on the forward side with an approved type of hinge and open outward meeting FMVSS 217 requirements. Door is to be designed to open and close from inside of the bus. Door release and opening and closing device to be approved upon inspection of pilot model. Latch must be of the same design as the rear emergency door latch. Lift door shall be metal, double wall, and shall be provided with suitable weather stripping to prevent leaks.

WHEELCHAIR ANCHORS AND OCCUPANT SECUREMENT SYSTEM

1. The Mobility Aid Securement and Occupancy Restraint System shall be designed, installed and operated to accommodate passengers in a forward facing orientation within the vehicle.
2. For each Mobility Aid Securement System provided, a Type 2, three-point occupant restraint system consisting of a lap (pelvic) belt and a shoulder (upper torso) belt complying with all applicable provisions of 49CFR, Part 571, shall be provided for use by mobility aid users.
3. The Occupant Restraint System shall be equipped with a single point, push-button "quick disconnect" for the lap belt and the lower end of the shoulder belt, to provide immediate release of the occupant in the event of an emergency evacuation.
4. The shoulder belt system shall provide a vertical height adjuster with 12 inches of vertical adjustment for proper placement of the shoulder belt.
5. The Mobility Aid Securement System shall utilize four adjustable Securement strap assemblies that attach to structural members of the mobility aid at four separate points: two strap assemblies for attachment to the front of the mobility aid, and two strap assemblies for attachment to the rear of the mobility aid.

6. Each front Securement strap assembly shall be capable of withstanding a minimum static load force of 5,000 pounds. Each rear Securement strap assembly shall be capable of withstanding a minimum static load force of 6,000 pounds.
7. The Mobility Aid Securement System shall utilize positive-locking anchorage and attachment hardware to prohibit accidental or inadvertent release of the system.
8. The Mobility Aid Securement Strap Assemblies shall be composed of a different size or color of material than the Occupant Restraint Belts to provide quick visual identification of the two systems and to distinguish the separate function.
9. Each of the individual securement straps and restraint belt assemblies shall be marked with the manufacturer's name, part number, month and year of manufacture.
10. The Mobile Aid Securement and Occupant Restraint System shall be subjected to, and successfully pass, a dynamic 30mph/20g force Impact Test per Society of Automotive Engineer's SAEJ2249 Wheelchair Tie down and Occupant Restraint Systems for use in Motor Vehicles document. The testing shall be performed by experienced personnel using an impact simulator and proven ability to provide reliable, accurate and repeatable.
11. A storage container shall be provided for each securement station to allow for clean storage of the system straps and belts when not in use. A separate space within the container shall also be provided to insert detailed operation instructions for use of the entire system.

Occupant Securement

All wheelchair positions shall be equipped with a "Type II" occupant protection and securement system meeting the requirement of FMVSS 209 and 210. The design of the securement system shall reference, as a standard, the Surelock or QStrait four point wheelchair anchorage part number FF612-4c-7 or -9 and the physical dimensions of an Everest & Jennings manual wheelchair, Model T8A200, to determine the seating reference point and the design angle of pull of the torso belt for passenger protection between the average size six (6) year old and fifty (50) percentile male. Adjustable attachment points of the overhead torso belt connectors shall be identified in some manner that a prudent operator would assure achieving the design angle of pull relative to the physical dimensions of the person being transported.

NOTE: All lift-equipped school/activity buses shall be equipped with securement for two (2) wheelchair positions.

ALTERNATE POWER LIFT SCHOOL / ACTIVITY BUS (Additional/requirements/specifications and/or modifications) Body Designed for Flat Floor Configuration - The floor shall be designed to provide a solid platform for the flat floor body configuration that allows the elimination of wheelhouse intrusion.

This floor design shall have been successfully crash tested to provide compliance with FMVSS. In addition, the floor shall be equipped with continuous aluminum button tracks (full length of floor, to include wheel chair securement and CSRS seats. Button style tracking shall be installed continuous length of bus above all windows for shoulder belt attachment. This will provide maximum flexibility in seating and wheelchair positions. Fully seat remainder of bus body with 39-inch seats and leave space for two wheel chair positions.

Note: Flat floor buses shall come equipped with Securement belts for two wheel chairs.

LED exterior lighting is optional

Crossover Mirrors Heated mirror is optional.

Exterior Rear View Mirrors - Heated remote control is optional.

Child Safety Restraint Systems Optional (CSRS) - Buses equipped with Integrated Child Restraint Seats that meet FMVSS 210, 213, 222, 225 and 302 (Fire Block Test). All CSRS attachment hardware and anchorage systems must meet FMVSS 210, Seat Belt Anchorage or FMVSS 225, Tether Anchorage and Child Restraint Anchorage Systems. (CE White Slim Line 39", IMMI Safeguard Model #ICS-39, or Collins Model Dura –Straint)

